Test Methods

for the Evaluation of Maintenance Chemicals for Textile Floor Coverings and Furnishing Fabrics

The WoolSafe Organisation,
Europe, Australia, USA, South East Asia

Index

Foreword

This standard has been prepared by The WoolSafe Organisation with additional contributions from *Cleaning Research International*, *the Woolmark Company* and *Wools of New Zealand*.

The WoolSafe Organisation is a certification body involved, among other things, in the testing and accreditation of carpet care products suitable for use on wool and synthetic fibre textile floor coverings; and the researching of appropriate cleaning methods.

Attention is drawn to the possibility that some of the elements of this Standard may be the subject of patent rights. The WoolSafe Organisation shall not be held responsible for identifying or infringing any or all such patent rights.

Introduction

This WoolSafe test protocol first established in 1991 describes the tests, performance requirements and standards used to evaluate and accredit the chemicals used for the cleaning and maintenance of textile floor coverings.

The test methods and the performance criteria for accepting or rejecting textile floor covering maintenance products as being suitable for cleaning, maintaining and protecting the different fibre carpets and rugs are based on accumulated performance data and on internationally used standards and tests. These test methods are constantly reviewed by The WoolSafe Organisation and, if necessary, updated in line with new developments in the cleaning industry.

1 Scope

This Standard contains the test methods required for the evaluation of cleaning chemicals suitable for the cleaning, treating or otherwise maintaining of textile floor coverings and forms part of the WoolSafe and CleanSeal carpet care products evaluation programme.

This Standard does not contain the evaluations for the Green WoolSafe Mark, which are published in WS 1002.

2 References and Sources of Information

Information contained in the following standards has been used to compile this standard:

ISO 105-A02: "*Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour".*

ISO 105-J01: *"Textiles — Tests for colour fastness — Part J01: General principles for measurement of surface colour".*

ISO 139: *"Textiles - Standard atmospheres for conditioning and testing".*

ISO 1957: *"Machine-made textile floor coverings - Sampling and cutting of specimens for physical tests".*

ISO 2424: *"Textile Floor Coverings – Vocabulary"*

ISO 3696, *"Water for analytical laboratory use - Specification and test methods".*

ISO 9405: *"Textile floor coverings — Assessment of changes in appearance*."

WS 1000: *"The Maintenance and Cleaning of Wool Floor Coverings"*

WS 1001: *"Protocol for the evaluation and accreditation of carpet cleaning chemicals for the WoolSafe Mark"*

CS 1011: *"Protocol for the Evaluation and Certification of Cleaning and Maintenance Formulations for the CleanSeal Mark"*

International, National or other Standards on which WoolSafe Test Methods are based

WoolSafe Test Method (CCP)	ISO Standard	National Standard	Other Standard or Test Method
1	ISO 1130; ISO1957	BS 4088 – Part 1.1	
2		BS 4088 – Part 1.1	
3		BS 4088 – Part 1.1	
4		BS 4088 – Part 1.1	
5	ISO 3071		
6		BS 4088 – Part 1.1	
6.1		BS 4088 – Part 1.1	
7			
8	ISO 11379	AATCC TM 171 BS 4088 – Part 1.2	Woolmark TM 233 A
9	ISO 11378 – Part 1 ISO 11378 – Part 2	BS 4088 – Part 1.1	Woolmark TM 267
10			
11	ISO 18168		Woolmark TM 233
12	ISO 5657		
13			
14	ISO 13750	AATCC TM 130	
15	ISO 13750	AATCC TM 175	Woolmark TM 282
16	ISO 11378 – Part 1 ISO 11378 – Part 2		Woolmark TM 267
17	ISO 14419	AATCC TM 118 AATCC TM 193	Woolmark TM 258
20			
21	ISO 105 – B01	AATCC TM 16.1	Woolmark TM 133
22			Woolmark TM 262

3 Definitions

For the purpose of this standard, the definitions given in ISO 2424 and WS 1000 apply.

WoolSafe Test Method CCP 1

SAMPLING AND PREPARATION OF THE TEST SAMPLE

1 SAMPLING

Take a representative sample of the product of not less than 1 l or 1 kg. Place the sample in a clean, dry, labelled bottle. Take care to ensure no contamination during sampling.

If the sample is to be taken from several containers, the following requirements shall be complied with:

(a) each container shall have homogeneous contents, prepared by agitation;

(b) the same proportion, by mass, shall be taken from each container;

(c) if the containers comprise a batch, the number of containers sampled shall be not lower than the cube root of the number of containers in the batch.

Note: It is preferable that any container should not have been opened previously.

2 PREPARATION OF THE TEST SAMPLE

2.1 Product as supplied

Agitate the sample to ensure it is homogeneous and carefully pour into a clean, dry, labelled glass bottle a portion of quantity sufficient for the series of tests planned. Stopper or seal to avoid contamination or evaporation during storage.

2.2 Product diluted to working strength

Agitate the sample to ensure it is homogeneous. Depending on the amount of test sample required, carefully pour the product into a clean, dry, labelled glass container and dilute to working strength in accordance with the manufacturer's instructions. Mix well. Stopper and seal to avoid contamination or evaporation during storage.

Do not store diluted product for a period longer than four weeks.

WoolSafe Test Method CCP 2

METHOD FOR THE DETECTION OF OXIDISING AGENTS

1 PRINCIPLE

Addition of potassium iodide to an acidified solution of the product and in the presence of any oxidising agent, liberation of iodine will give a yellow-brown colour or blue with the addition of starch solution.

2 REAGENTS

During the analysis use only reagents of a recognised analytical grade and distilled or de-ionised water.

2.1 Sulphuric acid solution, approximately 100 g/l.

2.2 Potassium iodide, solid.

2.3 Starch indicator solution, 10% (m/m), freshly prepared.

3 APPARATUS

Ordinary laboratory apparatus.

4 PROCEDURE

4.1 Test portion

Prepare a fresh solution of the cleaning chemical according to the manufacturer's instruction at maximum use concentration. Transfer 50ml of the test sample to a 100 ml beaker.

4.2 Determination

Acidify the sample with 1 ml ± 0.5 ml of the sulphuric acid solution (2.1). Add about 0.5 g of the potassium iodide (2.2) and shake the solution.

Note if any yellow or yellow-brown colour develops, indicating the presence of an oxidising agent.

If no colour develops, add four drops of the starch indicator solution (2.3) and note if any blue colour develops, indicating the presence of an oxidising agent.

5 EXPRESSION OF RESULTS

Record the presence or absence of oxidising agents.

WoolSafe Test Method CCP 3

METHOD FOR THE DETECTION OF REDUCING AGENTS

1 PRINCIPLE

Acidification of a solution of the product; heating of the solution and, in the presence of any reducing agent, de-colouring of potassium permanganate solution.

2 REAGENTS

During the analysis use only reagents of a recognised analytical grade and distilled or de-ionised water.

2.1 Sulphuric acid solution, approximately 100 g/l.

2.2 Potassium permanganate solution, 3 g/l.

3 APPARATUS

Ordinary laboratory apparatus and the following:

3.1 Boiling tube, 150 mm x 25 mm.

3.2 Heating bath, capable of being maintained at 100 ± 1°C.

3.3 Cork/polyethylene tube assembly (see figure 1), consisting of two corks, one a correct, easy fit for the mouth of the boiling tube, and the other a very easy sliding fit for the interior. Bore both corks to take a 3 mm internal diameter polyethylene tube, 150 mm long, which is split for 12 mm at the lower end. Position the corks on the tube so that when the upper (correct fit) cork is inserted in the mouth of the boiling tube, the lower end of the polyethylene tube is about 25 mm to 40 mm above the surface of the liquid.

Note: The lower (sliding fit) cork facilitates insertion of the tube without the latter touching the sides of the boiling tube.

3.4 Glass fibre filter paper, cut into triangular pieces, approximately 12 mm x 6 mm.

Note: Whatman grade 'GFA' has been found to be suitable.

4 PROCEDURE

4.1 Test portion

Remove the cork/polyethylene tube assembly (3.3) from the boiling tube (3.1). Transfer 10 ml of the test sample to the boiling tube.

4.2 Determination

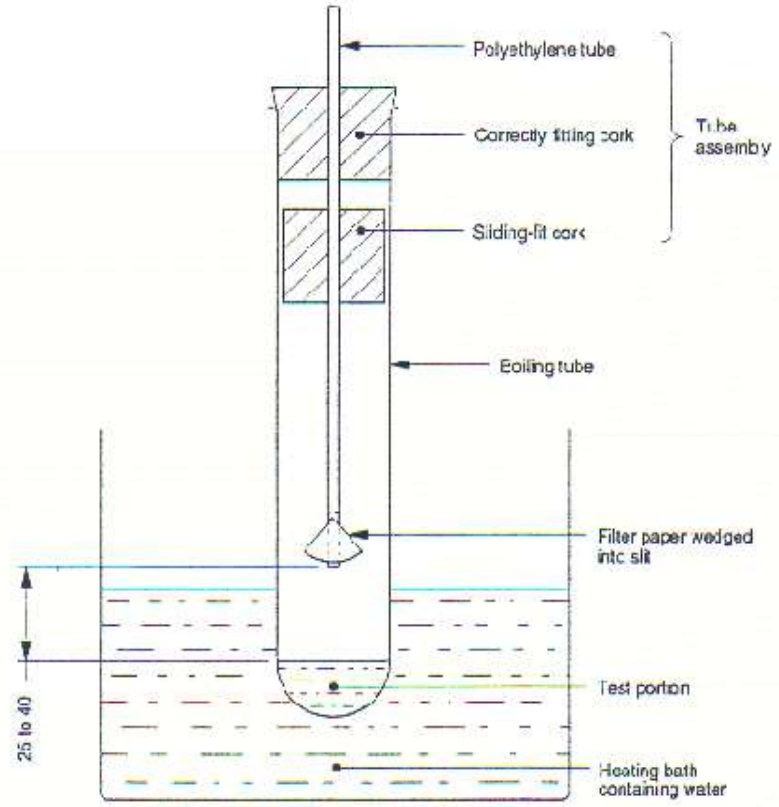
Add 4 ml of the sulphuric acid solution (2.1) to the test portion (4.1). Position a piece of the filter paper (3.4) in the fork end of the polyethylene tube, dip the paper into the potassium permanganate solution (2.2), fit the tube assembly into the boiling tube, then immerse it in the heating bath (3.2) maintained at 100 ± 1°C, and heat it for 5 minutes.

Note whether there is a complete loss of colour of the potassium permanganate, indicating the presence of reducing agents in the product.

Note: Formation of a brown colour is not to be regarded as loss of colour.

5 EXPRESSION OF RESULT

Record the presence or absence of reducing agents.



Dimensions are in millimetres

Figure 1: Location of apparatus and test portion for detection of reducing agents

WoolSafe Test Method CCP 4

METHODS FOR THE DETECTION OF ADDITIVES IN CARPET CLEANING PRODUCTS

1 FLUORESCENT BRIGHTENING AGENT

1.1 SCOPE

Carpet maintenance products may contain optical brightening agents, i.e. fluorescent colourless dyestuffs which have the ability to transform invisible ultra violet light into visible light. These products may affect he appearance of the carpet after cleaning and in the longer term the colour fastness of the cleaned carpet.

1.2 PRINCIPLE

Any fluorescent brightening agent present in the product under test is deposited on a textile floor covering under standard conditions. The treated test carpet is compared with untreated sample under an ultra violet light source. The degree of discernible fluorescence is noted

Two concentrations of solution are used, as the deposition of some fluorescent materials is adversely affected by high concentrations of detergents.

1.2 METHOD

Apply approximately 20 ml of the undiluted cleaning agent to a piece of undyed or light coloured cut or loop pile carpet, itself free of fluorescent brightening agents. View the still damp spot under ultraviolet light for fluorescent effect. Record the presence or absence of fluorescence in the cleaning agent. Repeat with a sample diluted to manufacturer's recommendations.

2 COLOUR

Note the hue and intensity of colour of the undiluted cleaning agent.

3 PERFUME

Make an olfactory examination of the undiluted cleaning agent and record the presence or absence of added fragrance or perfume to the agent.

This test may indicate the presence of solvents (e.g. iso-propanol, alkylglycol ethers etc).

Note: Do not confuse odours from perfume or solvent(s) with the characteristic smell of detergents.

4 OTHER ADDITIVES

Note any other additives present if so indicated by the manufacturer of the product.

WoolSafe Test Method CCP 5

DETERMINATION OF pH

1 PRINCIPLE

Dilution of the product to working strength followed by the electrometric determination of the pH at 20°C, determination likewise of the pH of the product as supplied.

2 REAGENTS

2.1 **General**
Use only reagents of recognised analytical grade and distilled or de-ionised water.

2.2 Three buffer solutions, of pH values 4, 7 and 10, to standardise the pH meter over the required range.

3 APPARATUS

Ordinary laboratory apparatus and the following:

3.1 pH meter, with glass and calomel electrode assembly, capable of discriminating to 0.05 units of pH.

Calibrate the pH meter using buffers which cover the pH range between 4 and 10. Clean the probe by thoroughly rinsing in water before and after each test until the indicated pH value changes by no more than 0.05 units in 5 mins. Carry out the calibration at the start of each session.

3.2 Beakers, tall-form, 100 ml capacity.

3.5 Thermometer, general purpose type, capable of indicating 20°C to an accuracy of ± 2°C.

4 PROCEDURE

4.1 Test portion
Prepare 1l of the test sample and maintain at 20 ± 2°C.

4.2 Determination
Decant about 50 ml of the test portion into a beaker (3.2) and maintain at 20 ± 2°C. Using the pH meter (3.1) with the electrode assembly at a depth of 1 cm, determine the pH value, with gentle stirring, as the steady value obtained furthest from a value of 7.

Note: This pH value is often referred to as the ‘extreme steady value’.

5 EXPRESSION OF RESULTS

Express the results to the nearest 0.1 pH unit. Report the pH of the test sample as follows:

pH of X at 20°C = Y

where

X is the product, as supplied or at working strength,
Y is the pH of the test portion, recorded to the nearest 0.1 pH unit.

WoolSafe Test Method CCP 6

DETERMINATION OF ALKALINITY

1 PRINCIPLE

Observation, using a pH meter, of the neutralisation of the product at working strength by titration with acid.

2 REAGENTS

2.1 General

During the analysis, use only reagents of recognised analytical grade and distilled or de-ionised water.

2.2 Titrant

Hydrochloric acid standard solution, c (HCl) = 0.10 mol/l. Make up from a concentrated volumetric solution by carefully following the manufacturer's instructions.

Alternatively, carefully dissolve into water 10.3 g (8.7 ml) of concentrated hydrochloric acid (35.9% HCl) in the 1litre one-mark volumetric flask (3.5) and make up to the mark. Standardise the acid solution with anhydrous sodium carbonate.

3 APPARATUS

Ordinary laboratory apparatus and the following:

3.1 Burette, 35 ml.

3.2 Beaker, 250 ml.

3.3 pH meter, as described in CCP5, clause 3.1.

3.4 Magnetic stirrer.

3.5 One-mark volumetric flask, 1litre.

4 PROCEDURE

4.1 Test solution

Prepare 1l of the test solution according to the manufacturer's recommendations for the highest concentration used in practice.

4.2 Determination

Into the beaker (3.2) place the stirrer (3.4), a 100 ml of the test solution (4.1) and the probe of the pH meter (3.3). Activate the stirrer and select a setting which just produces a vortex at the centre of the surface of the test solution. Record the initial pH value.

If the test solution pH≥7, slowly start adding hydrochloric acid standard titrant (2.2) from the burette (3.1) to the test solution. When the pH of the test solution reaches 7, record the volume of titrant used.

Continue adding Hydrochloric acid standard solution from the burette to the test solution. When the pH of the test solution reaches 5.5, record the volume of titrant used.

If the test solution pH<7, add hydrochloric acid standard titrant from the burette until the test solution pH reaches 5.5 and record the volume of titrant used.

5 EXPRESSION OF RESULTS

Record the alkalinity of the test sample, in mls Hydrochloric acid, at pH=7 and at pH=5.5.

WoolSafe Test Method CCP 6.1

DETERMINATION OF BUFFERING CAPACITY

1 PRINCIPLE

Observation, using a pH meter, of the neutralisation of the product at working strength by titration with acid or alkali.

2 REAGENTS

2.1 **General**

During the analysis use only reagents of recognised analytical grade and distilled or de-ionised water.

2.2 Titrant 1

Hydrochloric acid (HCl) standard solution: 0.10 mol/l. Make up from a concentrated volumetric solution by carefully following the manufacturer's instructions.

Alternatively, carefully dissolve into water 10.3 g (8.7 ml) of concentrated hydrochloric acid (35.9% HCl) in a 1litre one-mark volumetric flask (3.5) and make up to the mark. Standardise the acid solution with anhydrous sodium carbonate.

2.3 Titrant 2

Sodium hydroxide (caustic soda, NaOH) standard solution: 0.10 mol/l. Make up from a concentrated volumetric solution by carefully following the manufacturer's instructions.

Alternatively, carefully dissolve into water 4.0 g of sodium hydroxide pellets (or crystals) in a 1litre one-mark volumetric flask (3.5) and make up to the mark. Standardise the solution with hydrochloric acid of known concentration.

3 APPARATUS

Ordinary laboratory apparatus and the following:

3.1 Burette, 35 ml.

3.2 Beaker, 250 ml.

3.3 pH meter, as described in CCP5, clause 3.1.

3.4 Magnetic stirrer

3.5 One-mark volumetric flasks, 1litre.

4 PROCEDURE

4.1 Test portion

Prepare 1l of the test solution according to the manufacturer's recommendations for the highest concentration used in practice.

4.2 Determination

4.2.1 Titration with titrant 1 (HCl)

For products with a pH >10.

Into the beaker (3.2) place the stirrer (3.4), a 100 ml aliquot of the test sample (4.1) and the probe of the pH meter (3.3). Activate the stirrer and select a setting which just produces a vortex at the centre of the surface of the test portion. Record the initial pH value.

If the test solution pH≥10, slowly start adding hydrochloric acid standard titrant (2.2) from the burette (3.1) to the test solution. When the pH of the test solution reaches 10, record the volume of titrant used.

4.2.2 Titration with titrant 2 (NaOH)

For products with a pH <4.0.

Into the beaker (3.2) place the stirrer (3.4), a 100 ml aliquot of the test portion (4.1) and the probe of the pH meter (3.3). Activate the stirrer and select a setting which just produces a vortex at the centre of the surface of the test portion. Record the initial pH value.

If the test solution pH<4.0, slowly start adding sodium hydroxide standard titrant 2 (2.3) from the burette (3.1) to the test solution. When the pH of the test solution reaches 4, record the volume of titrant used.

5 EXPRESSION OF RESULTS

Record the buffering capacity in mls titrant 1 at pH=10 and in mls titrant 2 at pH=4.

WoolSafe Test Method CCP 7

DETERMINATION OF THE NON-VOLATILE COMPONENT OF CLEANING FORMULATIONS

1 SCOPE

These tests determine the percentage solids left after evaporation of the volatile part of cleaning agents.

2 LIQUID CLEANING PRODUCTS

2.1 APPARATUS

250 ml Soxhlet flasks
Electric heating mantles
Drying oven (105° ± 2°C)
Balance with an accuracy of at least 5 mg
Desiccator

2.2 TEST PROCEDURE

Take two clean Soxhlet flasks, dry in oven, and cool in desiccator until constant weight is obtained. Record the weight of each flask (A1, A2).

Place 10 ml of concentrated cleaning agents in each Soxhlet flask and weigh flask (B1, B2). Heat on the electric heating mantles until most volatile matter has evaporated. Complete drying in the oven until a constant weight is obtained. Cool flasks in desiccator and weigh (C1, C2). Calculate percentage solids as shown:

$$\frac{(C1 + C2) - (A1 + A2)}{(B1 + B2) - (A1 + A2)} \times 100\%$$

3 POWDER-BASED CLEANING COMPOUNDS

Take two clean glass beakers (approx.50 ml capacity), dry in an oven and cool in desiccator until constant weights are obtained. Record the weight of each beaker (A1, A2).

Weigh out 10 g of the cleaning compound in each beaker, and weigh the beakers (B1, B2).

Place the beakers with the compound in a drying oven (see 2.1) until a constant weight is obtained. Cool in a desiccator and weigh, record weights of both beakers (C1, C2).
Calculate percentage of non-volatile component as follows:

$$\frac{(C1 + C2) - (A1 + A2)}{(B1 + B2) - (A1 + A2)} \times 100\%$$

WoolSafe Test Method CCP 8

CLEANING PERFORMANCE TEST

1 PRINCIPLE

Specimens of pre-soiled textile floor covering are cleaned under laboratory conditions using the product to be tested, diluted to manufacturer's recommended working strength. The results of these tests are compared with the original pre-soiled textile floor covering using a colour measurement device.

2 APPARATUS

2.1 Standard Carpets

2.1.1 Tufted, cut pile, secondary backed carpet, made from scoured, undyed, 100% wool yarn. Surface pile weight: 700 ± 25 g/m^2; pile thickness: 6 ± 0.5 mm. Primary backing: woven polypropylene; secondary backing: jute.

2.1.2 Tufted, cut pile, secondary backed carpet, made from undyed, 100% nylon yarn. Surface pile weight: 950 ± 25 g/m^2; pile height: 8 ± 0.5 mm. Primary backing: woven polypropylene; secondary backing: jute.

2.2 Cleaning template (see 4.2 and figure 1)

2.3 Soft bristled brush

2.4 Trigger spray

2.5 Top pan balance

2.6 Colour measuring device (e.g. Minolta Chroma Meter CR-410)

2.7 Vacuum cleaner

3 REAGENTS

3.1 Distilled or deionised water

4 PREPARATIONS

4.1 Pre-soiled textile floor covering

Cut a circle of the standard carpet (2.1) and cut into 12 equal segments. Soil the 12 segments according to the test method described in CCP19 (ISO 11378 - Part 1).

Leave the 12 segments to "mature" for at least 14 days before using them for the cleaning tests.

***Note**:* If the segments are used before this time, the tests will be invalid as too much soil will be removed by cleaning.

4.2 Cleaning template

A suitable piece of unused textile floor covering measuring 400 mm x 500 mm, out of which an irregular central section has been cut (see figure 1) is firmly attached to a suitable flat base, ie a bench or table top, using an appropriate adhesive.

5 PROCEDURE FOR CLEANING WITH CARPET SHAMPOOS

5.1 Test portion

Prepare 2 litres of the product to be tested, diluted to working strength according to the manufacturer's instructions.

5.2 Shampooing

Select, measure and cut two pre-soiled textile floor covering specimens using the template as described in CCP19. Spray the solution under test evenly over the two specimens to be cleaned, at the rate of 1200 g/m^2 or 25 g per segment (surface area 0.021 m^2). Position these two specimens in the central space of the cleaning template (see 4.2 and figure 1). Gently clean the surface with the soft brush using 3 linear passes over each section. Repeat this action at right angles to the original direction. Align the pile in one direction by flattening evenly with the edge of a ruler. Allow the segments to dry thoroughly for two days.

Clean the two specimens using the vacuum cleaner, passing the suction head four times over each specimen, ie twice backwards and twice forwards using 50% overlap on each pass. Re-align the pile.

6 PROCEDURE FOR CLEANING WITH SPRAY EXTRACTION CLEANING CHEMICALS

Use the cleaning test method for textile floor coverings by the spray extraction technique CCP18 based on ISO 11379, with the following modifications:

Clause 3.2: use the cleaning template as described above (4.2)
Clause 4.0: use the textile floor covering size and shape as specified above (4.1).

7 PROCEDURE FOR CLEANING WITH 'DRY EXTRACTION' CLEANERS

Use the cleaning template as described under 4.2. Apply the manufacturer's recommended quantity of compound over the two soiled textile floor covering segments (total area 0.042 m^2). For instance: recommended application rate is 175 g of compound/m^2, apply 175 x 0.042 = 7.35 g to the soiled textile floor covering specimens. Brush the compound into the pile with a brush of medium stiffness for 30 seconds, covering the whole area of the two segments evenly and brushing both from left to right and from top to bottom. Leave to dry under atmospheric conditions for at least two hours, or until dry. ***Vacuum clean thoroughly***.

8 PROCEDURE FOR CLEANING WITH ENCAPSULATING AND CRYSTALLIZING CLEANERS

Use the cleaning template as described under 4.2. Spray the manufacturer's recommended quantity of the solution under test evenly over the two soiled test specimens. Brush the product into the pile with a brush of medium stiffness for 30 seconds, covering the whole area of the two segments evenly and brushing both from left to right and from top to bottom. Leave to dry under atmospheric conditions for two days.

Clean the two specimens using the vacuum cleaner, passing the suction head four times over each specimen, ie twice backwards and twice forwards using 50% overlap on each pass. Re-align the pile.

9 ASSESSMENT

Measure the colour difference between the cleaned and the original, pre-soiled, textile floor covering segments using the colour measurement device, and express the results as ΔL.

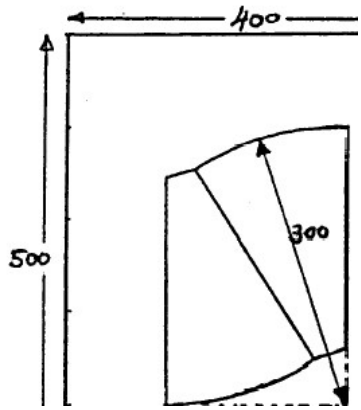


Figure 1. Cleaning template

WoolSafe Test Method CCP 9

DETERMINATION OF THE RE-SOILING PROPENSITY OF CARPET CLEANING PRODUCTS

1 PRINCIPLE

Specimens of textile floor covering are pre-cleaned with the cleaning product and soiled. The soiling level of the cleaned textile floor covering is compared with that of the original textile floor covering.

2 APPARATUS

2.1 Standard Carpet

2.1.1 Tufted, cut pile, secondary backed carpet, made from scoured, undyed, 100% wool yarn. Surface pile weight: 700 ± 25 g/m^2; pile thickness: 6 ± 0.5 mm. Primary backing: woven polypropylene; secondary backing: jute.

2.1.2 Tufted, cut pile, secondary backed carpet, made from undyed, 100% nylon yarn. Surface pile weight: 950 ± 25 g/m^2; pile height: 8 ± 0.5 mm. Primary backing: woven polypropylene; secondary backing: jute.

2.2 Carpet soiling machine

See CCP 19 (ISO 11378 – Part 1 “Textile floor coverings – Laboratory soiling tests – Part 1: Kappasoil test”).

2.3 Airless spraying device

This can be pressurised to 2 bar (30 psi) fitted with a suitable nozzle which produces a fan shaped spray pattern.

2.3 Colour measuring device

Minolta Chroma Meter CR-410 with a (21 ± 0.5) mm aperture, capable of measuring L* a* b* values according to the CIE and ΔE CIELAB[1], using standard illuminant C or D 65.

2.4 Vacuum cleaner

3 PROCEDURE FOR CARPET SHAMPOOS AND EXTRACTION CLEANERS

3.1 Test portion

Prepare 2 l of the cleaning product to be tested, diluted to manufacturer's recommended working strength.

3.2 Determination

Place two of the carpet segments on a suitable non-absorbent surface and apply the product evenly by spraying at the rate of 1000 g/m^2 (22.5 g per carpet segment). Dry the specimens at room temperature. Repeat this spraying and drying procedure. The combined treatment represents the add-on of product as would have been applied in four cleaning operations. Clean the specimens with the vacuum cleaner.

Carry out the soiling test on the cleaned carpet specimens and on an untreated specimen according to test method CCP 19.

Duplicate tests on treated and untreated specimens must be carried out.

[1] Commission Internationale d’Eclairage

4 PROCEDURE FOR CARPET CLEANING PRODUCTS IN POWDER, GEL OR SOLID FORM

Determination
Place two carpet segments on a suitable non-absorbent surface and apply the product under test using the manufacturer's recommended amount, application method and removal (i.e. rinse, vacuum, etc) procedure. Allow specimens to dry and repeat procedure of application, removal and drying. Clean the specimens with the vacuum cleaner and carry out the soiling test on both the cleaned specimens and an untreated specimen according to test method CCP 19.

5 PROCEDURE FOR ENCAPSULATING AND CRYSTALLIZING CLEANING AGENTS

Determination
Treat the sample with the product under investigation according to the manufacturer's instructions for cleaning. Let it dry completely, clean the specimens with the vacuum cleaner. Repeat the procedure finishing with vacuum cleaning. Carry out the soiling test on both the treated specimens and on an untreated specimen, according to test method CCP 19.

6 PROCEDURE FOR OTHER CARPET MAINTENANCE PRODUCTS

Spot Removers
Treat the sample as for spot removal, following the manufacturer's instructions (i.e. spray or dab on the product, absorb it with clean tissue and rinse if specified). Let it dry completely and repeat the procedure. Clean the specimens with the vacuum cleaner and carry out the soiling test on both the cleaned specimens and an untreated specimen according to test method CCP 19.

Traffic Lane Cleaners/Pre-Spotters
Spray lightly, than extract with clean water or as instructed by the manufacturer. Let it dry completely and repeat the procedure. Clean the specimens with the vacuum cleaner and carry out the soiling test on both the cleaned specimens and an untreated specimen according to test method CCP 19.

Deodorisers, Acid Rinses/Neutralisers…
Treat the sample with the product under investigation according to the manufacturer's instructions. Clean the specimens with the vacuum cleaner and carry out the soiling test on both the treated specimens and an untreated specimen according to test method CCP 19.

7 ASSESSMENT

Compare the soiling test results expressed in ΔL values of the treated and untreated (original) specimens. Determine whether the re-soiling level of the treated specimen is acceptable or not.

WoolSafe Test Method CCP 10

EVAPORATION RESIDUE AND DUST ADHESION - PLATE TESTS

1 EVAPORATION RESIDUE - PLATE TEST

1.1 Dilute the agent as recommended by the manufacturer. Products that are supplied as a ready-to-use solution are not diluted.

1.2 Pour 20 ml in a level, clean, glass Petri dish, 76 mm (3 inch) diameter.

1.3 Evaporate to almost dryness in an oven at 75 – 80°C.

1.4 Remove from oven and leave to evaporate further in a conditioned atmosphere (20 ± 2°C, 65 ± 2% RH) until the Petri dish has acquired constant weight.

1.5 Observe the quality of the cleaning agent residue and qualify its characteristics as follows:

Physical Characteristics	Rating
Crystalline or powdery residue	+++
Dry, waxy residue	++
Soft, waxy residue	+
Very soft, sticky, “greasy” residue, or liquid	0

2 DUST ADHESION - PLATE TEST

2.1 Prepare the evaporation residue as described under 1. above.

2.2 Deposit 1.0 g of standard dirt (see ISO 11378 - Part 1) on the surface of the evaporation residue and shake the Petri dish gently from side to side to distribute the dirt over the surface of the residue. Invert the dish and gently tap the bottom to dislodge dirt not attached to the residue. Place the dish on a white sheet of paper, observe the amount of dirt adhering to the residue, and qualify as follows:

Dust Adhesion	Rating
Negligible	+++
↓	++
	+
Maximum	0

WoolSafe Test Method CCP 11

COLOUR FASTNESS TEST

1 PRINCIPLE

Immersion at 37°C, under pressure, of specimens of standard dyed wool or nylon carpet in contact with undyed adjacent fabrics in the product at working strength and in water. Separation and drying of the material and assessment of staining and colour changes using a colour measurement device.

2. WATER

Distilled or deionised water, freshly prepared and maintained at 37 ± 2°C.

3 SPECIMENS

3.1 Two carpet pieces (wool or nylon), or corresponding yarn[1], each dyed with an 8% (m/m) solution of C.I. Acid Red 213.

3.2 Two sets of undyed fabric[2] patterns of wool and cotton (WoolSafe Test Protocol) or nylon and wool (CleanSeal Test Protocol), each 5 cm x 4 cm, sufficient in number to make the composite specimens for the test and provide blanks for colour measurement comparisons (see 7).

3.3.a Composite specimens for test using carpet: cut out 4 cm x 10 cm length of each of the dyed carpet pieces (3.1). Cover fully with both of the undyed fabric patterns (3.2), each measuring 5 cm x 4 cm, arranged side by side.

3.3.b Composite specimens for test using yarn: using a white plastic card (about 8.5 cm x 5.5 cm) wind the yarn (3.1) around it lengthways in a single layer but snuggly fitting, completely covering an area 8.5 cm x 4.0 cm. Trap the ends securely into two slits on the card. Cover fully with both of the undyed fabric patterns (3.2), each measuring 4 cm x 4 cm, arranged side by side.

4 APPARATUS

Ordinary laboratory apparatus and the following:

4.1 Two flat-bottomed dishes, 10 cm x 15 cm x 5 cm deep, maintained at 37 ± 2°C.

4.2 Two smooth glass or plastic plates, 11.5 cm x 6 cm x 0.3 mm thick, maintained at 37 ± 2°C.

4.3 Two weights, about 5 kg each, maintained at 37 ± 2°C before use.

4.4 Oven, capable of being maintained at 37 ± 2°C.

4.5 Colour measurement device, calibrated and capable of measuring changes in colour in accordance with the CIELAB[3] system 1976. (e.g. Minolta Chroma Meter CR-410)

5 PROCEDURE

5.1 Test Portion

Prepare 2 litres of the test sample maintained at 37 ± 2°C before use.

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[1] Obtainable from The WoolSafe Organisation

[2] Obtainable from The Society of Dyers & Colourists, PO Box 244, Bradford, BD1 2JB, Great Britain

[3] Commission Internationale d'Eclairage

5.2 Determination

5.2.1 Place one of the composite specimens (3.3) in each one of the correspondingly marked flat-bottomed dishes (4.1) and pour over the specimens a quantity of the test portion (5.1) sufficient to give a liquid to material ratio of 10:1, by volume. Ensure that the specimens are thoroughly wetted by the product and lie flat.

Note: Wetting of undyed fabrics can be facilitated by working the cloth with the flattened end of a glass rod whilst it is immersed in the solution.

Cover the specimens with the glass plates (4.2), press with fingers to remove air bubbles and place the weights (4.3) on top of the plates. Stand the dishes and contents in the oven (4.4), maintained at 37 ± 2°C, for 15 mins. Remove the weight, pour off the product without removing the plates, replace the weights, and stand it in the oven for a further period of 1.5 h at 37 ± 2°C.

Remove the weights and glass plates, open out the composite specimens and allow the carpet pieces and the undyed fabrics to dry on a clean, non-absorbent surface, at a temperature between 15°C and 60°C.

6 VALIDATION OF RESULTS

Treat as invalid any procedure which gives rise to blotchy or irregular staining in that area of the fabric to be measured (see 7). If valid results are not obtained, repeat the procedure (5) using new specimens (3).

Note: This validation procedure is expected to ensure that the area of fabric measured is representative of the general degree of staining observed.

7 MEASUREMENT

Fold, once, each pattern of stained fabric (see 5.2) and a blank pattern of unstained fabric (3.2) and measure the difference in colour between the fabrics and the blank, operating the colour measurement device (4.5) in accordance with the instrument manufacturer's instructions.

Note: Folding of the fabric serves to reduce background interference in the colour measurement.

Calculate the colour difference (in ΔE), due to colour bleeding, for both dyed carpet pieces or yarns.

8 EXPRESSION OF RESULTS

Record the colour differences, in ΔE, expressed to one decimal place.

WoolSafe Test Method CCP 12

FLAMMABILITY TEST FOR CARPET CLEANING AND SPOT REMOVAL PRODUCTS

1 PRINCIPLE

The cleaning product, in the form of a blanket of foam or a layer of cleaning powder, or applied to the surface of a piece of wool or nylon carpet, is exposed to a live flame.

2 APPARATUS

2.1 Fume cupboard suitable for flammability tests.

2.2 Flat bottomed stainless steel container, with internal dimensions 350 mm long, 25 mm wide and 12.5 mm deep, with welded joints and outside edges marked at 50 mm interval.

2.3 Burner tube, consisting of a length of stainless steel tube (8.0 ± 0.1 mm outside diameter, 6.5 ± 0.1 mm inside diameter and 200 ± 5 mm in length), connected by flexible tubing to a cylinder containing butane via a flowmeter, fine control valve, on-off valve (optional) and cylinder regulator, providing an outlet pressure of 27.5 m bar (2750 Pa). The flowmeter shall be calibrated to supply a butane gas flow rate at 25ºC of 45 ± 2 ml/min. When lit the flame height under these conditions is approximately 35 mm.

2.4 Standard wool or nylon carpets (see CCP 8, clause 2.1)

2.5 Pipette, 2 ml capacity

2.6 Water bath, maintained at 25ºC ± 1ºC

2.7 Steel straight-edged ruler

3 PROCEDURE

Different cleaning products are tested in different ways, but in a manner which approximates as closely as practicable the way they are used in practice.

3.1 Aerosol foam shampoos, pre-sprays, spot removal products, etc.

3.1.1 Select a full aerosol can and allow to reach equilibrium temperature by immersion in the water bath for at least 45 minutes.

3.1.2 Light the butane emerging from the burner tube, adjust the gas flow to the specified rate (2.3) and allow the flame to stabilise for at least 2 mins. Shake aerosol can for 15 seconds and deposit a blanket of foam at least 20 mm thick into the metal container, avoiding the inclusion of air pockets. Quickly draw the ruler across the top of the trough to level the foam surface.

Note: Do not expose aerosol cans, or containers holding powders or liquids to a naked flame, or spray foam or liquid into a naked flame.

3.1.3 Within 5 seconds, apply the flame of the burner tube to the surface of the foam 10 mm from one end of the trough for 20 ± 1 seconds and note whether or not the foam ignites and/or supports burning. Note also any movement of the flame along the length of the trough. If the foam continues to burn, record burning time.

3.1.4 Repeat this procedure 5 times.

3.2 Impregnated powder formulations

Sprinkle a uniform layer of the powder, at least 5 mm thick, into the metal container. Proceed as in clause 3.1.3.

3.3 Liquid[1] or dissolved products

3.3.1 Apply 2 ml of the product in liquid form to a small area, typically 10 to 15 mm diameter, of a piece of standard carpet (100 mm by 100 mm). Light the burner tube as given in clause 3.1.2 and apply the flame to the spot on the carpet where the liquid has been applied for 20 ± 1 seconds and note whether the carpet ignites and/or supports burning.

3.3.2 Repeat above procedure 5 times.

Note: Do not expose aerosol cans, or containers holding powders or liquids, to a naked flame, or spray foam or liquid into a naked flame.

4 EXPRESSION OF RESULTS

4.1 Aerosol foam-type and powder products

4.1.1 Record the flame propagation, i.e. the distance the flame travelled along the trough in mm.

4.1.2 Record whether the flame is transient (i.e. goes out at the end of its travel) or is self-sustaining (i.e. continues to burn).

4.1.3 Record the burning time after the pilot flame has been removed.

4.2 Liquid or dissolved products

4.2.1 Record the burning time after the pilot flame has been removed.

[1] This includes liquid products dispensed from aerosol type or trigger-spray containers

WoolSafe Test Method CCP 13

OIL WICKING TEST FOR TEXTILE FLOOR COVERINGS

1 PRINCIPLE

By allowing a coloured oil to wick up a carpet pile, determine the presence of a fluorochemical finish.

2 REAGENT

Colourless mineral oil (Nujol, liquid paraffin), coloured to a medium blue with a suitable blue oil (or solvent) soluble dyestuff (e.g. Waxoline Blue, Zeneca).

3 APPARATUS

Petri dishes (glass or polythene)
Scissors or knife.

4 PROCEDURE

Fill the Petri dish with the blue-coloured oil to a depth equivalent to the thickness of the backing of the carpet specimen under test plus 2 mm.

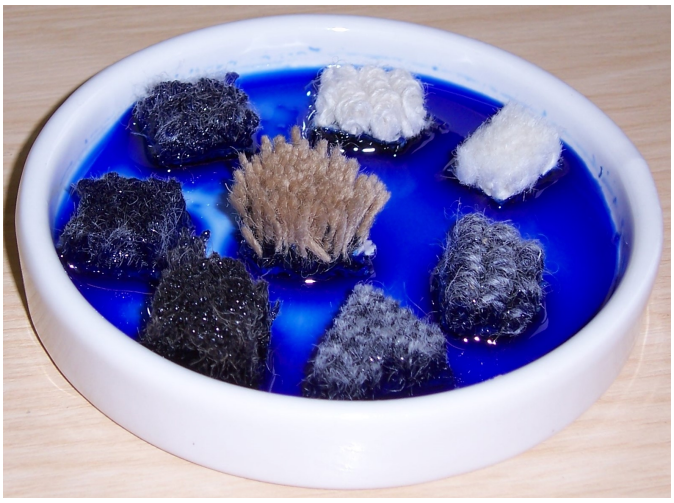
Cut a small square of the specimen - approximately 15 x 15 mm - and place it, backing down, in the Petri dish. The oil should cover the backing and approximately 2 mm of the roots of the carpet pile.

Wait 10 minutes to allow the oil to saturate the backing and the roots of the tufts.

If the tufts, or part of the tufts, are treated with a compound (e.g. a fluorochemical) which is oil repellent, that part of the tuft which is treated will <u>not</u> stain with the blue oil. Any tuft, or part of a tuft, that is not treated will stain a blue colour.

5 ASSESSMENT

Visually assess the degree of staining of the carpet tufts and report whether or not tufts are stained, whether they are partly stained or whether there is a mixture of stained and unstained tufts.



WoolSafe Test Method CCP 14

METHOD OF ASSESSING THE EFFICIENCY OF SPOT REMOVAL PRODUCTS

1 PURPOSE AND SCOPE

This test assesses the efficiency of spot (or stain) removal products in removing spots from wool or nylon carpets.

2 PRINCIPLE

A 'standard' carpet is spotted with a range of staining agents, and after pre-determined periods of time the stains are treated with the spot removal product under test, and the efficiency of the removal is assessed.

3 APPARATUS

Normal laboratory equipment and the following:

3.1 Stain Applicator

A stainless steel cylinder, 60 mm long, with an internal diameter of 55 mm, and with steel mesh (mesh size: 24 openings/cm) covering one end.

3.2 Standard Carpet

3.2.1 Tufted, cut pile, secondary backed carpet, made from scoured, undyed, 100% wool yarn. Surface pile weight: 700 ± 25 g/m^2; pile thickness: 6 ± 0.5 mm. Primary backing: woven polypropylene; secondary backing: jute.

3.2.2 Tufted, cut pile, secondary backed carpet, made from undyed, 100% nylon yarn. Surface pile weight: 950 ± 25 g/m^2; pile height: 8 ± 0.5 mm. Primary backing: woven polypropylene; secondary backing: jute.

3.3 Colour Measurement Equipment

Capable of measuring L* a* b* values according to the CIE and ΔE_{CIELAB} using standard illuminant C or D 65.

3.4 White Tissue Paper

3.5 Small Sponge or White Cotton Cloth

3.6 Weights of 500 g mass

Five weights are usually required.

4 REAGENTS

4.1 Staining Agents

The following agents are required (see also Notes):

4.1.1 Coffee: Nescafe Granules instant coffee, made up to a 2% solution in hot water (50°C).

4.1.2 Standard Red Stain

CI Food Red 17 (FD & C Fed 40): 0.08 g/l, citric acid: 0.4 g/l, non-ionic wetting agent: 0.01 g/l.

4.1.3 Orange Cordial (e.g. Lucozade or Fanta) (colour description of stain: 65.0 ≤ L* ≤ 67.0, 18.8 ≤ a* ≤ 19.3, 35.0 ≤ b* ≤ 36.0.

4.1.4 Black Shoe Polish

4.1.5 Red Lipstick (colour description 57.0 ≤ L* ≤ 59.0, 21.0 ≤ a* ≤ 22.0, 8.8 ≤ b* ≤ 9.2)

4.2 De-ionised Water

5 PROCEDURE

5.1 On samples of the standard carpet (3.2), measuring 90 x 90 mm, standardised amounts of the various staining agents (4.1) are applied, one on each sample.

To apply the liquid stains (4.1.1, 4.1.2, 4.1.3) place the stain applicator (3.1) on the centre of the specimen, with the wire mesh in contact with the pile surface. Pour 10 ml of the staining solution quickly into the centre of the stain applicator. Hit the top of the applicator firmly with the flat of the inside of the hand. (This creates air pressure inside the applicator and forces the staining solution evenly into the carpet pile.)

Apply the solid staining substances (4.1.4, 4.1.5) to the surface of the standard carpet, covering a circular area with a diameter of 55 mm with a thin but uniform layer of substance.

5.2 If the manufacturer of the product under evaluation has supplied specific instructions or recommendations regarding the application of the product, proceed according to Clauses 5.3 and 5.4

If no adequate instructions are available from the manufacturer of the product under evaluation, proceed according to Clauses 5.6 and 5.7.

5.3 Leave one set of stains for 5 minutes. Subject the water-borne stains (coffee, standard red stain and orange cordial) and/or the grease-borne stains (shoe polish and lipstick) to the stain removal procedures specified by the manufacturer of the product under test. If these instructions specify repeated applications of the product, e.g. to remove stubborn stains, the above procedure must be repeated in line with the manufacturer's instructions.

5.4 Repeat the procedure described under 5.3, but leave the stains for 24 hours prior to commencing the stain removal procedures.

5.5 Repeat the procedure described under 5.3 and 5.4 using the procedure described under Clauses 5.6 and 5.7.

5.6 Leave one set of stains for 5 minutes. Depending on the type of stain removal product, ie whether the product is a general or multi-purpose remover, apply the product to the water-borne stains (4.1.1, 4.1.2, 4.1.3) and/or the grease-borne stains (4.1.4, 4.1.5).

5.6.1 Subject the water-borne stains to the following stain removal procedure: blot with white tissue paper (3.4) until no more staining material is removed from the carpet to the tissue paper. Apply small amounts of the spot removal product, in concentrated form, or diluted according to the manufacturer's instructions, by means of the sponge (3.5) or tissue paper (3.4), to the stains, working from the edge of the stains inwards towards the centre. Do not overwet the stains. Continue until no more staining material is removed from the carpet. Cover the stains with wads of tissue paper (3.4), weighed down with the weights (3.6) (one weight for each stain) for at least 24 hours to absorb any loose remaining staining substance from the carpet. Remove the weights and the tissues and brush the carpet pile in the direction of the natural pile lay.

5.6.2 Subject the grease-borne stains to the following stain removal procedure:

Apply small amounts of the spot removal product, in concentrated form, or diluted according to the manufacturer's instructions, to the stains by means of the sponge (3.5) or tissue paper (3.4), working from the edges of the stains inwards towards the centre. Do not over-wet the stains. Continue until no more staining materials are removed from the carpet.

Cover the stains with wads of clean tissue paper, weighed down with the weights (one weight for each stain) for at least 24 hours to absorb any remaining staining substance from the carpet. Remove the weights and the tissues and brush the carpet pile in the direction of the natural pile lay.

5.7 Repeat the procedure described under 5.6, but leave the stains for 24 hours prior to commencing the stain removal procedure.

5.8 Repeat procedures 5.3, 5.4 and 5.6 and 5.7 again to give two sets of results for each test.

6 ASSESSMENT

Calculate the percentage stain removal for each stain as follows:

$$100 - \left\{ \frac{\Delta E \text{ (remaining stain)}}{\Delta E \text{ (original stain) (*)}} \right\} \times 100\%$$

(*) original stain: reference stains are applied (see 5.1) to untreated standard carpet and left for 48 hours.

6.1 Where stains are removed using both the manufacturer's recommended procedure (5.3 and 5.4) ***and*** the standard procedure (5.6 and 5.7), both sets of results shall be reported. The procedure giving the best overall results shall be used for the final assessment of the product, and reported as such.

NOTES

1. The choice of staining agents is governed by the frequency with which certain stains give problems (complaints) in practice and by practical considerations regarding the execution of this test method. The staining agents listed in this test method may be changed in future if these conditions change.

2. Problem stains may be different between countries or parts of the world, and the choice of spotting agent to evaluate a product from a particular part of the world may reflect this.

3. Where a spot removal product claims efficiency against (a) particular type(s) of stain(s), the choice of staining agent(s) used in the test will be adjusted accordingly.

WoolSafe Test Method CCP 15

ASSESSMENT OF THE STAINING PROPENSITY OF TEXTILE FLOOR COVERINGS TREATED WITH STAIN RESISTANT FINISHES

1 SCOPE

This test assesses the resistance to staining of textile floor coverings which have been treated with stain resistant finishes.

2 PRINCIPLE

Measured quantities of standard staining substances are placed on the surface of carpets treated with the stain resistant finish under test. The staining substances are left for given lengths of time, and then they are subjected to standard stain removal treatments. The various degrees of staining are assessed by measuring the colour differences between the stained and unstained parts of the carpets.

3 APPARATUS

3.1 Standard Carpet

3.1.1 Tufted, cut pile, secondary backed carpet, made from scoured, undyed, 100% wool yarn. Surface pile weight: 700 ± 25 g/m^2; pile thickness: 6 ± 0.5 mm. Primary backing: woven polypropylene; secondary backing: jute.

3.1.2 Tufted, cut pile, secondary backed carpet, made from undyed, 100% nylon yarn. Surface pile weight: 950 ± 25 g/m^2; pile height: 8 ± 0.5 mm. Primary backing: woven polypropylene; secondary backing: jute.

3.2 Colour Measurement Equipment

Minolta Chroma Meter CR-410 with a (21 ± 0.5) mm aperture, capable of measuring L* a* b* values according to the CIE and ΔE CIELAB, using standard illuminant C or D 65.

3.4 White Tissue Paper

3.5 Weights of 500 g mass

Five weights are usually required.

3.6 Spray Extraction Type Carpet Cleaning Machine

Fitted with 100 ± 5 mm wide upholstery wand, which delivery 900 ± 100 ml water per minute, and has a 900 ± 200 Watt suction motor with 1.9 ± 0.1 bar suction capacity.

3.7 Laboratory Equipment

Usual laboratory glass wear, including a measuring cylinder, capable of measuring a maximum of 25 ml of liquid.

4 REAGENTS

4.1 Staining Agents

The following agents are required (see also Notes):

4.1.1 Coffee: Nescafé Granules instant coffee, made up to a 2% solution in hot water (50ºC).

4.1.2 Standard red stain: CI Food Red 17 (FD & C Red 40): 0.08 g/l, citric acid: 0.4 g/l, non-ionic wetting agent: 0.01 g/l.

4.1.3 Orange cordial (e.g. Lucozade).

4.1.4 Black shoe polish.

4.1.5 Red lipstick.

4.2 De-ionised water.

4.3 Dichloromethane.

5 CONDITIONING AND TESTING ATMOSPHERE

5.1 The standard atmosphere for conditioning and testing is:

Relative humidity:	65 ± 2%
Temperature:	20 ± 2ºC

6 TREATED CARPETS

6.1 The minimum size of treated carpet for testing is 200 x 300 mm.

6.2 Treated carpets must be conditioned in the standard atmosphere (see 5.1) for at least 24 hours prior to testing.

7 PROCEDURE

7.1 Lay the specimen (6.1) to be tested on a cleaned, smooth, flat, horizontal and non-absorbent surface, with pile uppermost. The various staining agents (4.1) are applied in duplicates.

To apply the liquid stains (4.1.1, 4.1.2 and 4.1.3), place the stain applicator (3.1) on the centre of the specimen, with the wire mesh in contact with the pile surface. Pour 10 ml of the staining solution quickly into the centre of the stain applicator. Hit the top of the stain applicator firmly with the flat of the inside of the hand. This creates air pressure inside the stain applicator and forces the staining solution evenly into the carpet pile. Remove the stain applicator.

Apply the solid staining substances (4.1.4, 4.1.5) to the surface of the standard carpet, covering a circular area with a diameter of 55 mm with a thin but uniform layer of substance.

7.2 Leave the stains to develop for 30 minutes. Attempt to remove the liquid stains by cleaning using clean, cold, tap water, and the method described in ISO 13750 “Textile floor coverings – Laboratory staining tests”.

Attempt to remove the solid stains by applying small amounts of dichloromethane (4.3) by means of tissue paper (3.4) in a blotting motion to the stains, working from the edges of the stains inwards towards the centres. Continue until no more staining materials are removed. Cover the stains with wads of clean tissue paper, weighed down with the weights (one weight for each stain) (3.5) for at least 24 hours. Remove the weights and tissues and brush the carpet pile in the direction of the natural pile lay.

7.3 Repeat the procedure described under 7.2, but leave the stains to develop for 24 hours.

8 ASSESSMENT

Using the colour difference meter (3.3), measure the colour difference between the original, unstained, specimen and the stained specimen, ensuring that the measuring head of the colour difference meter only reads the stained part of the specimen. Calculate the difference in reflectance (ΔE) and record this data.

Calculate the percentage stain removal for each stain as follows:

$$100 - \left[\frac{\Delta E \text{ (remaining stain)}}{\Delta E \text{ (original stain)*}} \right] \text{x } 100\%$$

* original stain: reference stains are applied (see 7.1) to untreated carpet and the liquid stains (4.1.1, 4.1.2, and 4.1.3) extracted with water only, using the spray extraction cleaning machine (3.6), and left to dry. The solid stains (4.1.4, 4.1.5) are cleaned the same way as above.

Notes:

1. The choice of staining agents is governed by the frequency with which certain stains give problems (complaints) in practice and by practical considerations regarding the execution of this test method. The staining agents listed in this test method may be changed in future if these conditions change.

2. Problem stains may be different between countries or parts of the world, and the choice of staining agent to evaluate a product from a particular part of the world may reflect this.

3. Where a stain removal product claims efficiency against (a) particular type(s) of stain(s), the choice of staining agent(s) used in the test will be adjusted accordingly.

WoolSafe Test Method CCP 16

ASSESSMENT OF THE SOILING PROPENSITY OF TEXTILE FLOOR COVERINGS TREATED WITH SOIL RESISTANT FINISHES

1 SCOPE

This test assesses the resistance to soiling of textile floor coverings which have been treated with soil resistant finishes.

2 PRINCIPLE

Specimens of textile floor covering are treated with the soil resistant product under test according to the manufacturer's instructions; and soiled according to CCP19. The soiling level of the treated textile floor covering is compared with that of the original textile floor covering.

3 APPARATUS

3.1 Standard Carpet

3.1.1 Tufted, cut pile, secondary backed carpet, made from scoured, undyed, 100% wool yarn. Surface pile weight: 700 ± 25 g/m^2; pile thickness: 6 ± 0.5 mm. Primary backing: woven polypropylene; secondary backing: jute.

3.1.2 Tufted, cut pile, secondary backed carpet, made from undyed, 100% nylon yarn. Surface pile weight: 950 ± 25 g/m^2; pile height: 8 ± 0.5 mm. Primary backing: woven polypropylene; secondary backing: jute.

3.2 Carpet soiling machine

See CCP 19 (ISO 11378 – Part 1 “Textile floor coverings – Laboratory soiling tests – Part 1: Kappasoil test”).

3.4 Colour measuring device

Minolta Chroma Meter CR-410 with a (21 ± 0.5) mm aperture, capable of measuring L* a* b* values according to the CIE and ΔE CIELAB, using standard illuminant C or D 65.

3.5 Vacuum cleaner

4 CONDITIONING AND TESTING ATMOSPHERE

4.1 The standard atmosphere for conditioning and testing is:

Relative humidity:	65 ± 2%
Temperature:	20 ± 2ºC

Treated carpets must be conditioned in the standard atmosphere for at least 24 hours prior to testing.

5 PROCEDURE

Carry out the soiling test on the treated carpet specimens and on an untreated specimen according to test method CCP 19. Clean the specimens with the vacuum cleaner.

6 ASSESSMENT

Compare the soiling test results expressed in ΔL values of the treated and untreated (original) specimens. Determine whether the level of protection against soiling is acceptable or not.

WoolSafe Test Method CCP 17

METHOD FOR ASSESSING THE OIL AND WATER REPELLENCY OF TEXTILE FLOOR COVERINGS

1 SCOPE

This test method assesses the oil and water repellency properties of textile floor coverings. Its is particularly applicable to those floor coverings which have been treated with an anti-stain or anti-soil finish.

2 PRINCIPLE

The oil and water repellency is assessed after drops of various 'standard' liquids are placed on the surface of the textile floor covering. The result depends on the extent to which the drops soak into the floor covering.

3 APPARATUS/REAGENTS

16 dropper bottles – 8 for oil repellency, 8 for water repellency.

3.1 Oil repellency

The test solution consists of 8 oils with different surface tensions:

Oil repellency rating number	Composition	Surface tension (dynes/cm)
1	White mineral oil (Nujol)	32.8
2	65/35 (v/v) Nujol/n.hexadecane	29.5
3	n-hexadecane	27.7
4	n-tetradecane	26.5
5	n-dodecane	25.4
6	n-decane	23.9
7	n-octane	21.7
8	n-heptane	20.0

3.2 Water repellency

The test solution consists of 8 (distilled) water/propan-2-ol (isopropanol or isopropyl alcohol) mixtures:

Water repellency rating number	Composition
0	100% water
1	90/10 v/v water/propan-2-ol
2	80/20 v/v water/propan-2-ol
3	70/30 v/v water/propan-2-ol
4	60/40 v/v water/propan-2-ol
5	50/50 v/v water/propan-2-ol
6	40/60 v/v water/propan-2-ol
7	30/70 v/v water/propan-2-ol
8	20/80 v/v water/propan-2-ol

3.3 Safety precautions

Propan-2-ol is volatile and flammable. Keep away from heat, sparks and open flame. Use only with adequate ventilation. Keep test liquids tightly capped at all time.

4 CONDITIONING AND TESTING ATMOSPHERE

4.1 The standard atmosphere for conditioning and testing is:

Relative humidity:	65 ± 2%
Temperature:	20 ± 2ºC

Treated carpets must be conditioned in the standard atmosphere for at least 24 hours prior to testing.

5 TEST PROCEDURE

5.1 Test specimens

The size of the treated test specimen should be such that a number of tests may be carried out to determine the maximum rating to be assigned to that specimen. A piece 200 x 200 mm square should be large enough.

5.2 Determination

Place the conditioned test specimen on a horizontal, flat surface.

Beginning with the lowest numbered test liquid (Repellency Rating No1), carefully place one drop (approximately 5 mm in diameter, or 0.01 ml) on each of three locations at least 5 cm apart.

NOTE — Care should be taken to avoid placing the test liquid on the same sites that have been previously tested.

Observe for 10 seconds.
If, at the end of this time, two of the three drops are still visible as spherical to hemispherical, with no wetting or wicking around the drop, i.e. are satisfactorily repelled, place drops of the next higher numbered test liquid on an adjacent site and observe for the specified time again.

Continue this procedure until more than one of the test droplets are observed to be no longer repelled.

6 ASSESSMENT

The repellency rating of the textile floor covering is assessed as the highest numbered test liquid for which two or three drops are repelled.

Report the oil and water repellency rating of the textile floor covering.

WoolSafe Test Method CCP 18

STANDARDISED CLEANING TEST FOR TEXTILE FLOOR COVERINGS (ISO 11379)

1 SCOPE

This International Standard describes a laboratory-scale carpet cleaning procedure using a spray extraction technique.

NOTE — Depending on the characteristic under investigation, test specimens subjected to this cleaning procedure may be evaluated for many properties, eg. ease of soil (dirt) removal, changes in appearance, effects of cleaning materials and durability of floor covering finishes.

2 PRINCIPLE

Test specimens of textile floor coverings are treated in a controlled manner with a spray extraction cleaning machine.

3 APPARATUS AND MATERIALS

3.1 **Spray extraction cleaning machine**, capable of applying (3.75 ± 0.25) litres/m^2 of cleaning solution to the surface when the cleaner wand is moved across the surface at a rate of (40±5) mm/s.

NOTE — This may be achieved by using a machine with a wand width of (100 ± 5) mm and an application rate of (0.9 ±0.1) litres/min or by using a machine with a wand width of (200 ± 10) mm and an application rate of (l.8±0.2) litres/min.

An antifoam agent may be used in the waste water tank of the spray extraction machine but shall not be used in the delivery tank.

3.2 **Suitable base**, e.g. bench, table top or floor.

3.3 **Floor covering adhesive** or **pressure sensitive adhesive tape**.

3.4 **Vacuum cleaner**, canister-type, giving an airflow of (25 ± 5) litres/s through the suction-only nozzle with a suction surface of (125 ± 25) mm x (15 ± 2.5) mm.

3.5 **Cleaning solution** Dilute the cleaning product under evaluation according to the manufacturer's instructions.

4 CONDITIONING

The standard atmosphere for conditioning and testing is:

Relative humidity:	65 ± 2%
Temperature:	20 ± 2ºC

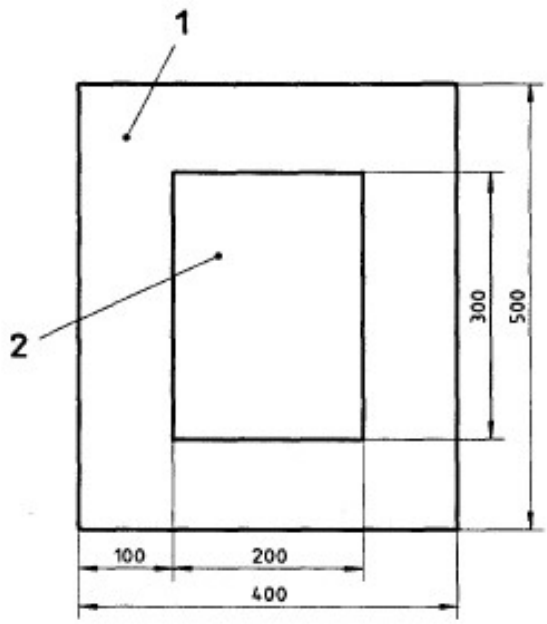
Condition the test specimens in the standard atmosphere for a minimum of 24 h.

5 PREPARATION OF TEST SPECIMENS

Sample and select test specimens in accordance with ISO 1957. Cut a test specimen of suitable dimensions from each sample, e.g. (200 x 300) mm, with the longer side in the manufacturing direction as shown in figure 1.

Mount the test specimen on a suitable base (4.2) using a floor covering adhesive or pressure sensitive adhesive tape (4.3). Surround the test specimen with material of comparable construction and thickness of dimensions at least 100 mm greater than those of the test specimen secured to the base using the floor covering adhesive or pressure sensitive adhesive tape (4.3) (see figure 1). Ensure this material is colourfast to prevent bleeding into the test specimen.

Dimens



Key

1 Surround carpet

NOTE — In some cases the test specimen will be of predetermined dimensions, as it will have been used for other procedures, e.g. soiling, and the mounting arrangements will have to be adjusted accordingly.

6 PROCEDURE

6.1 Use the vacuum cleaner (3.4) to clean the test specimens, using two double strokes, i.e. twice backwards and twice forwards, in order to give all parts of all specimens equal treatment, as follows. The first two double strokes shall be made with the vacuum cleaner suction slot approximately 50% on the buffer carpet and 50% over the test area. Each subsequent series of strokes is made parallel to the first series with 50% overlap, ending when the buffer strip at the other side is included in the overlap.

6.2 Prepare the cleaning solution (3.5). Pour the cleaning solution into the spray extraction cleaning machine (3.1). Attach the cleaning head and run the machine prior to cleaning to obtain stable conditions, including temperature, at the point of delivery.

6.3 Spray and extract the test specimen by drawing the cleaning head at the speed of (40 ± 5) mm/s necessary to obtain the required application per unit area (see 4.1) in the length direction both with and against the pile lay. For the first stroke, position the cleaning head approximately 50% over the surround carpet and 50% over the test specimen. For each subsequent stroke, allow 50% overlap per stroke, finally ending when the opposite side surround carpet is included in the overlap. Do not use a scrubbing action.

6.4 Turn the test specimen through 180° and repeat the process described in 6.3.

6.5 Dry the test specimen to approximately constant mass and then condition in the standard atmosphere (clause 4) for a minimum of 24 h, or proceed to the conditioning process required by any subsequent test procedure.

6.6 Vacuum clean the test specimen as in 6.1 with the last stroke in the direction of the pile lay.

7 ASSESSMENT

Measure the colour difference between the cleaned and the original, pre-soiled, textile floor covering segments using the colour measurement device, and express the results as ΔL.

WoolSafe Test Method CCP 19

Laboratory soiling test: Kappasoil test (ISO 11378 – Part 1)

1 SCOPE

This standard test (ISO 11378, Part 1) specifies a method for assessing the propensity of textile floor coverings to soiling using an artificial soil composition.

The scope of this test method can be extended to assess the efficiency of cleaning chemicals and cleaning equipment.

2 PRINCIPLE

Carpet specimens are subjected to an accelerated soiling process. The degree of soiling is measured by comparing the change in colour between soiled and original specimens.

3 APPARATUS

3.1 **Kappasoil machine**, consisting of the following components.

3.1.1 **Circular table**, (600 ±2) mm in diameter, rotating at a speed of 18±1) rpm and reversing direction every 250 revolutions, to which the test specimens are attached.

3.1.2 **Two cones**, which rest radially on the table, one being free-running and the other driven in the same direction and with a cone surface speed (5 ± 1) % higher than the surface speed of the table, each cone assembly being adjusted to apply a load of (40 ± 2) N.

3.1.3 **Soil dispenser**, placed above the table, capable of dispensing soil uniformly and intermittently for distribution on the test specimens over a period of time during the machine cycle.

NOTE Typically 14 g of soiling compound (3.2) is dispensed over 5000 revolutions.

3.2 **Standard soiling compound**, compatible with the equipment.

NOTE The soiling compound used by WoolSafe is listed in annex B.

3.3 **Vacuum cleaner**, with an airflow of (25 ± 5) l/sec through the suction-only nozzle with a suction surface of (125 ± 25) mm x (15 ± 2.5) mm.

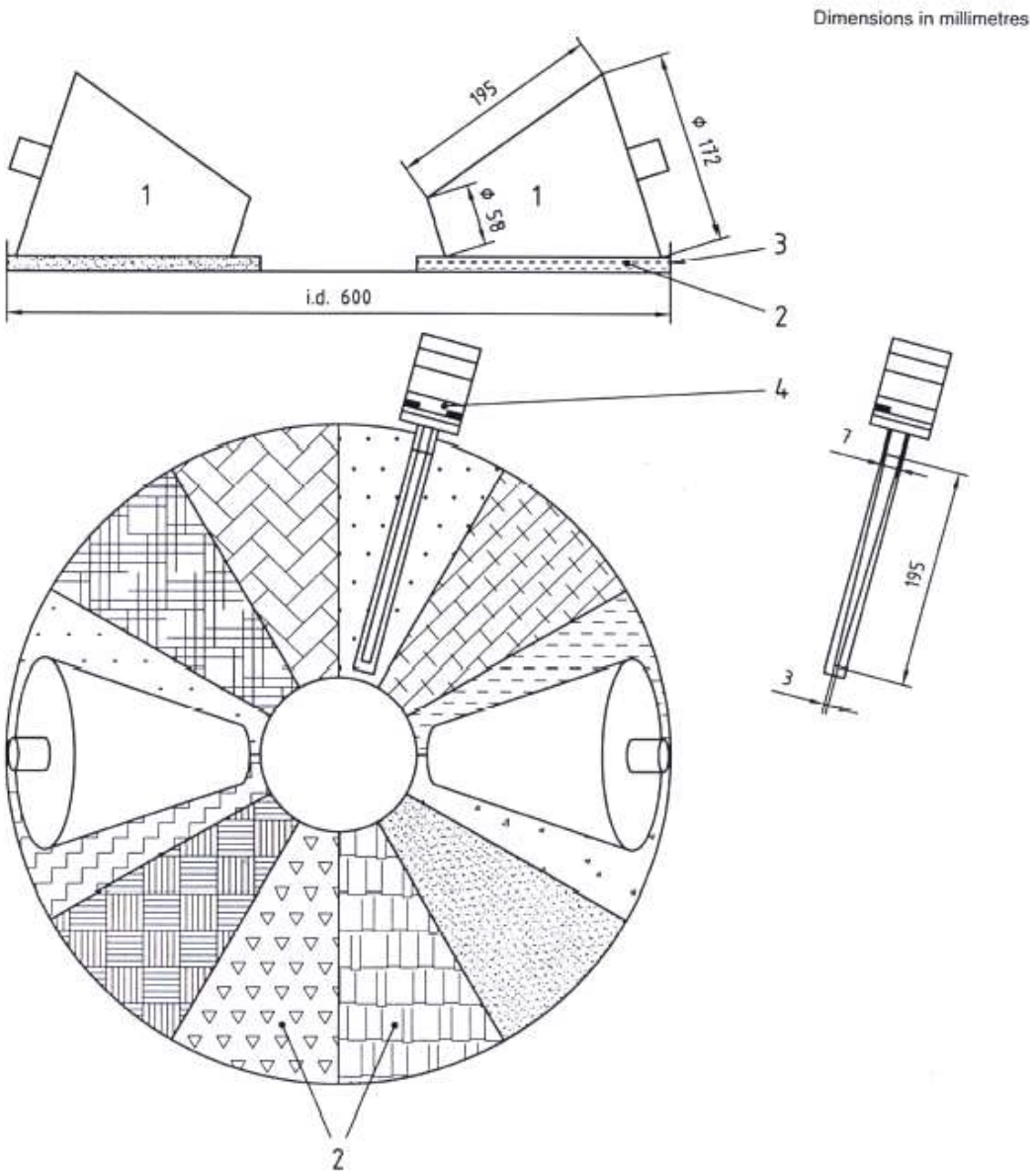
3.4 **Means of securing** floor covering specimens to the horizontal table.

NOTE This can be double-sided, pressure-sensitive, adhesive tape or (aerosol) contact adhesive or a clamping system.

3.5 **Colour measurement instrument**, with a (50 ± 0,5) mm aperture, capable of measuring the colour of textile floor-coverings and expressing the results as ΔE or ΔL (CIELAB system) in accordance with ISO 105-J01.

3.6 **Template**, to be used in conjunction with the colour measurement instrument and of the same size as the specimens with five holes of the same dimensions as the measuring head of the colour measurement equipment (see Figure 2).

3.7 **Straight edged ruler**, at least 200 mm long.



Key
1 Conical feet
2 Carpet specimens
3 Table
4 Soil dispenser

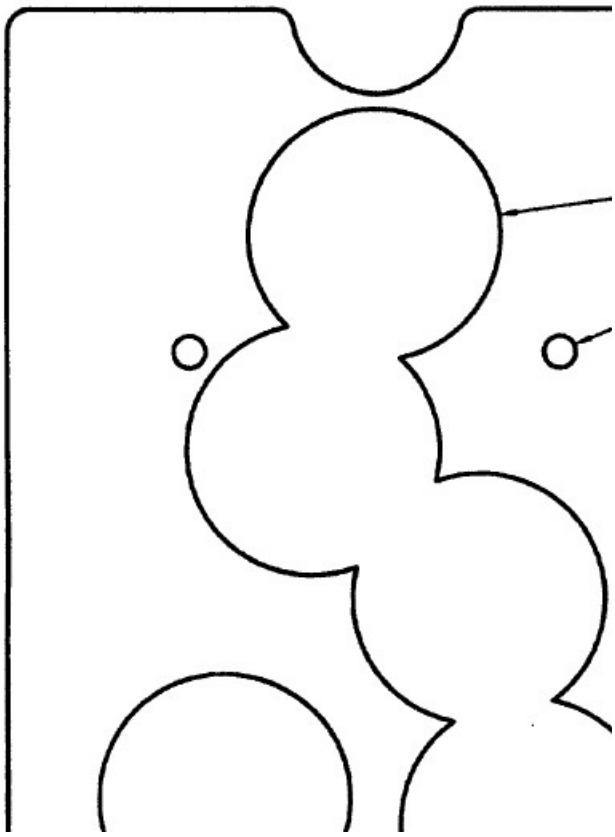
Figure 1 — Diagram of Kappasoil machine

4 CONDITIONING

The standard atmosphere for conditioning and testing is:

Relative humidity:	65 ± 2%
Temperature:	20 ± 2ºC

Condition the test specimens in the standard atmosphere for a minimum of 24 h.



Key
1 Colour measuring aperture
2 Specimen locating peg

Figure 2 — Example of suitable template for colour measurement

5 SAMPLING AND PREPARATION OF TEST SPECIMENS

5.1 Sampling

Select a minimum of two test specimens per textile floor covering being tested in accordance with ISO 1957. Cut each test specimen in such a way that in the case of those textile floor coverings with a "natural" pile lay, the direction of pile lay is at right angles to the direction of the rotational motion of the table. The specimens and soiling compound (3.2) shall be conditioned for a minimum of 24 h, and the test and assessment carried out in the standard atmosphere (clause 4).

5.2 Preparation of test specimens

A maximum of twelve test specimens (see Figure 1) from the same or different samples shall be exposed in each test run. Cut out the appropriate number of test specimens and allow to condition in the standard atmosphere (clause 4), flat, singly and use-surface uppermost, for at least 24 h. If there are insufficient specimens available for testing, any vacant spaces on the circular table of the Kappasoil machine shall be filled with spare floor covering material of similar thickness.

6 PROCEDURE

6.1 Clean the test specimens using the vacuum cleaner (3.3) to remove loose surface fibre using a total of four strokes, two against and two with the direction of pile lay. In the case of cut pile carpet, align the pile in the direction of natural pile lay by using a clean straight edged ruler (3.7). Move the ruler once across the carpet pile in the direction of pile lay, applying slight pressure.

6.2 Locate the measuring template (3.6) on the test specimen and, using the colour measurement instrument (3.5), measure the colour of the test specimen in five places. Record these values.

6.3 Attach the test specimens securely on the table (3.1.1), ensuring that there are no gaps between the test specimens and that, when specimens of differing thickness are tested, the difference in thickness of adjacent test specimens is not more than 1 mm. Place the soil mixture (3.2) in the soil dispenser.

NOTE: When filling the soil dispenser, it is essential that the test specimens be protected from accidental soil spillage.

6.4 Start the machine and continue until 5,000 revolutions of the table have been completed. If there is a build-up of loose fibre on the surface of the test specimens during the early part of the test, stop the machine and carefully remove the loose fibre by hand. Restart the machine and continue the test.

6.5 Remove the test specimens carefully and clean them by suction with the vacuum cleaner to remove loose dirt and fibre, using a total of four strokes (two against the direction of the pile lay, and two with). In the case of cut pile carpets, ensure that the last stroke of the suction nozzle is in the direction of the pile lay. Move the clean straight edged ruler across the pile in the direction of pile lay, applying slight pressure.

7 ASSESMENT

7.1 Colour measurement

Using the measuring template and the colour measurement instrument (3.5), measure the colour of the soiled test specimens in the same five places on each specimen (see Figure 2). Calculate the mean colour difference (ΔE) or mean lightness difference (ΔL) between original and soiled specimens according to the following formulae:

$$\Delta E = \sqrt{(L_o - L_s)^2 + (a_o - a_s)^2 + (b_o - b_s)^2}$$

or

$$\Delta L = L_o - L_s$$

where

L_o, a_o and b_o are the mean CIE colour co-ordinates of the original specimen;

L_s, a_s and b_s are the mean CIE colour co-ordinates of the soiled specimen.

8 Accuracy and precision

Accuracy and precision data were obtained by means of interlaboratory trials. High levels of correlation were obtained between this test method and floor trials.

10 Test report

Compare the soiling test results expressed in ΔL or ΔE values of the treated and untreated (original) specimens. Determine whether the level of soiling is acceptable or not

WoolSafe Test Method CCP 20

DETERMINATION OF THE PRESENCE AND SUBSTANTIVITY OF FLUORESCENT BRIGHTENING AGENTS IN DETERGENTS

1. SCOPE

Carpet maintenance products may contain optical brightening agents, i.e. fluorescent colourless dyestuffs which have the ability to transform invisible ultra-violet light into visible light. These products may affect he appearance of the carpet after cleaning and in the longer term the colour fastness of the cleaned carpet.

2. PRINCIPLE

Any fluorescent brightening agent present in the product under test is deposited on a multi-fibre test fabric under standard conditions. The treated multi-fibre test fabric is compared with untreated fabric under an ultra-violet light source. Each fabric is rated according to the degree of discernible fluorescence.

Two concentrations of solution are used, as the deposition of some fluorescent materials is adversely affected by high concentrations of detergents.

3. MATERIALS AND APPARATUS

3.1 **Boro-silicate glass beaker**, 250 ml capacity.

3.2 **Mercury in glass laboratory thermometer** graduated in divisions of 0.1°C up to 100°C.

3.3 **Distilled, de-ionised or similarly pure water.**

3.4 **Multi-fibre fabric** (see 6.1).

3.5 **Ultra-violet light source.**

4. PROCEDURE

4.1 Prepare 250 ml of a 2% w/v solution of the product under test, stirring, shaking or otherwise agitating to ensure that the detergent is completely dissolved. The solution can be warmed gently if necessary, using a well dispersed heat source and with continual stirring to avoid local superheating. A temperature of 40°C should not be exceeded.

4.2 From this solution prepare, by dilution, 200 ml of a 0.5% w/v solution of the product under test.

4.3 Heat the solutions prepared in 4.1 and 4.2 to 40°C, again avoiding local superheating.

4.4 Immerse in each of these solutions a strip of the multi-fibre fabric 1 cm wide. Leave the fabrics immersed in the solutions for 15 mins, maintaining the temperature at 40°C. Agitate the strips gently from time to time.

4.5 Remove the strips of fabric from the solutions and allow them to drain for one minute suspending them from one edge with the longer side hanging vertically (i.e. length vertically).

4.6 Rinse the fabrics with a stream of distilled water from a wash bottle.

4.7 Rinse again by immersing for one minute in 100 ml of distilled water at 40°C.

4.8 Repeat the immersion rinse process a further two times using fresh distilled water each time.

4.9 Dry the strips in a dark oven or drying cabinet at a temperature not exceeding 40°C. The strips should be hung in the oven vertically, not touching each other or the oven walls.

4.10 When the strips are dry, mount them one on each side of an untreated strip of multi-fibre fabric on a piece of black card.

5. ASSESSMENT

5.1 Examine the mounted strips under the ultra violet light source and rate the degree of change in fluorescence for each individual fibre according to the following visual judgement rating:

Rating	Description of effect
0	No visible increase in fluorescence
1	Just discernible fluorescence increase
2	Easily discernible increase in fluorescence
3	Pronounced increase in fluorescence

5.2 The assessment should be carried out for both treated strips using more than one assessor.

6. REPORT

Report the degree of change in fluorescence for each individual fibre and at both concentrations.

7. NOTES

The multi-fibre fabric contains yarns made from the following fibres in order. A red border with a black index thread identifies the start of the sequence.

Cotton	Viscose Rayon	Wool
Silk	Cellulose secondary acetate	Cellulose Triacetate
Nylon 6.6	Nylon 6	Terylene
Acrilan 1656	Courtelle	Orlon 42

The fabric is made by Shirley Developments Ltd, PO Box 6, 856 Wilmslow Road, Didsbury, Manchester M20 8RX, Great Britain.

WoolSafe Test Method CCP 21

DETERMINATION OF THE COLOUR FASTNESS TO LIGHT - DAYLIGHT

1. Scope

This method determines the resistance of the colour of a carpet to the action of daylight.

2. Principle

A specimen of the carpet is exposed to daylight under prescribed conditions, along with up to eight dyed wool lightfastness standards.

The fastness is assessed by comparing the change in colour of the specimen with that of the standards.

3. References

ISO 105 - section A01: General principles of testing; section A02: Grey scale for assessing change in colour.

4. Standards and equipment

4.1 Standards

Blue wool standards, developed and produced in Europe, and identified by the numerical designation 1 to 8, ranging from 1 (very low lightfastness) to 8 (very high lightfastness).

4.2 Equipment

4.2.1 Exposure rack, facing south, and sloping at an angle from the horizontal approximately equal to the latitude of the place where the exposure is made. The rack is covered with clear, flat window glass 3.5 (± 1) mm thick, with at least 90% transparency between 380 and 700 nm, falling to 0% between 310 and 320 nm and at least 50 mm from the mounted specimens.

4.2.2 An opaque cover for the specimens that avoids surface compression.

4.2.3 A mask of a colour and with an aperture similar to the Grey Scale (4.2.4) for Grey Scale assessment.

4.2.4 Grey Scale for assessing change in colour (ISO 105-A02).

5. Test specimens

5.1 An area of the material not less than 10 mm x 60 mm is used for method 1 (see 6.1) or 10 mm x 100 mm for method 2 (see 6.2) so that each exposed portion is not less than 10 mm x 20 mm.
The specimen may be a strip of carpet, yarns wound close together on a card or laid parallel and fastened on a card, or a mat of fibres combed and compressed to give a uniform surface and fastened on a card.

5.2 To facilitate handling, the specimen or specimens to be tested and the similar strips of the references may be mounted on a card in an appropriate arrangement

5.3 The specimens to be tested and the blue strips of the references shall be of equal size and shape in order to avoid errors in assessment due to over-rating the visual contrast between exposed and unexposed parts on a larger pattern as against narrower references

6. Exposure methods

Expose the specimen (or group of specimens) and the references simultaneously for 24 hours per day under the conditions described in 4.2.1, in such a manner and for such times as are necessary to

evaluate fully the colour fastness of each specimen relative to that of the references, by successively covering the specimens and exposed references throughout the duration of the test.

Four methods can be used – see 6.1.

6.1 Method 1 – Dispute over rating

6.1.1 The basic feature is the control of the exposure periods by inspection of the specimen and, therefore, only one set of blue wool references is required for each specimen under test.

6.1.2 Arrange the test specimen and the references as shown in figure 1 with an opaque cover AB across the middle one-third of the specimen and references. Expose to daylight under the conditions described in 4.2.1. Follow the effect of light by removing the cover AB and inspecting the specimen frequently. When a change in the test specimen can be perceived equal to grey scale 4-5 (4.2.3) note the number of the blue wool reference showing a similar change. (This is a preliminary assessment of colour fastness.)

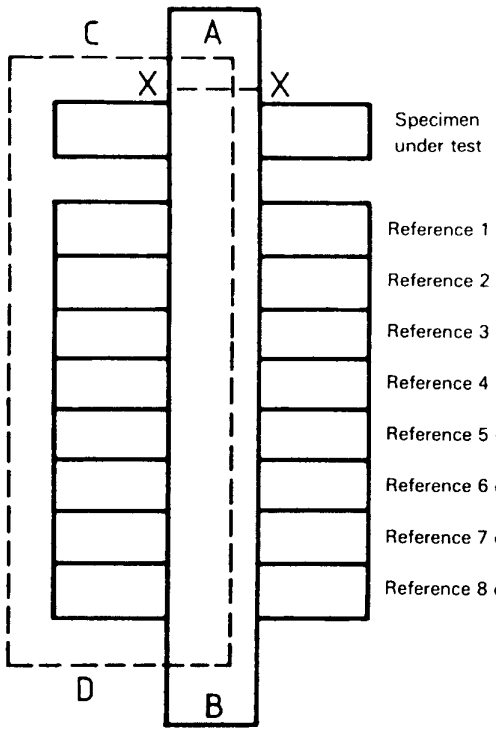


Figure 1. Mounting of specimens for exposure method 1

6.1.3 Continue to expose until the contrast between the exposed and the unexposed portions of the specimen is equal to grey scale grade 4. Cover the left-hand one-third of the specimen and references with an additional opaque cover (CD in figure 2).

6.1.4 Continue to expose until the contrast between the fully exposed and unexposed portions of the test specimen is equal to grey scale grade 3.

6.1.5 If reference 7 fades to a contrast equal to grey scale grade 4 before the test specimen does, he exposure may be terminated at this stage. When a specimen has a colour fastness equal to or greater than 7, it would require unduly long exposure to produce a contrast equal to grey scale grade 3; moreover, this contrast would be impossible to obtain when the colour fastness is 8. Assessments in the region of 7 to 8 are made, therefore, when the contrast produced on reference 7 is equal to grey scale grade 4, the time required to produce this contrast being long enough to eliminate any error which might result from inadequate exposure.

6.2 Method 2 – Large number of simultaneous specimens

6.2.1 The basic feature is the control of the exposure period by inspection of the references, which allows a number of specimens differing in colour fastness to be tested against a single set of references, thus conserving supplies.

6.2.2 Arrange the test specimens and the refer-ences as shown in figure 2, with covers A'B' and AB each covering one-fifth of the total length of each specimen and reference. Expose to daylight under the conditions described in 4.2.1. Follow the effect of light by lifting cover AB periodically and inspecting the references. When a change in reference 3 can be perceived equal to grey scale grade 4-5, inspect the specimens and rate their colour fastness by comparing any change that has occurred with the changes that have occurred in references 1, 2 and 3. (This is a preliminary assessment of colour fastness.)

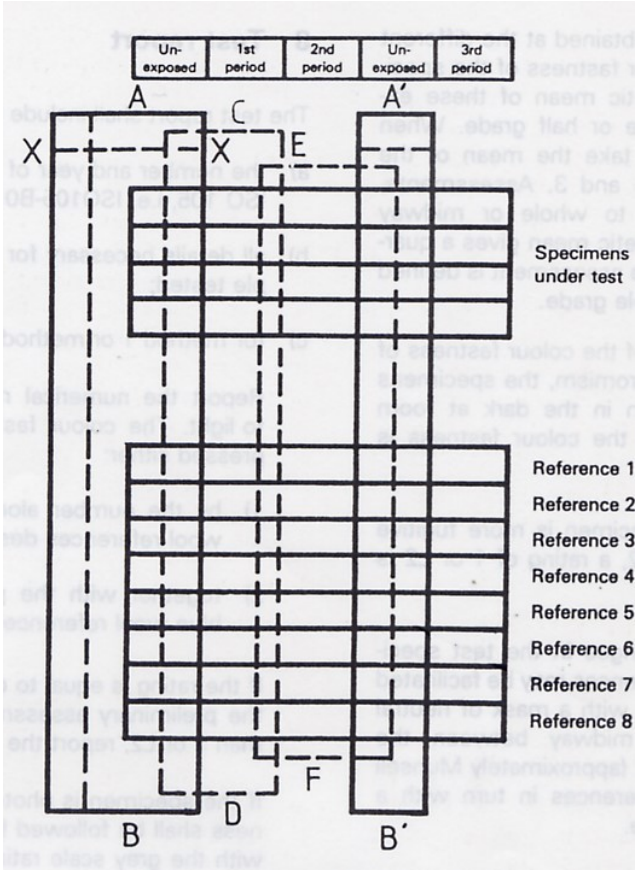


Figure 2. Mounting of specimens and references for exposure method 2

6.2.3 Replace the lifted cover AB in exactly the same position and continue to expose the specimens until a change in reference 4 can be perceived equal to grey scale grade 4-5; at this point fix an additional cover CD in the position shown in figure 3, overlapping the cover AB.

6.2.4 Continue to expose the specimens until a change in colour in reference 6 can be perceived equal to grey scale grade 4-5; then fix the final cover EF in the position shown in figure 2, the other three covers remaining in position.

6.2.5 Expose until either

a) a contrast is produced on reference 7 equal to the contrast illustrated by grey scale grade 4;

or

b) a contrast equal to grey scale grade 3 is produced on the most resistant specimen,

whichever occurs first.

6.3 Method 3 – Conformity with performance specification

Expose the specimens with two blue wool references only; that specified as minimum and the one below it. Continue exposure until grey scale grade 4 and grey scale grade 3 contrasts have been produced on separate areas of the minimum blue wool reference.

6.4 Method 4 – Conformity with agreed reference sample

Expose the specimens with the reference sample only. Continue exposure until grey scale grade 4 and/or grey scale grade 3 contrasts have been produced on the reference sample.

7 Assessment

7.1 The final assessment, given as numerical ratings, is based on contrasts equal to grey scale grade 4 and/or grade 3 between exposed and unexposed portions of the test specimen.

7.2 Remove all the covers, thus revealing on test specimens and references two or three areas, depending on the method used, which have been exposed for different times, together with at least one area which has not been exposed to light.

Compare, under suitable illumination (see ISO 105-A01:1994, clause 14), the changes in the specimen with the relevant changes in the references.

The colour fastness of the specimen is the number of the reference which shows similar changes in colour (visual contrast between exposed and unexposed parts of the specimen). If the specimen shows changes in colour which are nearer to the imaginary reference midway between any two consecutive references, an intermediate rating, for example 3-4, shall be given.

If different assessments are obtained at the different degrees of contrast, the colour fastness of the specimen is taken as the arithmetic mean of these expressed to the nearest whole or half grade. When three areas are being rated, take the mean of the contrasts closest to grades 4 and 3. Assessments, however, shall be confined to whole or midway ratings only. When the arithmetic mean gives a quarter or three-quarters rating, the assessment is defined as the next higher half or whole grade.

7.3 If the colour of the specimen is more fugitive than that of reference 1, a rating of 1 is given.

7.4 Comparison of the changes in the test specimen with changes in the references may be facilitated by surrounding the specimen with the mask (4.2.3).

7.5 If the colour fastness is equal to or higher than 4, any preliminary assessment based on the contrast equal to grey scale 4-5 (see 6.1.2 and 6.2.2) becomes significant; if this preliminary assessment is 3, it shall be included in the rating in brackets. For example, a rating of 6(3) indicates that the specimen changes very slightly in the test when reference 3 just begins to fade, but that on continuing the exposure the resistance to light is equal to that of reference 6.

7.6 The term "change in colour" includes changes in hue, chroma, lightness, or any combination of these characteristics of colour (see ISO 105-A02, clause 3).

WoolSafe Test Method CCP 22

METHOD OF ASSESSING THE ODOUR REMOVAL PROPERTIES OF DEODORANTS

1 PURPOSE AND SCOPE

This test assesses the efficiency of *Odour Removal Products* in eliminating odours from wool or nylon carpets.

2 PRINCIPLE

A 'standard' carpet is spotted with a range of odorous contaminants, and after drying the contaminated areas of the test carpet are treated with the *Odour Removal Product(s)* under test, and the efficiency of the elimination of the odour (and its source) is assessed.

3 APPARATUS

Normal laboratory equipment and the following:

3.1 Odour Test Chamber (OTC)

Test chambers, measuring 200 x 170 x 150mm, fitted with airtight lids containing a small circular port, closed with a rubber stopper.

Carpet samples used in the test (180mm x 140mm) are mounted on Perspex or glass plates using two clips.

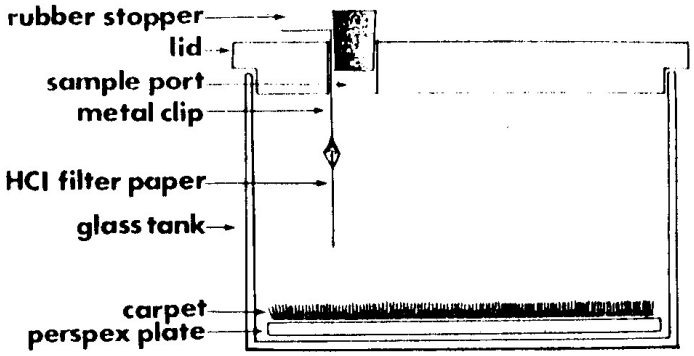


Figure 1. Odour Test Chamber (OTC) with test carpet

3.1 Stain Applicator

A stainless steel cylinder, 60 mm long, with an internal diameter of 55 mm, and with steel mesh (mesh size: 24 openings/cm) covering one end.

3.2 Standard Carpet

3.2.1 Tufted, cut pile, secondary backed carpet, made from scoured, undyed, 100% wool yarn. Surface pile weight: 700 ± 25 g/m^2; pile thickness: 6 ± 0.5 mm. Primary backing: woven polypropylene; secondary backing: jute.

3.2.2 Tufted, cut pile, secondary backed carpet, made from undyed, 100% nylon yarn. Surface pile weight: 950 ± 25 g/m^2; pile height: 8 ± 0.5 mm. Primary backing: woven polypropylene; secondary backing: jute.

4 REAGENTS

4.1 Staining substances.

4.1.1 (Synthetic) cat urine

Note 1: Synthetic cat urine supplied by *Synthetic Urine eK*, www.synthetic-urine.de

4.1.2 Milk (sour)

4.1.3 Synthetic cat vomit (cat food, acidified with HCl to pH 3.2 ± 0.2.

Note 2: The choice of staining substance is governed by the frequency with which certain spills give problems (complaints) in practice and by practical considerations regarding the execution of this test method. The staining agents listed in this test method may be changed in future if these conditions change.

Note 3: Where an odour removal product claims efficiency against (a) particular type(s) of spill(s), the choice of staining substance(s) used in the test will be adjusted accordingly.

4.2 Concentrated (fuming) hydrochloric acid

5 PROCEDURE

5.1 Cut four samples of the standard carpet (3.2), measuring 180 x 140mm, and mark as 1, 2, 3 and 4.

5.2 Apply a standardised amount of one of the staining substances (4.1) to the four carpet samples.

To apply the liquid substances (4.1.1 and 4.1.2) place the stain applicator (3.1) on the centre of the carpet, with the wire mesh in contact with the pile surface. Pour 10 ml of the staining solution quickly into the centre of the stain applicator. Hit the top of the applicator firmly with the flat of the inside of the hand (this creates air pressure inside the applicator and forces the staining solution evenly into the carpet pile).

Apply the solid staining substance (4.1.3) to the surface of the carpet, covering a circular area with a diameter of 55 mm with a thin but uniform layer of substance.

5.3 Store the stained samples in separate OTCs in the dark for 24 hours at room temperature.

Apply the *Odour Removal Product* under test to the stains on carpet samples 1 and 2 according to the manufacturer's instructions.

Apply distilled water to the stain on carpet sample 3 in the same manner as was used for the *Odour Removal Product.*

Leave carpet sample 4 untreated.

Replace each carpet in its original OTC and store in the dark at room temperature as before.

5.4 After 1 hour, sample the odour in the OTCs by briefly removing the lid of each OTC in turn. Record the smell. Secure all lids and store OTCs in the dark for a further hour.

5.5 Carry out an ammonia release test in each OTC as follows:

Strips of filter paper (10mm x 70mm) are dipped for half their length in the concentrated (fuming) HCl (4.2), attached to clips and suspended through the sample ports in the OTCs (see Figure 1). White "smoke" is generated in an amount proportional to the amount of NH_3 present.

Note 4: The white "smoke" is very fine, air-borne particles of NH_4Cl.

5.6 Secure the lids of the OTCs and store in the dark for 24 hours at room temperature and repeat measurement of odour and NH_3 as described in 5.4 and 5.5.

5.7 Repeat the above procedure with staining substances 4.1.2 and 4.1.3.

5.8 Record all the results.

Note 5: All OTCs, plates, clips, and lids are to be cleaned between series of tests with 70% ethanol.

6 ASSESSMENTS

The intensity of the odour, including that of any remaining *Odour Removal Product*, is determined by smelling, and the amount of white "smoke" generated is assessed, using three (3) experienced observers and the results are rated as follows:

Rating	Observed odour	Observed “smoke”
D	Strong smell of deodoriser	N/A
++++	No odour or NH_3	None
+++	Very little odour	Very little
++	Moderate odour	Noticeable amount
+	Strong odour	Moderate amount
0	Very strong odour	Large amount; dense

Annex A

Assessment of the efficiency of cleaning chemicals and cleaning equipment

A.1 General

The scope of this laboratory soiling test can be extended by either cleaning the soiled specimen(s) with different chemicals or by using different cleaning machines. Colour measurement or grey scale assessments can then be used to quantify the relative efficiencies of the cleaning products or processes being evaluated.

A.2 Assessment of further properties

A.2.1 The number of specimens per sample should be increased or decreased according to the number of chemicals and/or machines to be assessed.

A.2.2 Carry out each test in accordance with the procedure given in this part of ISO 13178, up to and including the assessment procedure (clause 7).

A.2.3 Clean the specimens in accordance with the method specified in ISO 11379. To assess cleaning chemical performance, use the same extraction cleaning machine for each chemical, and to assess cleaning machines use a standard cleaning chemical.

A.2.4 The efficiency of the cleaning is determined by comparison of the cleaned specimen(s) with the original, unsoiled, specimen(s) or with the soiled specimen(s), i.e. how well the cleaning process has restored the original appearance, or how much soil the cleaning process has removed, using one of the assessment methods given in clause 8 of this part of ISO 11378.

Annex B

Standard artificial soiling compounds

A number of artificial soiling compounds, which can be used for laboratory soiling tests, have been available for many years. The composition used by The WoolSafe Organisation is given in Table A.1.

	% by mass
Fine grained sand (≤ 500 µ)	83.00
Kaolin	7.3
Calcium carbonate	1.95
Calcium sulphate	1.95
Slurried chalk	1.95
Peat	1.57
Portland cement	0.74
Activated charcoal	0.57
Bayferrox yellow 391	0.37
Mineral oil (Nujol 014)	0.26
Bayferrox brown 686	0.23
Ferric oxide	0.11
Soot (carbon black)	0.11
Mixed metal oxides	0.01