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Datasheet for the decision of 29 April 2014

Case Number: T 1643/12 - 3.3.06

Application Number: 05787403.4

Publication Number: 1794276

IPC: C11D3/40

Language of the proceedings: EN

Title of invention:
LAUNDRY TREATMENT COMPOSITIONS

Patent Proprietors:
Unilever PLC
Unilever N.V.

Opponent:
The Procter & Gamble Company

Headword:
Shading polyester laundry/Unilever

Relevant legal provisions:
EPC Art. 52(1), 56

Keyword:
Inventive step (no, all requests) - obvious to try (yes) - reasonable expectation of success (yes)

Decisions cited:

Catchword:

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Case Number: T 1643/12 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 29 April 2014

Appellant: (Opponent)	The Procter & Gamble Company One Procter & Gamble Plaza Cincinnatti, Ohio 45202 (US)
Representative:	Samuels, Lucy Alice Gill Jennings & Every LLP The Broadgate Tower 20 Primrose Street London EC2A 2ES (GB)
Respondents: (Patent Proprietors	Unilever PLC Unilever House 100 Victoria Embankment London EC4Y 0DY (GB) Unilever N.V. Weena 455 3013 AL Rotterdam (NL)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 25 May 2012 rejecting the opposition filed against European patent No. 1794276 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman: B. Czech
Members: G. Santavicca
J. Geschwind

Summary of Facts and Submissions

I. The appeal lies from the decision of the Opposition Division rejecting the opposition against European patent n° 1 794 276.

II. Claim 1 of the granted patent reads as follows:
"*1. A method of treating textile, the method comprising the steps of:*
(i) treating a textile with an aqueous solution of a hydrophobic dye, suitable for providing a blue or violet shade to white polyester, the aqueous solution comprising from 1 ppb to 5 ppm of the hydrophobic dye and from 0.2 g/L to 3 g/L of a surfactant; and,
(ii) rinsing and drying the textile, wherein the hydrophobic dye is selected from: benzodifuranes; methine; triphenylmethanes; naphthalimides; pyrazole; naphthoquinone; mono-azo and di-azo dyes."

III. The patent had been opposed in its entirety, *inter alia* on the grounds of lack of novelty and inventive step (Article 100(a) EPC).

The evidence relied upon in the opposition proceedings includes the following documents:

D1: US 3 958 928 A;

D5: K. Hunger (Editor), Industrial Dyes - Chemistry, Properties, Applications, Wiley-VCH, 2003, Pages 134-138;

D10: Kirk-Othmer, Encyclopedia of Chemical Technology, 4th ed., 1993, Volume 8, Pages 542-554;

D14: Page 139 of D5;

D18: Pages 36 and 295 to 297 of D5;

D23: A.T. Leaver et al., *Recent Advances in Disperse dye Development and Applications;* Textile Chemist and Colorist, January 1992, Vol. 24, No.1, Pages 18-21; and

D24: O. Annen et al., *Replacement of disperse anthraquinone dyes;* Rev.Prog.Coloration, 1987, Vol.17, Pages 72-85.

IV. According to the decision under appeal:

a) All documents filed late, up to the day of the oral proceedings, i.e. *inter alia* documents D14, D18, D23 and D24, were admitted into the proceedings.

b) The method of Claim 1 as granted was novel over the prior art considered.

c) The closest prior art was disclosed in D1, which dealt with a liquid laundry detergent composition comprising a surfactant and a combination of anthraquinone dyes, suitable for blueing fabrics made of synthetic fibres with reduced staining.

d) Considering the comparative data filed by the adverse parties, the problem solved over D1 was to provide an improved method to maintain the white appearance of polyester-comprising garments.

e) Although it was apparent from the cited prior art including D5, D10, D14, D23 and D24 that anthraquinone dyes were considered to be disadvantageous, and were thus gradually being replaced by azo dyes, there were no hints in this prior art that an improved shading was obtainable by such a replacement. Industrial dyeing, in which anthraquinone dyes were being replaced by azo dyes, was very different in operating conditions

from laundering, so that there was no reasonable expectation of success as regards the achievement of an improved shading.

f) Thus, the method of Claim 1 as granted was not obvious over D1.

V. In its statement setting out the grounds of appeal, the Opponent/Appellant maintained *inter alia* that the claimed subject-matter did not involve an inventive step over the closest prior art disclosed by D1. It also submitted further items of evidence and (re)submitted comparative experimental data.

VI. With their reply dated 11 February 2013, the Patent Proprietors/Respondents submitted six sets of amended claims as First to Sixth Auxiliary Requests, as well as further items of evidence and further comparative data.

VII. The Respondents requested accelerated proceedings. The request was granted and the parties were summoned to oral proceedings.

VIII. The Appellant filed further arguments and items of evidence with its letters of 31 January 2014, of 28 March 2014 and of 7 April 2014, maintaining *inter alia* its objection regarding lack of inventive step against all the pending requests of the Respondents and also raising formal objections against the auxiliary requests filed by the Respondents with the reply to the statement of grounds of appeal.

IX. The Respondents filed further arguments, evidence and experimental data with their letters of 3 February 2014, 27 March 2014, 31 March 2014 and 17 April 2014. With the last letter filed two sets of

claims, i.e. an additional "First (1a) Auxiliary Request " and a "Corrected Third Auxiliary Request".

X. Oral proceedings were held on 29 April 2014. The debate *inter alia* focussed on the issue of inventive step over D1 as the closest prior art. In a first approach, the debate was confined, for the sake of argument and in the Respondents' favour, to the question of whether starting from D1 as the closest prior art, the method of Claim 1 at issue was an obvious solution to the technical problem formulated by the Respondents, assuming that it was successfully solved. This issue was extensively debated based on the understanding of Claim 1 put forward by the Respondents, i.e. that Claim 1 was directed to a laundry method for treating and shading textile garments containing white polyester, by which method a perceptible improvement in whiteness was achieved. The Appellant argued that even based on these assumptions the claimed subject-matter would lack an inventive step. The experimental/documentary evidence filed in the course of the appeal proceedings was thus not considered in detail in the submissions made in this respect by the parties, who relied essentially on the contents of documents D5, D10, D14, D18, D23 and D24. At the end of the oral proceedings, the decision was announced.

XI. The Appellant (Opponent) requested that the decision under appeal be set aside and that the patent be revoked.

XII. The Respondents (Patent Proprietors) requested that the appeal be dismissed (Main Request), or, in the alternative, that the patent be maintained on the basis of the claims according to one of the following requests:

- the First Auxiliary Request filed with letter of 11 February 2013,
- the First (1a) Auxiliary Request filed with letter of 17 April 2014,
- the Second Auxiliary Request filed with letter of 11 February 2013,
- the Third Auxiliary Request filed with letter of 17 April 2014,
- the Fourth to Sixth Auxiliary Requests filed with letter of 11 February 2013.

XIII. Claim 1 according to these First to Sixth Auxiliary Requests respectively reads as follows:

Compared to Claim 1 as granted, Claim 1 according to the **First Auxiliary Request** additionally contains an appended disclaimer worded as follows:
"*with the proviso that the following method is excluded: a stock solution of 1.8g/L of base washing powder in water is created; the washing powder containing 18% NaLAS, 73% salts (silicate, sodium tri-poly-phosphate, sulphate, carbonate), 3% minors including perborate, fluorescer and enzymes, remainder impurities and water; the solution was divided into 100ml aliquots and solvent black 3 added from an ethanol solution, the ethanol solution containing approximately 1000 ppm solutions of solvent black 13[sic], to give 0.9 ppm and 1.9 ppm solvent black 3 solutions respectively; 1 g of pure woven polyester fabric was added to each of the wash solutions and the solution then shaken for 45 minutes, rinsed and dried*".

Compared to Claim 1 according to the First Auxiliary Request, Claim 1 according to the **first(1a) auxiliary request** was amended to read (amendments made apparent by the board):

"*... with the proviso that the following method**s*** ~~*is*~~ ***are*** *excluded: ...*".

Compared to Claim 1 as granted, Claim 1 according to the **Second Auxiliary Request** was restricted to read as follows:
"*... rinsing and drying the textile, wherein the hydrophobic dye is **a*** ~~*selected from: benzodifuranes; methine; triphenylmethanes; naphthalimides; pyrazole; naphthoquinone;*~~ *mono-azo* ~~*and di-azo*~~ *dyes*~~*.*~~".

Compared to Claim 1 as granted, Claim 1 according to the (corrected) **Third Auxiliary Request** was amended to read as follows:
"*...rinsing and drying the textile, wherein the hydrophobic dye is selected from: benzodifuranes; methine; triphenylmethanes; naphthalimides; pyrazole; naphthoquinone; mono-azo and di-azo dyes, **wherein the dye is a mono-azo dye**.*".

Compared to Claim 1 as granted, independent Claims 1 and 2 according to the **Fourth Auxiliary Request** were amended to read as follows, respectively:

"*1. ...rinsing and drying the textile, wherein the hydrophobic dye is selected from: benzodifuranes; methine; triphenylmethanes; naphthalimides; pyrazole; naphthoquinone; **and**, mono-azo* ~~*and di-azo dyes*~~*, **with the proviso that the presence of a di-azo hydrophobic dye does not result in the aqueous solution comprising more than 5 ppm of hydrophobic dye**.*"

"*2. ...rinsing and drying the textile, wherein the hydrophobic dye is selected from: benzodifuranes; methine; triphenylmethanes; naphthalimides; pyrazole; naphthoquinone; **and**, mono-azo* ~~*and di-azo dyes*~~*, **and***

wherein the total amount of hydrophobic dye selected from: benzodifuranes; methine; triphenylmethanes; naphthalimides; pyrazole; naphthoquinone; mono-azo dyes and, di-azo dyes does not result in the aqueous solution comprising more than 5 ppm of hydrophobic dye."

The **Fifth Auxiliary Request** comprises independent Claims 1 to 3, which, compared to Claim 1 as granted, were amended to read as follows, respectively:

"*1. the aqueous solution comprising from ~~1 ppb to 5 ppm~~* ***10 ppb to 200 ppb*** *of the hydrophobic dye ...*".

"2. ... rinsing and drying the textile, wherein the hydrophobic dye is ***a*** *~~selected from: benzodifuranes; methine; triphenylmethanes; naphthalimides; pyrazole; naphthoquinone;~~ mono-azo ~~and di-azo~~ dyes~~s~~,* ***and wherein the total amount of hydrophobic dye selected from: benzodifuranes; methine; triphenylmethanes; naphthalimides; pyrazole; naphthoquinone; mono-azo dyes and, di-azo dyes does not result in the aqueous solution comprising more than 5 ppm of hydrophobic dye.***"

"3. .... *rinsing and drying the textile, wherein the hydrophobic dye is* ***a*** *~~selected from: benzodifuranes; methine; triphenylmethanes; naphthalimides; pyrazole; naphthoquinone;~~ mono-azo ~~and di-azo~~ dyes~~s~~,* ***with the proviso that the presence of hydrophobic dye selected from: benzodifuranes; methine; triphenylmethanes; naphthalimides; pyrazole; naphthoquinone; mono-azo dyes and, di-azo dyes does not result in the aqueous solution comprising more than 5 ppm of hydrophobic dye.***"

Compared to Claim 1 as granted, Claim 1 according to the **Sixth Auxiliary Request** was amended to read as follows:

"*1. A **laundry** method of treating **a polyester comprising garment** textile, the method comprising the steps of: (i) treating ~~a~~ **the** textile with an aqueous solution of a hydrophobic dye, ~~suitable for~~ providing a blue or violet shade to ~~white~~ polyester, the aqueous solution comprising from 1 ppb to 5 ppm of the hydrophobic dye and from 0.2 g/L to 3 g/L of a surfactant; and, (ii) rinsing and drying the textile, wherein the hydrophobic dye is selected from: benzodifuranes; methine; triphenylmethanes; naphthalimides; pyrazole; naphthoquinone; mono-azo and di-azo dyes.*".

XIV. The Appellant's arguments concerning inventive step and being of relevance here can be summarised as follows:

Main Request (patent as granted) - Inventive step

a) D1 concerned liquid detergent compositions containing dyes for blueing without staining. Thus it pertained to the same technical field as the patent in suit and was a suitable starting Point for assessing inventive step. More particularly, Example VI of D1 illustrated the use of compositions containing various dyestuffs, one of which incorporated only Solvent Blue 58, an oil soluble anthraquinone solvent dye of Formula I, which according to D1 produced the desirable bluing effect (in this respect, reference was made to Column 3, lines 17-19, of D1). The dye of Formula I of D1 was indisputably a hydrophobic dye as defined in Claim 1 as granted. The amounts of dyes, as defined in Claim 1 of D1 or used in the

method of Example VI of D1, in particular the levels of Solvent Blue 58 illustrated in D1, and also the amount of surfactant illustrated in Example VI of D1, fell within the ranges defined in Claim 1 as granted. This fact was not contested, as also apparent from the details given on Pages 19 and 20 of the letter of the Respondents dated 11 February 2013.

Thus, only the (classes of) dyes defined in Claim 1 as granted distinguished the claimed subject-matter from the methods disclosed in D1/Example VI.

b) As already indicated under Point X *supra*, the Appellant held that the claimed subject-matter was obvious even when considering, for the sake of argument only, that the technical problem put forward by the Respondents, i.e. the provision of a laundry method for treating white polyester-containing textile garments which imparted improved perceptible whiteness, was indeed solved.

c) In particular, the Appellant held that the skilled person starting from D1, and aiming to provide an improved laundry method for treating and shading white polyester containing textile garments, would be motivated, in view of common general knowledge and of several hints in various prior art documents, to replace the anthraquinone dye Solvent Blue 58 of D1 with dyes belonging to at least some of the classes defined in Claim 1 as granted, for the following reasons:

   i) The attempt by the Patent Proprietors to make a distinction between hueing of fabrics in a laundering process and industrial dying

of fabrics was not convincing, as the link between hueing of fabrics and industrial dyes had already been made in D1, which not only taught the use of industrial dyes for hueing of fabrics but also acknowledged that this use was known at that time.

ii) The charged and uncharged colorant dyes mentioned in D1 were all identified by their Colour Index name, the Colour Index only listing industrial dyes.

iii) Nor could the alleged invention reside in the discovery that small amounts of dyes that were known for dyeing fabrics could also be used for hueing fabrics in a wash context in order to provide an improved whiteness perception, as also this step had been already made in D1.

iv) The fact that D1 disclosed a mixture of hydrophobic and hydrophilic dyes was not a disincentive, as Claim 1 at issue did not exclude the combined use of charged (i.e. hydrophilic) and uncharged (i.e. hydrophobic) dyes, as apparent from Claim 14 as granted.

v) D10 (Page 542, last but two sentence of the first paragraph) disclosed that tinctorially weak chromogens, such as anthraquinone, were being replaced by tinctorially stronger chromogens, such as azo and benzodifuranone.

vi) This fact was also confirmed by D14 (i.e. Page 139 of D5, second full paragraph), according to which anthraquinone dyes had poor dyeing strength, which was the reason why they were being replaced by azo dyes.

vii) D10 (Page 546) also taught that the most common dyes for dyeing polyester fabrics

were disperse dyes, which comprised the azo class as the most common and the anthraquinone class as the second most common. This was confirmed by D5, published in 2003, which disclosed (Page 135, Section 3.3.3) that 60% of all disperse dyes, i.e. of the dyes used for dyeing hydrophobic fibres, were based on azo chromophores, whilst anthraquinone chromophores only represented 25% thereof, and that azo dyes were used to create the whole range of shades.

viii) D23 (Page 28, first column, was referred to) was not a mere advertisement, as alleged by the Respondents, but an edited journal article which dealt with the replacement of tinctorially weak anthraquinone disperse dyes. D23 disclosed bright blue mono-azo disperse dyes that were suitable therefor, *inter alia* C.I. Disperse blue 165, 366 and 367 (all of which being preferable disperse dyes according to Claim 9 as granted).

ix) D24, invoked by the Respondents to show disincentives to the said replacement, mentioned some potential disadvantages associated with azo dyes as compared to anthraquinone dyes, such as hydrolysis, heat and reduction stability problems, but under very particular conditions such as Xenon lamp irradiation or the presence of glucose as a reducing agent. However, the "D" values given in D24, concerning diffusion, were important in dyeing, but not in hueing polyester. As regards hydrolysis stability, D24 taught that none of the anthraquinone dyes were stable at a pH above 7, so it was

not apparent that hydrolysis stability played a role when shading in a laundry treatment. Reduction with glucose was not important either in shading. Xenon lamp treatments of 230 hours as in D24 were not relevant when considering hueing to be imparted when washing clothes. Also, storage stability was not important, as Claim 1 concerned a method and not a product. On the other hand, if it were important, no data showing storage stability had ever been provided. In fact, for trying to achieve improved whiteness benefits, which was the sought-for effect, a trade-off of properties would be acceptable to the skilled person. In any case, the properties - other than tinctorial strength - referred to in D24 did not relate to the problem solved by the method of the patent in suit. Moreover, these other properties were not addressed at all in the patent in suit. According to the patent these disadvantages thus appeared to be acceptable, e.g. because they were compensated by the sought-for, much better tinctorial strength, which was the key Point.

x) As regards the argument of the Respondents that the effect shown in D1 was obtained after several cycles, as a result of build up, the method of Claim 1 as granted was open as regards the number of cycles, hence multicycle as that of D1, i.e. it implied build up in exactly the same way.

xi) Since detergent compositions were produced in very high amounts, cost was important.

d) When assessing what would have been obvious for the skilled person at the effective filing date of the patent in suit, it was important to consider that along the years from 1992 (D23) until 2003 (D5) there was a consistent general indication in D5, D10, D14, D23 and D24 that azo dyes and benzodifuranes were tinctorially stronger than anthraquinone dyes. The question was not whether anthraquinone dyes should be disregarded, but whether in the context of a method as decribed in D1, where little dye was used, hence where tinctorial strength was important, the skilled person would have tried to replace the anthraquinone dye used with e.g. azo dyes known to be tinctorially stronger.

e) This was also apparent from the fact that the invoked disadvantages of e.g. azo dyes had not dissuaded the Respondents from applying for a patent directed to the use of azo dyes.

f) Hence, the skilled person starting from D1 would have paid less attention to potential disadvantages such as diffusion, hydrolysis and reduction and would have focussed mainly on tinctorial strength, e.g. in view the smaller amount of dye necessary and of cost aspects. In particular, the skilled person aiming to achieve an improved degree of hueing (e.g. by using a smaller amount of a tinctorially stronger dye) would obviously have tried to replace the anthraquinone dye of D1 with tinctorially strong mono-azo dyes such as Disperse blue CI 165 or 366, which according to D23 were promising in this respect.

g) The claimed method was thus obvious over D1.

Auxiliary requests

h) All these arguments and reasons applied likewise against the claimed subject-matter of each of the auxiliary requests which either contained disclaimers having no bearing on the above considerations or further limiting features already disclosed in D1. The subject-matters of the auxiliary requests comprising the further limitation to the use of mono-azo dyes, e.g. in smaller amounts, or the limitation to the laundry of a polyester-comprising garment textile, were also obvious in view of the prior art and the common general knowledge.

XV. The Respondents' arguments of relevance here can be summarised as follows:

a) D1 was 30 years older than the patent in suit, but nevertheless the most appropriate starting point for assessing inventive step.

D1 (Claim 1, Column 1, lines 30-40 and 50-55, and Column 13 were referred to) disclosed a detergent composition suitable for increasing the apparent whiteness of fabrics, without staining. However, D1 necessarily required Solvent Blue 58, i.e. an anthraquinone dye, in combination with any of two charged dyes as defined in Claim 1 thereof. Thus, D1 concerned a method which differed from that of Claim 1 at issue in that a specific solvent dye was used for providing the desired hueing effect.

b) As reflected in paragraph [0006] of the patent in

suit, the problem solved over D1 was the provision of a more effective laundry method for treating textile garments comprising white polyester, which resulted in improved shading whiteness benefits at low levels of dye.

c) The skilled person starting from D1 and seeking to solve the problem posed had no motivation to use a dye different from Solvent blue 58, not even when taking into account common general knowledge, for the following reasons:

i) The present invention was implemented in the context of a laundry process. There was a great difference between dying and washing clothes, as the operator of a laundry process, unlike the operator of a dyeing process, did not know that he was applying a dye in order to provide a modified whiteness perception. In particular, the invention did not require heat-curing of the dyed fabric and was concerned with treating fabrics with a small amount of dye not to colour but to provide a perception of whiteness. Although the manufacturer of a laundry product had little or no control over the process carried out at whim by the user, he nevertheless had to use a dye having acceptable substantivity to clothes (neither too much nor too little) in the presence of a laundry composition whose *raison d'être* was to remove matter from clothes.

ii) Although D1 disclosed levels of dyes and surfactants which were commensurable with those defined in Claim 1 at issue, the only hydrophobic dye disclosed in D1 was Solvent Blue 58, which was a specific type of blue

anthraquinone dye, namely a solvent dye, which was normally used for colouring gasoline and plastics inks, and not a disperse dye. No further hydrophobic dye was disclosed by D1.

iii) The examples of D1 showed the "b" values after 5 washes, implying that a build up of dye over multiple washes was necessary in order to attain a perception of whiteness.

iv) The Respondents had shown that hydrophobic, dyes such as Disperse Blue 165 and 367 performed better than Solvent Blue 58 of D1. Compared to the anthraquinone dyes of D1, the claimed dyes provided a better colour transfer, which was independent from tinctorial strength, i.e. the tested/claimed dyes provided more whiteness per unit colour in solution than Solvent Blue 58.

v) D5, D10, D14 and D18 concerned industrial dyeing, in particular of polyester fibres, and were thus not relevant in the context of shading to provide whiteness in laundering methods.

vi) In particular, D5 (Page 138, Point 3.2.2.2, was referred to) mentioned that the brilliant blue anthraquinone dyes had major industrial significance. This more specific statement prevailed over the general statement in D10 about replacement of anthraquinone dyes.

vii) D14 disclosed that anthraquinone dyes were particularly useful in the blue to red range whilst warning that azo dyes were less stable than anthraquinone dyes against hydrolysis and reduction. Thus, these usefulness and better stability against

hydrolysis and reduction were not traded off with other properties such as tinctorial strength.

viii) D18 (Pages 36, Point 2.2.3, was referred to) mentioned expensiveness and tinctorial weakness but also good brightness and good fastness properties (Page 297, last line of first paragraph, were referred to). Considering the levels of dyes used in detergent compositions, cost was not that important.

ix) D23 was a mere advertisement.

x) D24 (Pages 72, left-hand column, second paragraph; Page 73, left-hand column, last line; Page 82, Table 3) instead expressly mentioned that the "unrivalled brillance" of anthraquinone dyes counterbalanced their relatively low tinctorial strength, and that azo dyes were weakly resistant to hydrolysis. The many advantages of anthraquinone dyes over azo dyes were more apparent from the table on Page 82 of D24. Also important was the disclosure on Page 84 of D24, according to which anthraquinone dyes were still more advantageous than replacement dyes in the coverage of Barré and other aspects (Point "D. Conclusions and Outlook", in particular right hand column, first, third and fifth paragraphs. Hence, D24 too dissuaded the skilled person from replacing the anthraquinone dyes of D1 by azo dyes.

xi) The skilled person knew that in the claimed method not only tinctorial strength but a number of other factors played a role, such as whether the dye was insoluble, would

diffuse, would decompose, would be stable or hydrolyse in the context of a detergent composition, would show up. Hence, better resistance against hydrolysis and reduction was an important Point against replacement of anthraquinone dyes.

xii) Moreover, whilst D1 focussed only on one specific member of the anthraquinone class of dyes, this class comprised many more dyes, as also apparent the Colour Index, so that for the skilled person the selection of the claimed classes was not obvious.

d) Summing up, in particular in view of the "major significance" of anthraquinone dyes mentioned in D5 and the "unrivalled brilliancy" emphasised in D24, the skilled person would have stayed with the specific anthraquinone dye of D1, i.e. would have had no reasonable expectation of success in terms of an improvement of the whiteness benefits achievable by its replacement. Consequently, it would not have been obvious to try such a replacement, let alone by mono-azo-dyes.

Auxiliary requests

e) All these arguments and reasons were *a fortiori* applicable in support of the inventiveness of the subject-matters claimed according to the auxiliary requests, which were more restricted compared to the subject-matter of Claim 1 as granted.

Reasons for the Decision

Main Request - Inventive step - Claim 1 as granted

The invention

1. The invention concerns a method of treating textile comprising the steps of treating the textile with an aqueous solution of a hydrophobic dye suitable for providing a blue or violet shade to white polyester and a surfactant, followed by rinsing and drying (see paragraph [0007] and Claim 1).

The closest prior art

2. At the oral proceedings before the Board, it was common ground between the parties that the method for treating textiles as described in D1, Example VI, was the most appropriate starting point for the assessment of inventive step. Considering the similarities between the claimed invention and D1 in terms of method features and problems addressed (see *infra*), the Board has no reason to take a different stance.

2.1 D1 (Claim 1) is directed to "a liquid synthetic detergent composition of blue colour having reduced staining characteristics, while retaining the ability to **increase the apparent whiteness of fabrics**", comprising *inter alia* (emphasis added by the board): **"about 0.006 to about 0.025 percent by weight of a dye mixture, consisting essentially of about 0.0005 to about 0.0030 percent by weight of 1,4-bis(2-ethylhexyl-amino) anthraquinone** and at least one soluble anthraquinone dye selected from the group consisting of 1-amino-2-sulfo, 4-(2-sulfo-para toluidino) anthraquinone sodium salt, 1,4-bis(3-sodium sulfonate-

mesitylidino) anthraquinone and mixtures thereof; 0 to about 40 percent by weight of a nonionic detergent; and about 5 to about 20 percent by weight of an alkali metal or organic amine salt of an alkyl aryl sulfonate ...".

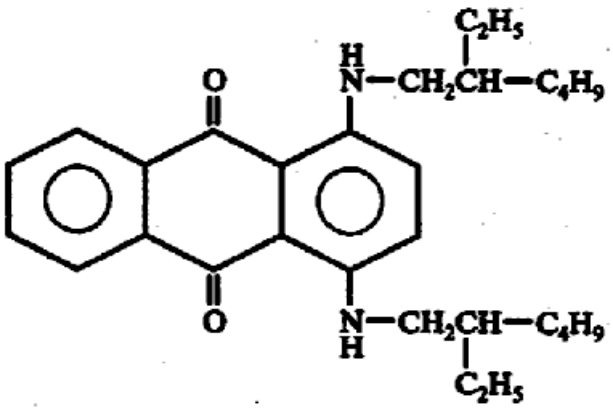
2.2 According to D1 (Column 1, lines 46-56), this liquid detergent product is esthetically pleasant, has a desirable blue color value and also the capacity to **blue the fabrics** with substantially reduced staining. The fabrics that may be treated with the compositions of D1 include those formed from all commonly used natural and synthetic fibres, *inter alia* from cotton and **polyester** fibres, synthetic blends as well as blends of natural and synthetic fibres such as cotton/ polyester blends (Column 4, lines 1-8).

2.3 The 1,4-bis(2-ethylhexylamino)anthraquinone dye referred to in Claim 1 of D1 is an oil soluble dye known as C.I. Solvent Blue 58 and having the following Formula I (see D1, column 2, lines 19 to 40):

FORMULA I.

1,4-bis(2-ethylhexylamino)anthraquinone,

C.I. Solvent Blue 58



It is not in dispute that this dye is a hydrophobic dye

in the sense of Claim 1 at issue. In any case, this is also common general knowledge, as apparent from e.g. D10 (Page 546, "Solvent dyes"), or D18 (Page 295, Point 3.10.1, first paragraph), according to which solvent dyes are water-insoluble and devoid of polar solubilising groups such as sulfonic acid, carboxylic acid, or quaternary ammonium.

2.4 According to D1 (Column 3, lines 16-20, emphasis added by the board), the "total concentration of the dye combination utilized is generally governed by production of the required color value, together with the **desirable blueing effect, which effect is in turn produced by the oil soluble component (Formula I)".** This is also confirmed by the examples of D1 (see *infra* Point 2.5.6).

2.5 In Example VI of D1 (which bridges Columns 12 and 13), the bluing effect of the dye combination of D1 is determined in comparison with an uncolored product and with each of the dyes of the combination used separately. This comparison is accomplished by incorporating varying amounts of the dyestuff combinations and by preparing control formulations which either contain no colorant, or only one of the dyes of Formulae I, II and III, respectively (see the results of "blueing tests" reported in Tables IV and V of D1).

2.5.1 According to Example VI of D1, 26.25 grams of the liquid detergent composition of Example II are added to 3 gallons of deionized water, at 120°F in a stainless steel tub containing a mechanical agitator, similar to that in a commercial washing machine. The water and formulation are agitated for one minute to achieve complete dispersion of the composition. The treatment

liquid so obtained thus provides 2.31 g/L of said detergent composition detergent (letter of the Respondents dated 11 February 2013, Page 19, penultimate paragraph, and Page 20, first paragraph "*the levels of dye and surfactant are commensurate with Claim 1 of the opposed patent*").

2.5.2 In Example VI of D1, the hydrophobic dye Solvent Blue 58 is actually added in amounts ranging from 0.002 to 0.007 wt% (Tables IV and V). These concentrations were converted to ppb in the wash liquor by the Respondents (letter 11 February 2013, Page 19, *supra*), as follows:

dye level %	ppb
0.0005	11.6
0.003	69.3
0.002	46.2
0.007	161.7

2.5.3 The swatches of different fabrics that were treated with said wash liquor according to Example VI include *inter alia*:
d. Spun **Dacron** TF 754 AW*
e. **Polyester** Double Knit TF 720*
f. 65/35 **Dacron**/Cotton blend with a Permanent Press Finish TF 7406 WRL*.

2.5.4 The load of swatches in the tub is then made up to 16 ounces with cotton sheeting TF 400* and agitated for 15 minutes. The rub is then drained and the load is **rinsed** (emphasis added) with agitation for 3 minutes. The washing rinsing cycle is carried out five times and the swatches are hand squeezed between each wash and rinse and at the end of each rinse. The fabric swatches are then **ironed** (hence, dried) and their blue-yellow

reflectance measured on a Gardner XL-10 CDM Reflectometer using a "b" reading. The Reflectometer is standardized by using a Gardner standard plate with a "b" value of +0.2.

2.5.5 The results of the tests are reported in Tables IV and V where the more negative values indicate greater bluing effect. These tables are reproduced here below:

TABLE IV

BLUING TESTS

Product	"b" Values - 5 Washes: Cotton Startex	TF302A Nylon	TF754AW Spun Dacron
1. 0.002%/0.008% Formula I/Formula III	+3.1	+2.3	+3.1
2. 0.002%/0.02% Formula I/Formula III	+3.2	+3.1	+3.2
3. 0.007% - Formula I (Control)	+3.0	+1.2	+1.5
4. No Colorant	+3.7	+4.2	+3.9

Product	TF429 Cotton Shirting	TF7406WRL Dacron/ Cotton Blend	TF720 Polyester Double Knit
1. 0.002%/0.008% Formula I/Formula III	+2.2	+3.1	+3.3
2. 0.002%/0.02% Formula I/Formula III	+2.6	+3.1	+3.4
3. 0.007% Formula I (Control)	+2.6	+0.6	+2.3
4. No Colorant	+2.9	+3.6	+3.9

TABLE V

BLUING TEST

Product	"b" Values - 5 Washes: Cotton Startex	TF302A Nylon	TF754AW Spun Dacron	TF429 Cotton Shirting	TF7406WRL Dacron/ Cotton Blend	TF720 Polyester Double Knit
Formula II - 0.165% (Control)	+3.1	+3.8	+2.7	+2.6	+3.9	+3.7
Formula III - 0.02% (Control)	+2.8	+4.7	+2.7	+3.2	+3.7	+3.8
Formula I - 0.002%/Formula II - 0.005% Formula III - 0.006	+3.0	+3.8	+2.1	+2.8	+2.9	+3.5
Formula I - 0.003%/Formula II - 0.008%	+3.1	+3.1	+1.9	+2.4	+2.4	+3.3
No Colorant (Control)	+3.2	+4.4	+2.6	+2.5	+3.7	+3.7
Formula I - 0.007% (Control)	+2.9	+2.7	+1.1	+2.6	+1.7	+3.0

2.5.6 It can be gathered therefrom, as regards the sought-for "blueing effect", that the formulation providing the best blueing effect on polyester textiles is the Control, containing only the dye of Formula I, i.e. **Solvent Blue 58** (see Tables IV and V) in an amount of 0.007% (161.7 ppb).

2.6 Therefore, D1 discloses methods with all the express features of Claim 1 as granted, except for the different type of the hydrophobic dye used for shading.

The technical problem according to the Respondents

3. According to the Respondents, the technical problem to be solved in the light of D1 was the provision of a laundry method for polyester comprising textile garments resulting in improved shading whiteness benefits at low levels of dyes (see also patent in suit (paragraph [0006]).

The solution

4. As a solution to the technical problem, the patent in suit proposes the method of treating textile according to Claim 1 which is characterised in that it comprises the steps of:
"*(i) treating a textile with an aqueous solution of a hydrophobic dye, suitable for providing a blue or violet shade to white polyester, the aqueous solution comprising from 1 ppb to 5 ppm of the hydrophobic dye and from 0.2 g/L to 3 g/L of a surfactant; and,*
(ii) rinsing and drying the textile, wherein the hydrophobic dye is selected from ***benzodifuranes; methine; triphenylmethanes; naphthalimides; pyrazole; naphthoquinone; mono-azo and di-azo dyes***" (emphasis added by the board).

The success of the solution

5. The Appellant maintained, in writing (e.g. letter of 7 April 2014, Page 4, in particular first and second full paragraphs) as well as at the oral proceedings, that the method according to Claim 1 at issue was obvious in the light of the prior art even when assuming, purely for the sake of argument, that Claim 1 was to be understood as being limited to methods and conditions always resulting in the desired improved

whiteness (shading/blueing) benefit to polyester containing textile garments. In other words, the claimed subject-matter was not inventive over D1 even if the claimed solution was considered to successfully solve the technical problem posed (Point 3 *supra*).

5.1 Since the following considerations of the Board are also based, in the Respondents' favour, on said assumption, there is no need to analyse in detail whether or not the experimental data on file actually convincingly demonstrate that the improved shading whiteness benefit aimed for is indeed achieved across the full ambit of Claim 1 at issue.

Obviousness

6. Hence, it has to be assessed whether in the light of the state of the art and common general knowledge the claimed solution was obvious for the skilled person starting from the closest prior art, i.e. a method as disclosed in Example VI of D1, and trying to solve the stated technical problem.

In other words, the question has to be answered whether the skilled person would obviously have considered using, in a laundry method for treating textile garments containing white polyester, a shading dye selected from the classes of dyes defined in Claim 1 at issue instead of the specific anthraquinone dye to be used according to D1.

6.1 D1 taken alone

6.1.1 Since D1 expressly relates to "laundry detergents" (see title) and "increase ... whiteness" , the skilled reader will inevitably understand that the envisaged

field of application of the composition disclosed includes laundry methods for treating textile garments, including garments comprising white polyester fibres.

6.1.2 However, D1 discloses and claims only the use of one particular hydrophobic dye suitable for producing the desired blueing effect, namely that of Solvent Blue 58 of Formula I (Column 3, lines 16-20), which is an anthraquinone dye.

6.1.3 Thus, D1 taken alone does not hint at using some other hydrophobic dye for attaining the sought-for improved blueing effect.

6.2 Common general knowledge - D10 and D5/D14/D18

Common general knowledge must also be taken into account when assessing the issue of inventive step in the light of the closest prior art described in D1.

6.3 Document D10, an excerpt from the Kirk-Othmer Encyclopedia of Chemical Technology (4th edition, 1993) indisputably illustrates common general knowledge.

6.3.1 On Page 542, lines 12-18, ("Dyes and Dyes intermediates") D10 contains the following statement (emphasis added): "The oil crisis **in the early 1970s**, which resulted in a steep increase in the prices of raw materials for dyes, **created a drive** for more cost-effective dyes, both by improving the efficiency of the manufacturing processes and by **replacing** tinctorially weak chromogens, such as **anthraquinone**, **with** tinctorially stronger chromogens, such as **azo** and benzodifuranone. These themes are still important and ongoing, as are the current themes of product safety, quality and protection of environment.".

6.3.2 The Board gathers from this passage of D10 that at the effective filing date of the patent in suit it was already generally known for quite some time that the tinctorial strength of a dye is of great practical value, as it is directly related to the economic viability of the dye, and that for this reason dyes based on anthraquinone chromogens qualified as "weak and expensive" in D10 (Page 543, lines 4-5) had been and were being more and more replaced with dyes based on azo and benzodifuranone chromogens qualified as "strong and cost-effective" (D10, Page 543, lines 4-5).

6.3.3 The quoted passages of D10 relate to general characteristics of the dyes. More particularly, the trend of replacing tinctorially weak anthraquinone dyes with tinctorially strong azo dyes and benzodifuranone is presented in D10 as relating to the basic chemical structure of the dyes, i.e. to the chromogens as such (the basic arrangement of atoms responsible for the colour of a dye according to D10, Page 542, lines 5-6) (see also Page 548, "Classification of dyes by Chemical Structure", first full paragraph), hence independently of coupling groups, thus from colour and shades, as well as from the specific intended use or application of the dye, e.g. as a disperse dye or as a solvent dye.

6.3.4 Hence, for the Board, the teaching of document D1 has to be considered against the background of the general trend, already prevailing at the filing date of D1 as referred to in D10, to replace anthraquinone dyes with azo and benzodifuranone dyes, because of the higher tinctorial strength and cost-effectiveness of the latter dyes.

6.3.5 The following, more specific information concerning the replacement of anthraquinone with azo dyes, in

particular as regards suitable coupling components, or in respect of hydrophobic dyes for the dyeing of hydrophobic fibres, was also generally known before the priority date of the patent in suit, as apparent from e.g. document D10 and documents D5/D14/D18, the latter being excerpts from a same book also undisputedly illustrating common general knowledge at the effective filing data of the patent in suit:

(a) D10 (see e.g. Page 554, last full paragraph and last four lines) discloses that whilst the carbocyclic azo dyes cannot compete with anthraquinone dyes in terms of brightness, heterocyclic azo dyes instead combine the brightness and high fastness properties of anthraquinone dyes with the strength and economy of azo dyes.

(b) D18 (Page 36, Point 2.2.3) too not only mentions that anthraquinone are tinctorially weak and also expensive. As regards solvent dyes, D18 mentions that solvent dyes for polyester fibres are principally disperse dyes (Page 295, Point 3.10.1, last sentence of first paragraph) (Solvent dyes of the type used in D1 were known, according to D5 (Page 297, Formula 6), to be used for coloring gasoline and mineral oil).

(c) D5 (Page 135, Points 3.2.2, first paragraph; Point 3.2.2.1 up to Page 136, third full paragraph) discloses that about 60% of all industrially applied disperse dyes are azo dyes. They may be produced by relatively simple processes. About 50% thereof are mono-azo dyes. The formulae of the mono-azo dyes having the greatest commercial importance are shown in Figures 1 and 2 of D5. They correspond to or at least overlap substantially with the dye definitions according to Claims 4 and 8 the patent in suit. The

statement on Page 138 (Point 3.2.2.2, first sentence) concerning the "major industrial significance" of blue anthraquinone dyes, invoked by the Respondents, has to be seen in context with the next Page, which is D14.

(d) In D14 (Page 139, second paragraph) it is mentioned that the tinctorial weakness of anthraquinone dyes is indicated by their low molar extinction coefficient, and that anthraquinone dyes are being increasingly replaced with azo dyes, because the azo dyes of similar shades have a higher molar extinction coefficient.

6.3.6 Hence, taking into account common general knowledge, the skilled person would have considered that the specific hydrophobic dye used as shading/blueing agent in the methods described in D1, which was not qualified as disperse dye, was not of very pronounced tinctorial strength.

6.3.7 The Board concludes that already for these reasons alone the skilled person was motivated to replace said specific dye by tinctorially stronger, cost effective dyes known to be particularly suitable for dying polyester, i.e. disperse dyes (D10, Page 546, **"Disperse Dyes** ... They are used predominantly on polyester").

6.4 Combination with document D23

6.4.1 More specific hints regarding the replacement of anthraquinone dyes with disperse mono-azo dyes were also available from a further document cited in the proceedings, namely D23.

6.4.2 D23 *inter alia* deals with the replacement of tinctorially weak anthraquinone disperse dyes with

disperse azo dyes in the context the dyeing of polyester fibres (Page 18, right column, last line, to Page 19, left column and middle column, first full paragraph). In particular, according to D23 (Page 18, right column, first full paragraph), anthraquinone disperse dyes are not only tinctorially weak but also poor in wetfastness (i.e. resistance of the material colour to wetting) and with respect to staining adjacent nylon, expensive relative to mono azo disperse dyes and environmental problematical.

6.4.3 More particularly, D23 deals with the replacement of bright blue disperse anthraquinone dyes with bright blue mono-azo dyes, i.e. to produce bright blue colours.

In this respect, D23 *inter alia* mentions Page 19, first and second columns), in increasing order of preference for the replacement, four disperse azo dyes, namely: C.I. Disperse Blue 165; C.I. Disperse Blue 366 and C.I. Disperse Blue 367; and a mono-azo thiophene bright blue being marketed as Dispersol Blue C-RN 200 Grains.

6.4.4 As regards the least preferable blue dye, C.I. Disperse Blue 165 (a mono-azo dye according to Figure 1 of D23), D23 mentions that it is more than three times stronger in tinctorial strength than the popular anthraquinone Disperse Blue 56 and that it has superior wet- or washfastness and much lower staining of adjacent nylon fabric. The only disadvantage of the former mentioned is that it is more easily reduced during a high temperature dyeing cycle.

6.4.5 Still according to D23, however, the combinations of two dyes, C.I. Disperse Blues 365/366 and 367/366 (C.I. Disperse blue 366, according to Figure 3, is also a

mono-azo dye) are said to overcome some of the drawbacks of C.I. Disperse Blue 165, and to be similar in hue to the anthraquinone dye.

6.4.6 Most important, still according to D23, a mono-azo thiophene dye (i.e. a heterocyclic mono-azo dye) "explodes the myth that mono-azo blue dyes cannot achieve the brightness of C.I. Disperse Blue 56 (an Anthraquinone dye)". This heterocyclic mono-azo dye is not only more resistant to high temperature dyeing than other azo blues, but also has superior wetfastness than the anthraquinone dye C.I. Disperse Blue 56.

6.4.7 Thus, D23 discloses mono-azo disperse dyes for brightly dyeing polyester fibres in blue, which are superior in tinctorial strength, and also in at least some fastness properties, compared to a popular anthraquinone disperse dye.

7. With regard to the obviousness of a combination of D1 with common general knowledge as illustrated by D10 and D5/D14/D18 and/or with D23, the Respondents have substantially opposed two lines of arguments:
i) On the one hand, they emphasised that D10 and D5/D14/D18 concerned industrial dyeing, whilst the invention had to do with shading of textiles in a laundry method, which was different.
ii) It was apparent from the documents cited, in particular from D24, that azo dyes presented a number of disadvantages, compared with anthraquinone dyes, which would dissuade the skilled person from replacing anthraquinone dyes with azo dyes.

7.1 As regards D10 and D5/D14/D18

7.1.1 According to D10 the scale and growth of the dyes

industry is inextricably linked to that of the textile industry, and dyes manufacturers tend to concentrate their efforts on producing dyes for the two most important textile fibres, i.e. cotton and polyesters (Page 542, second paragraph). This reference to dyes and fibres is of a general nature and cannot be taken as a statement relativizing the general importance of tinctorial strength disclosed elsewhere in D10, in a way confining the anthraquinone replacement trend to the field of dyeing fibres only, even though shading is not an application expressly addressed in D10.

7.1.2 For the board, the argument of the Respondents that dyeing and shading were different applications involving different process conditions, and that the skilled person would not have considered documents relating to dyeing when concerned with shading, is not convincing, for the following reasons:

(a) A link between industrial dyes, their use with a liquid detergent and effects such as "bluing white fabrics" and "blueing effect", at "sufficiently reduced concentration", is already acknowledged and disclosed in D1 (Column 1, lines 9, 20 and 55; Column 2, line 17), and cannot be invoked again as an invention. Also, D1 already discloses that industrial dyes were being used in detergent compositions "during wash or pre-wash applications for specific spot or stain removal" (D1, Column 1, lines 21-22), i.e. under a range of conditions and in the presence of a laundry composition whose whole "raison d'être" is to remove spots/stains from clothes. Hence, the use of industrial dyes for hueing white fabrics in laundering processes was known from D1.

(b) Also, despite the differences between shading and dyeing invoked by the Respondents, the dyes which

are used in D1 are commercial dyes listed in the Colour Index. As a case in point, D1 uses as blueing dye a specific solvent dye which according to D10 (and D18 too) is normally used for coloring plastics, gasoline, (mineral) oils and waxes, i.e. for industrially dyeing/colouring substrates quite different from textile fibres;

(c) Since, as alleged also by the Respondents (Page 18 of the letter dated 11 February 2013), blueing or shading dyes should nevertheless be (neither too much nor too little) substantive to the fibres to which they should transfer, as typically do industrial dyes for dyeing fibres, shading merely relates to the use of more minute amounts of dyes under different operating conditions.

(d) It is indisputable (D10, Pages 544 and 546) that at the time of filing the application, on which the opposed patent was granted, the most common dyes used for dyeing polyester fibres were disperse dyes.

(e) Since Claim 2 of the patent as granted also covers solvent dyes, any distinction between solvent (as in D1) and disperse dyes (as e.g. in D10) is not relevant.

(f) As regards the allegation that an improvement in whiteness had been shown by the Respondents, the Board has taken it into consideration (acknowledged) for the sake of assessing inventive step, in particularly whether it was nevertheless obvious to try in the expectation of success.

(g) However, contrary to the Respondents, the Board considers that *a fortiori* in applications such as bluing by shading, where mainly the colour (violet or blue) imparted to the fibres surface is of importance for achieving the desired effect at low

levels of dyes (which implies effectiveness), the tinctorial strength does play a major role.

(h) As a case in point, when using a dye having a significantly higher tinctorial strength than an existing dye (e.g. than the solvent blue of D1), the dyer, and the formulator of a blueing composition as well, will only need a significantly smaller dye quantity to obtain the desired colour effect. Provided the new dye is available at lower cost than the existing dye, it will be more cost effective.

(i) In this respect, the build up effect allegedly attained in the methods of D1 cannot be considered as a further difference, as it is not excluded by the wording of Claim 1 according to the Main Request.

(j) Finally, the question which arises in response to many of the objections by the Respondents against documents relating to industrial dyeing of fibres can be worded as follows: where else would the skilled person find information on general characteristics, and hence suitability of dyestuffs for a given purpose, if not in handbooks and encyclopedia, such as D10 and D5/D14/D18, concerning the dyes as such?

(k) No counter evidence in this respect was ever brought up.

7.2 As regards D24

7.2.1 D24 too deals with the replacement of disperse anthraquinone dyes, in particular in the blue region, according to which the well-known low tinctorial strength of anthraquinone dyes is counterbalanced by their "unrivalled brilliance" in certain blue regions This passage on Page 72, left column, second full

paragraph, was considered by the Respondents as something which would have dissuaded the skilled person from replacing blue anthraquinone dyes with other dyes, let alone azo dyes.

7.2.2 However, D24 is older than D23 and D10, as it confines itself to researches in the area of brillant blue disperse dyes for polyester fibres done in the years 1967-1984 (Page 72, left column third full paragraph).

7.2.3 Nevertheless, as regards brillant blue chromophores (starting from Page 79), D24 *inter alia* discloses (Page 79, right column, penultimate paragraph before Point C. 1.2) that in particular the tiophene-2-azo Blue XIX (described in C1.4) is still superior to the standard anthraquinone dye Blue VI.
More particularly, D24 (Point C.4) illustrates and concludes that, compared with the anthraquinone blues, the selected replacement products, including the mono-azo dyes of Formula (26) on Page 79, which correspond to and fall within the definition of suitable mono-azo dyes according to claim 8 at issue, exhibit considerably higher molar tinctorial strength.

7.2.4 The Respondents, on the basis of the data shown in the table of Page 82 (explanation of the terms used can be found on Page 77), have particularly stressed that apart from their better values for the molar extinction coefficient ε_{mol}, i.e. their better tinctorial strength, all the other reported properties of the replacement dyes, such as hydrolysis and reduction stability, fastness, coverage of barré were worse. Since the latter, according to the Respondents, were also important when carrying out a complex process such as shading, the skilled person would not have expected any

success achievable by such a replacement of the known anthraquinone dye in the method of D1.

7.2.5 The position of the Board in this respect is as follows:

(a) D24 (Page 84, Point "D. Conclusions and Outlook", second full paragraph) suggests that already merely from the considerably higher tinctorial strengths of the replacement products (including mono-azo products), the replacement of anthraquinone dyes could be expected to be economically successful, despite some potential difficulties pointed out by the Respondents (Page 84, right hand column, first, third and fifth full paragraphs).

(b) As regards application and fastness (Page 84, right column, fourth full paragraph), D24 mentions that the replacement of Anthraquinone dyes was a great success.

(c) As to the coverage of barré (i.e. the tendency of the dye to show the substrate-related differences to dye-uptake due to temperature differences and and various draw ratios used during manufacture), D24 (Page 84, right column, sixth full paragraph) discloses that owing to the quality improvements achieved by the yarn manufacturers, this factor became less important.

(d) The generally lower tendency to thermo-migration and more favourable rapid-dyeing behaviour are examples of properties where many replacement products are superior to the anthraquinone dyes (Page 84, right column, penultimate paragraph).

(e) As regards the fastnesses, the sensitivity to hydrolysis and the stability to reduction, still according to D24:

(i) Certain replacement products (e.g. the mono-azo-dyes Blue XIV, XV, XVII of formula (26)) attain the light fastness of the best Anthraquinone dyes, and also the sublimation fastness, and are fully adequate for application on textiles (Page 81, right column, Point C.4.2);

(ii) Although practically all anthraquinone dyes were stable to hydrolysis over a wide pH range, and many replacement product were stable at a pH of about 5 under high thermal dyeing conditions, replacement mono-azo dyes 0such as Blue XVII and XVIII were pH-stable (Page 84, left column, first full paragraph).

7.2.6 D24 concludes its analysis with the final remarks that the process of gradual replacement of anthraquinone dyes will continue, although specialty anthraquinone dyes could be expected to retain their position for a long time to come (which last passage has also been particularly emphasised by the Respondents).

7.2.7 For the Board, D24 not only foreshadows what was subsequently disclosed in D10 and D23 but actually confirms that tinctorial strength was and is the main factor driving the ongoing replacement of anthraquinone dyes with e.g. mono-azo dyes. This dominant drive is not mitigated by the fact that depending on the specific dyes and application conditions used, properties such as hydrolysis and reduction sensitivity or fastness of the replacement products might be poorer (e.g. in the context of industrial fibre dyeing) than those of the anthraquinone dyes, e.g. because process conditions can be found which mitigate those less favourable properties.

7.2.8 Moreover, this line of arguments by the Respondents is not convincing because the patent in suit is totally silent on these further important properties and process aspects, whilst Claim 1 merely defines entire **classes** of dyes such as the class of the mono-azo dyes, and not any specific dyes. Thus, the Respondents apparently accepted possible drawbacks of e.g. the mono-azo dyes, but in any case they did not disclose how to overcome them, insofar as they actually occur in the context of the claimed process.

7.3 Conclusion regarding obviousness

7.3.1 Common general knowledge (D10 and/or D5/D14/D18), as well as the specific disclosure of D23 or of D24, illustrating the trend towards replacing the tinctorially weak anthraquinone dyes with the tinctoriallly stronger mono-azo dyes, in particular heterocyclic, strongly motivated the skilled person seeking to solve the technical problem posed (Point 3, *supra*) to try replacing the anthraquinone solvent dye of D1 by e.g. disperse mono-azo dyes for the dyeing of polyester fibres, in the expectation of success, i.e. improved shading whiteness benefits in terms of improved perceived whiteness and/or improved process economy.

7.3.2 Since it was generally known (e.g. D10, Page 546; or D5) that azo and anthraquinone dyes are dominant in both classes of disperse dyes for polyester fibres and solvent dyes, both concerning hydrophobic dyes for hydrophobic substrates, and considering the general trend referred to in D10 (*supra*), it can be concluded that the mono-azo dyes generally disclosed in D10 and/or D5, as well as the specific disperse mono-azo blue dyes disclosed in D23, and/or the specific mono-azo

blue dyes illustrated in D24, were all suitable candidates for the replacement of the anthraquinone dye of D1 in the expectation of success, at least in view of their tinctorial strength.

7.3.3 The mono-azo dyes referred to on Pages 548 and 549 of D10 ("Classification of Dyes by Chemical Structure" and "Azo dyes"), in particular the formula on Page 548 and its detailed description, and formulas (1) to (3) on Page 549), as well as the heterocyclic azo dyes mentioned on Page 554 of D10, last paragraph, fall under the definition of suitable hydrophobic shading dyes according to Claim 4 as granted, hence also under Claim 1 as granted. The mono-azo dyes having the greatest commercial importance as shown with reference to Figures 1 and 2 of D5 (Pages 135 and 136) appear to correspond to or overlap with those defined in Claims 4 and 8 the patent in suit. The C.I. Disperse dyes 165, 366 and 367 disclosed by D23 are expressly mentioned in Claim 9 as granted of the patent in suit. The thiophene bright blue mentioned in D23 appears to fall under the definition given in Claim 4 as granted, namely under "D denotes an heteroaromatic group". Formula (26) of D24 appears to correspond to the formula defined in Claim 8 as granted, which depends on Claim 1 as granted, so that also these dyes fall under Claim 1 as granted.

7.3.4 Consequently, in the Board's judgement, trying to replace the anthraquinone dye Solvent Blue 58 of D1 with said mono-azo dyes of D10, and/or D5, or, more particularly, with any of the preferred mono-azo disperse blue dyes of D23, or D24, was an option readily available to the skilled person,and was worth trying in the expectation of success. Upon trying this possibility, the skilled person would inevitably have arrived, without the exercise of inventive ingenuity,

at a process solving the technical problem formulated by the Respondents (Point 3, *supra*), i.e. an laundry method for polyester comprising textile garments providing improved shading whiteness benefits at low levels of dyes.

7.4 Hence, Claim 1 is directed to subject-matter which does not involve an inventive step (Articles 100(a), 52(1) and 56 EPC).

Auxiliary requests

8. Admissibility of the auxiliary requests

8.1 The Respondents' seven auxiliary requests at issue correspond essentially to six auxiliary requests already filed during the opposition procedure. The first, second and fourth to Sixth Auxiliary Request were (re-)filed in reply to the statement of grounds of appeal, and the additional "First 1a Auxiliary Request" and the corrected "Third Auxiliary Request " at issue were filed in response to objections raised by the Appellant.

8.2 The Appellant raised various, also formal, objections against the sets of claims filed as auxiliary requests, but did not object to the admission of the requests as such.

8.3 Under these circumstances, the Board decided to admit and consider all the auxiliary requests of the Respondents pursuant to Articles 12 and 13 RPBA.

9. Since none of said auxiliary requests is allowable for the reasons (lack of inventive step) indicated below, there is no need to deal with the other objections

raised against these requests, including formal objections under Articles 84 and 123 EPC.

10. First and First (1a) Auxiliary requests

10.1 Claim 1 of the First Auxiliary Request and Claim 1 of the First (1a) Auxiliary Request both comprises a disclaimer having no bearing on the general validity of the considerations under the assessment of inventive step for the Main Request, *supra,* since said disclaimers were merely inserted to exclude some very specific prior art methods disclosed in a further prior art document of no particular relevance in said assessment and which was, hence, not considered in this context.

10.2 For the reasons already given under Points 6 to 7, *supra*, such methods do not involve an inventive step (Articles 52(1) and 56 EPC).

10.3 The First Auxiliary Request and the First (1a) Auxiliary request are thus not allowable either.

11. Second, Third and Fourth Auxiliary Requests

11.1 Claim 1 according to the Second Auxiliary Request and, according to the Respondents, also Claim 1 according to the Third Auxiliary Request, are both limited to a method relying on the use of a mono-azo dye as the hydrophobic blue-shading dye. Claims 1 and 2 according to the Fourth Auxiliary Request are, according to the Respondents, identical to Claim 1 as granted "*except that di-azo hydrophobic dyes have been removed from the scope of Claim 1*".

11.2 For the reasons already given under Points 6 to 7,

supra, in particular Point 7.3.4, such methods too do not, however, involve an inventive step (Articles 52(1) and 56 EPC).

11.3 The Second, Third and Fourth Auxiliary Requests are thus not allowable either .

12. Fifth Auxiliary Request

12.1 Compared to Claim 1 as granted, Claim 1 according to the Fifth Auxiliary Request defines the more limited concentration range of "*from 10 ppb to 200 ppb*" for the hydrophobic dye.

12.1.1 Concentrations in this more limited range are, however, already illustrated in D1/Example VI (Point 2.5.2, *supra*) (this being acknowlegded in the table on Page 19 of the Respondents' letter dated 11 February 2013). The skilled person would thus be prompted to try similar concentrations when using other hydrophobic dyes for shading purposes and would thus arrive at the subject-matter claimed without any ingenious considerations or measures.

12.1.2 Hence, the subject-matter of Claim 1 according this request does not involve an inventive step (Articles 52(1) and 56 EPC).

12.2 Independent Claims 2 and 3 according the Fifth Auxiliary Request are, according to the Appellant, "limited to mono-azo dyes".

12.2.1 For the reasons already given under Points 6 to 7, *supra*, in particular Point 7.3.4, *supra*, these claimed methods do not, however, involve an inventive step (Articles 52(1) and 56 EPC).

12.3 The Fifth Auxiliary Request is thus not allowable either.

13. Sixth Auxiliary Request

13.1 The subject-matter of Claim 1 according to the Sixth Auxiliary Request expressly concerns "*a laundry method of treating a polyester comprising garment textile*.

13.2 Such a process does not involve an inventive step over D1 (Articles 52(1) and 56 EPC) for the reasons already set out under Points 6 to 7, *supra*, considering in particular that D1 already discloses a laundry method of treating a polyester comprising garment.

13.3 The Sixth Auxiliary Request is thus not allowable either.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked

The Registrar: The Chairman:

D. Magliano B. Czech

Decision electronically authenticated