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**Datasheet for the decision
of 31 January 2018**

Case Number: T 0830/14 - 3.3.06

Application Number: 07703396.7

Publication Number: 1994135

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Language of the proceedings: EN

Title of invention:
LIQUID WHITENING MAINTENANCE COMPOSITION

Patent Proprietor:
Unilever PLC / Unilever N.V.

Opponent:
The Procter & Gamble Company

Headword:
Solubilised shading dye / UNILEVER

Relevant legal provisions:
EPC Art. 52(1), 56
RPBA Art. 13(1)

Keyword:

Inventive step (no) main request - obvious alternative - (yes)
2nd auxiliary request - non-obvious alternative
1st auxiliary claim request filed after issuance of the
summons to oral proceedings- not admitted

Decisions cited:

Catchword:



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Case Number: T 0830/14 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 31 January 2018

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 12 February
2014 rejecting the opposition filed against
European patent No. 1994135 pursuant to Article
101(2) EPC.**

Composition of the Board:

Chairman B. Czech
Members: P. Ammendola
 J. Hoppe

Summary of Facts and Submissions

- I. This appeal lies against the decision of the Opposition Division rejecting the opposition filed against European patent No. 1 994 135.
- II. The patent in suit relates an **aqueous laundry liquid detergent formulation** (herein below **ALLD formulation**).
- III. Claims 1, 6, 7 and 13 of the patent as granted read as follows (terms added to the corresponding claims of the application as filed made apparent by the Board):

"1. An aqueous laundry liquid detergent formulation comprising:

(a) 0.000001 to 0.01% of a hydrophobic dye

(b) between 10 to 50 wt% of a surfactant mixture, the surfactant mixture comprising: (i) a non-ionic surfactant; and (ii) an anionic surfactant selected from the group consisting of: linear alkyl benzene sulphonate (LAS), alkyl sulphate, and alkyl ethoxylated sulphate, and,

(c) that balance adjuncts to 100 wt %,

*wherein the **weight** ratio of the total content of linear alkyl benzene sulphonate and alkyl sulphate:non-ionic:alkyl ethoxylated sulphate is 1:0.5 to 3:0.5 to 3, and the alkyl ethoxylated sulphate is an alkyl ethoxylated sulphate having between 1.0 to 1.5 ethylene oxide units."*

"6. An aqueous laundry liquid detergent formulation according to any preceding claim, wherein the

hydrophobic dye is an anthraquinone benzodifuranes, methine, triphenylmethanes, naphthalimides, pyrazole, naphthoquinone and mono-azo or di-azo dyes."

"7. An aqueous laundry liquid detergent formulation according to claim 6, wherein the hydrophobic dye is blue or violet and selected from: a) mono-azo dyes and b) anthraquinones which do not contain alkyl chains."

"13. An aqueous laundry liquid detergent formulation according to any preceding claim, wherein a surfactant other than defined in claim 1 is present at a levels of less than 3 wt%."

IV. The Opponent had requested revocation of the patent in its entirety on the grounds of lack of inventive step and insufficiency of the disclosure (Articles 100(a) and (b) EPC).

During the opposition proceedings the Parties relied, *inter alia*, on the following evidence:

D1 = "Encyclopedia of Chemical Technology", Kirk-Othmer, 1993, vol.8, 4th ed., pages 542 to 554.

D3 = US 3,958,928 A

D5 = WO 98/47990 A1

A4 = "Annex 4" filed during the oral proceedings before the Opposition Division: Summary of experimental data reported in the patent in suit and by the Patent Proprietor presented during the opposition proceedings.

V. In the decision under appeal, the Opposition Division came to the following conclusions:

(a) Absent any evidence to the contrary, the mere use of term "*hydrophobic [dye]*" in claim 1, although being broad, did not justify the conclusion that that the requirement of sufficiency of disclosure was not met.

(b) The person skilled in the art starting from the liquid detergent formulation disclosed in D3 as the closest prior art, even if simply seeking to provide an ALLD formulation comprising an alternative surfactant mixture, would not consider modifying this closest prior art such as to arrive at a formulation as claimed. Thus, the claimed subject-matter involved an inventive step.

VI. In its statement of grounds of appeal the **Appellant** (Opponent) rebutted these conclusions and maintained sufficiency and inventive step objections.

In this statement (see the first paragraph on page 3) the expression "ternary blend" is used to identify a mixture of the (at least three) different surfactants in specific weight ratios as expressly referred to in claim 1, namely

i) non-ionic surfactant (herein below **NI**),

ii) linear alkyl benzene sulphonate (herein below **LAS**) and/or alkyl sulphate (herein below **AS**), and

iii) alkyl ethoxylated sulphate with between 1.0 and 1.5 ethylene oxide units (herein below **AE_{1.0-1.5S}**;

similarly **AE_nS** is used to refer to alkyl ethoxylated sulphate with a number "n" of ethylene oxide units),

these surfactants being mandatorily present in the ALLD formulation at a weight ratio (LAS + AS) : NI : AE_{1.0-1.5}S of 1 : 0.5 to 3 : 0.5 to 3.

The expression **ternary blend** is also used herein below with the same meaning.

VII. In its reply, the **Respondent** (Patent Proprietor) defended the patent in its granted version. However, it also filed (*inter alia*) a set of amended claims labelled 1st Auxiliary Request.

Claim 1 of this request resulted from appending at the end of claim 1 of the application as filed the wording "*wherein the hydrophobic dye is blue or violet and selected from: a) mono-azo dyes and b) anthraquinones which do not contain alkyl chains*" taken from claim 7 of the application as filed.

VIII. The Board summoned the Parties to oral proceedings and issued a communication conveying the Board's provisional opinion on some of the issues to be discussed at the forthcoming hearing.

IX. The Respondent replied by letter dated 11 January 2018, enclosing four sets of amended claims labelled 1st to 4th Auxiliary Request.

In particular, claim 1 of this new **1st Auxiliary Request** differs from claim 1 as originally filed in that it reads as follows (amendment by insertion made apparent by the Board):

"1. *An aqueous laundry liquid detergent formulation comprising :*

(a) ...

*(b) ... and alky ethoxylated sulphate,
and,*

***wherein a surfactant other than defined in (i)
and (ii) is present at levels of less than 3 wt.
%; and***

(c) that balance ...".

The previously pending 1st Auxiliary Request was turned into the 4th Auxiliary Request.

X. The Appellant replied with letter of 23 January 2018, objecting to the admittance of the new 1st to 3rd Auxiliary Requests into the proceedings. It also raised a new objection under Article 123(3) EPC (see fifth paragraph on page 2 of this letter) against claim 1 of the 4th Auxiliary Request (previously pending 1st Auxiliary Request).

XI. At the oral proceedings of 31 January 2018 the Respondent, aware of the Board's view regarding the non-allowability of the Main Request, and considering the non-admittance of the pending 1st Auxiliary Request, filed an amended set of claims labelled "**New 2nd Auxiliary Request**".

Claim 1 of this request reads as follows (differences compared to claim 1 as granted made apparent by the Board):

"1. *An aqueous laundry liquid detergent formulation comprising :*

(a) 0.000001 to 0.01 wt% of a hydrophobic dye
(b) between 10 to 50 wt% of a surfactant mixture,
the surfactant mixture comprising: (i) a non-ionic
surfactant; and (ii) an anionic surfactant selected
from the group consisting of: linear alkyl benzene
sulphonate (LAS), alkyl sulphate, and alkyl
ethoxylated sulphate, and,
(c) that balance adjuncts to 100 wt %,

wherein the ~~weight~~ ratio of the total content of
linear alkyl benzene sulphonate and alkyl
sulphate:non-ionic:alkyl ethoxylated sulphate is
1:0.5 to 3:0.5 to 3, and the alkyl ethoxylated
sulphate is an alkyl ethoxylated sulphate having
between 1.0 to 1.5 ethylene oxide units, **wherein
the hydrophobic dye is blue or violet and selected
from: a) mono-azo dyes and b) anthraquinones which
do not contain alkyl chains, with the proviso that
the total amount of hydrophobic dye is 0.000001 to
0.01 wt%.**"

The dependent claims 2 to 11 of this request are
directed to more specific embodiments of the ALLD
formulation of claim 1.

XII. Final requests

The **Appellant** (Opponent) requested that the decision of
the first instance be set aside and the patent be
revoked.

The **Respondent** (Patent Proprietor) requested that the
appeal be dismissed (Main Request), auxiliarily that
the patent be maintained on the basis of the claims
according to one of the pending auxiliary requests, to
be considered in the following order:

- the auxiliary request, titled "1st Auxiliary Request" filed with letter dated 11 January 2018 or
- the auxiliary request, titled "New 2nd Auxiliary Request", filed during the oral proceedings or
- the auxiliary request, titled "4th Auxiliary Request", filed with letter dated 11 January 2018 or
- the auxiliary request, titled "2nd Auxiliary Request", filed with letter dated 11 January 2018 or
- the auxiliary request, titled "3rd Auxiliary Request", filed with letter dated 11 January 2018.

XIII. The arguments of the Appellant of relevance here may be summarised as follows.

Ambit of claim 1 as granted

This claim did not impose any specific minimum level for the ternary blend present in the composition. Thus the surfactant mixture "(b)" could be made almost entirely of any sort of surfactants. For instance, claim 1 embraced also ALLD formulations comprising 49.9 wt% of cationic surfactants and 0.1 wt% of ternary blend.

Insufficiency of the disclosure

The Appellant considered the claimed ALLD formulations were insufficiently disclosed for two reasons:

- (a) "[T]he means for measuring the 'hydrophobic' parameter of the present claims" were not "made available to the skilled person after studying the patent".

(b) "[T]he skilled person is under an undue burden to establish what are the minimum levels of ternary blend required to achieve the alleged technical effect. Furthermore, the skilled person has not guidance as to what the maximum amount of other surfactant components can be in the mixture, and how much of them there can be without causing precipitation of the hydrophobic dye. Similarly, the Patent fails to teach how much ternary blend has to be present depending on the presence or absence of other surfactants".

Inventive step - claim 1 as granted

Example 1 of D3 could be regarded as the closest prior art. The experimental data of Annex 4 were too limited to prove that the patented ALLD composition solved, across the whole ambit of claim 1, the posed technical problem of providing ALLD formulation comprising "hydrophobic" shading dyes displaying a high level of stability of dye solubilisation. In particular, since the claim imposed no minimum level for the ternary blend, claim 1 allowed for almost all the surfactant mixture to be made of e.g. cationic surfactants that the patent itself discouraged the skilled person to use, most probably because surfactants of this kind predictably lead to a poorer solubilisation of the dye. Moreover, it was well-known that aqueous compositions containing large amounts of surfactants (as covered by claim 1) were complex systems, wherein the surfactants might generate several very different structures with very different physical-chemical properties. Thus, even small variations of the molecular structure of only one of the used surfactants might affect the stability of the dye solubilisation, as also apparent e.g. from the

data reported for the comparative formulations in Example 1 of the patent in suit.

Finally, since claim 1 was not even limited to formulations in which the hydrophobic dyes were shading dyes, the technical problem solved could not even be seen in the provision of further ALLD formulations containing shading dyes.

In any case, a skilled person found in D3 itself clear indication as to the possibility of replacing the anionic LAS surfactant used in Example 1 of this citation, *inter alia*, by an AE_nS. Thus, to arrive at the patented subject-matter it was sufficient to follow such indication by replacing a substantial portion of the LAS with e.g. a commercial AE₁S (the existence of such commercial products being also apparent from the last paragraph on page 6 of D5).

1st Auxiliary Request - Non-admittance

The very late filing of this request, which clearly addressed issues already raised in the statement of grounds of appeal, did not comply with Article 12(2) RPBA. Moreover, the amendment introduced in claim 1 of this request (see VIII, *supra*) raised new issues under Article 123(2) or 84 EPC, since the wording added in the definition of ingredient "(b)" could be construed differently from the similar wording as used e.g. in claim 13 to define a feature of the whole formulation.

New 2nd Auxiliary Request - non-compliance of claim 1 with Article 123(2) EPC

Claim 7 of the application as filed was dependent on claim 6 of the application as filed, which did not mention "anthraquinones", but "anthraquinone benzodifuranes". Consequently, the "anthraquinones

which do not contain alkyl chains" mentioned in said claim 7 had necessarily to be understood as referring to "anthraquinone benzodifuranes" with no alkyl chains. Thus, claim 7 of the application as filed provided no proper basis for the amended claim 1 according to the request at issue.

New 2nd Auxiliary Request - lack of inventive step

Even the less ambitious technical problem of providing a mere alternative to the prior art disclosed in Example 1 of D3 would not be solved across the whole scope of claim 1. This claim would allow for the presence of other shading dyes (e.g. a yellow shading dyes) possibly disruptive of the whitening effect of the now mandatory blue or violet shading dyes. In any case, replacing the combination of two dyes used in Example 1 of D3 with other conventional dyes involved no inventive step.

XIV. The relevant counter-arguments of the Respondent may be summarised as follows

Ambit of claim 1 as granted

Since the only surfactants referred to in claim 1 were those of the ternary blend, this latter was the (whole) ingredient "(b)" mandatorily constituting at least 10 wt% of the formulation. Also claim 13 and the patent description in paragraphs [0017] and [0018] supported the clear distinction between the ternary blend and the other surfactants. The presence of the latter in the patented ALLD formulation was only suggested as optional and in very small amounts. Therefore, granted claim 1 implicitly required the ternary blend to constitute at least 10 wt% of the ALLD formulation.

Sufficiency of the disclosure

Paragraph [0020] of the patent in suit provided sufficient information as to which kind of dyes could be regarded as "*hydrophobic*", in particular it stated that these dyes had to contain no chemical group that had a charge in a basic aqueous environment. The subsequent patent description also disclosed several general formulae and specific examples of "*hydrophobic dyes*".

The skilled person would thus encounter no difficulty in carrying out many different embodiments of the invention.

Non-obviousness of claim 1 as granted

The experimental data of Annex 4 proved that the patented ALLD formulation comprising "*hydrophobic*" shading dyes displayed improved stability of dye solubilisation.

Even if claim 1 were understood as not imposing that the ternary blend constituted at least 10 wt% of the ALLD formulation, relative amounts of the ternary blend smaller than 10 wt% would nevertheless produce this beneficial effect, although possibly to a lower extent. Thus, the technical problem addressed in the patent had been solved across the whole ambit of claim 1.

Alternatively, the technical problem actually solved across the whole ambit of claim 1 was at least the provision of further ALLD formulations containing shading dyes. Neither D3 nor the other prior art cited contained a pointer to a ternary blend as defined in claim 1 at issue. Hence, starting from the prior art in D3, to arrive at the patented ALLD formulation would have required a sequence of several choices that a

skilled person would have no motivation whatsoever to perform.

Hence, the subject-matter of claim 1 as granted involved an inventive step.

Admittance of the 1st Auxiliary Request

The filing of this request a few days before the oral proceedings was due to the fact that the Respondent had only become aware of the possible relevance of the Appellant's construction of granted claim 1 after having received the Board's communication. Moreover, this request clearly resulted from the incorporation of the feature expressed in claim 13 into claim 1.

New 2nd Auxiliary Request - compliance with Article 123(2) EPC

Claim 1 of this request resulted essentially from the the literal combination of claims 1 and 7 of the application as filed. The person skilled in the art reading claim 6 of the application as filed would immediately recognise that the wording "*anthraquinone benzodifuranes*" referred to two distinct classes of dyes. In particular, "*anthraquinone dyes*" (or "*anthraquinones*") were a well-known class of dyes, as also apparent from Table 1, pages 544 and 545 of D1, and even the formula on page 8 of the application as originally filed. Hence, the fact that claim 7 depended on claim 6 of the application as filed was no reason for attributing another meaning to the wording of the former.

New 2nd Auxiliary Request - inventive step

The technical problem solved across the whole ambit of claim 1 could at least be seen in the provision of an alternative to the liquid detergent comprising shading dyes as disclosed in Example 1 of D3 (closest prior art). It would indeed be totally unrealistic to imagine that claim 1 allowed for the presence in the claimed ALLD formulation of other shading dyes (e.g. the yellow shading dye suggested by the Appellant) that were already known to interfere with the whitening effect of the now mandatory blue or violet shading dyes. The skilled artisan would find no incentive in D3 for replacing the combination of two dyes used in Example 1 with any other dyes. Thus, the claimed formulations involved an inventive step.

Reasons for the Decision

Main Request (patent as granted) - Ambit of claim 1

1. The definition of ingredient "(b)".
 - 1.1 The parties disagreed as regards the meaning to be given to the definition reading:

"1. An aqueous laundry liquid detergent formulation comprising:

...

*(b) between 10 to 50 wt% of a surfactant mixture, the surfactant mixture comprising:
(i) a non-ionic surfactant; and (ii) an anionic surfactant selected from the group consisting of: linear alkyl benzene sulphonate (LAS), alkyl sulphate, and alkyl*

ethoxylated sulphate, and,

...

*wherein the **weight** ratio of the total content of linear alkyl benzene sulphonate and alkyl sulphate:non-ionic:alkyl ethoxylated sulphate is 1:0.5 to 3:0.5 to 3, and the alkyl ethoxylated sulphate is an alkyl ethoxylated sulphate having between 1.0 to 1.5 ethylene oxide units."*

- 1.2 The Board holds that considering the wording used ("*... the surfactant mixture **comprising:** ...*"; emphasis added by the Board) the inclusion of further surfactants into the "*surfactant mixture*", in addition to those forming the ternary blend, is clearly **not** excluded.
- 1.2.1 The fact, stressed by the Respondent, that the only surfactants expressly mentioned in claim 1 are those of the ternary blend is no justification for ignoring the clear literal meaning of the wording chosen for characterising the surfactant mixture (i.e. using "*comprising*" instead of, for instance, "*consisting of*").
- 1.2.2 Moreover, contrary to the Respondent's view, the Board holds that this literal understanding of the definition of ingredient "*(b)*" is also perfectly in line with claim 13 as granted, indicating that "*a surfactant **other** than defined in claim 1*" (emphasis added) may be present in the claimed ALLD formulation "*at levels of less than 3 wt%*".

This dependent claim, being directed to a more limited, preferred embodiment, actually confirms that the presence of other surfactants is in no way excluded, it

merely expresses a preferred upper limit for their relative amount.

- 1.2.3 Finally, neither do the description and claims of the patent in suit contain an element possibly speaking against this understanding. Indeed, the patent description comprises a single section (entitled "*SURFACTANT*") describing possible surfactant ingredients. This section
- starts by stating the mandatory presence in the formulation of the invention of specific amounts of "*a surfactant mixture*" (paragraph [0012]),
 - then describes (paragraphs [0013] to [0016]) the same classes of surfactants that the preceding paragraph [0006] (worded identically to granted claim 1) defines as forming the mandatorily present ternary blend, and
 - ends by mentioning (paragraph [0017]) that "*[f]urther minor surfactants **may** be added include cationics, soaps, ...*" and then stating (in paragraph [0018]) that "*[i]t is **preferred** that the minor surfactants are present at levels of less than 3%*" (emphasis added).

- 1.3 Hence,, contrary to the Respondent's submissions, the definition of ingredient "(b)" in claim 1 does not imply any specific minimum relative amount for the ternary blend mandatorily present in the composition. Based on an unbiased reading of claim 1, the mandatorily present ternary blend may even constitute only a very small fraction of the entire "*surfactant mixture*" comprised in the "*formulation*", and the remainder of the "*surfactant mixture*" ingredient "(b)" may be constituted by any other kind of surfactant, provided the sum of all surfactants is in the range of from 10 to 50 wt% of the formulation. A hypothetical ALLD formulation as proposed by the Appellant, in which

a cationic surfactant constitutes 49.9 wt% of the formulation and the ternary blend is only present at levels of 0.1 wt% thus also falls within the ambit of claim 1.

2. Sufficiency of disclosure (Article 100(b) / 83 EPC)

2.1 The Appellant submitted that the patent in suit did not sufficiently disclose ALLD formulations claimed, more particularly for the following two reasons:

(a) Even after having read the patent in suit, the person skilled in the art would not know how to identify which dyes qualified as being "*hydrophobic*".

(b) Since claim 1 did not impose a minimum relative amount of the ternary blend ingredient, the skilled person was faced with the undue burden of having to find out which levels of concentration of ternary blend and of the other optional surfactants were suitable for providing formulations with sufficient stability in terms of dye solubilisation.

2.2 Ad objection "(a)"

2.2.1 The Board notes the undisputed fact that "*hydrophobic dye*" is not a term normally used in the classification of dyes.

2.2.2 The Board notes, however, that this term is used in the patent in suit to indicate shading dyes that are (allegedly) difficult to solubilise stably in ALLD formulations (paragraph [0005] of the patent in suit). In paragraph [0020], the mandatory ingredient "*hydrophobic dye[]*" is defined as being "*uncharged in*

aqueous solution at a pH in the range 7 to 11" and "devoid of polar solubilising groups" such as "sulphonic acid, carboxylic acid, or quaternary ammonium groups", as well as by having a chromophore preferably selected from a specifically listed group of alternative chromophore classes.

2.2.3 Considering also that in the subsequent paragraphs [0021] to [0027] suitable "*hydrophobic dyes*" are defined in terms of three general formulae and that a number of suitable specific dyes are listed in paragraphs [0028], [0029] and [0035], the Board concludes that the patent in suit enables the person skilled in the art to identify many suitable alternatives of the essential ingredient "*hydrophobic dyes*" in accordance with the invention.

2.2.4 A mere uncertainty arising from the vague definition of a term (here: the "*hydrophobic dye*") does not necessarily deprive the person skilled in the art of the promise of the invention (see e.g. decision T 0608/07 of 27 April 2009, Reasons 2.5).

The Board holds that in the present case, the uncertainty in question does not justify the conclusion that the claimed ALLD compositions are insufficiently disclosed.

2.3 Ad objection "(b)", *supra*

2.3.1 The Board notes that granted claim 1 does **not** require any specific level of stability over time of the dye solubilised in the claimed formulation.

2.3.2 Hence, any amount of ternary blend can be used to prepare the claimed ALLD formulation, regardless of the

level of stability that such amount of ternary blend allows to achieve. Therefore the claim implies no undue burden of experimental work when seeking to prepare ALLD formulations as claimed. For instance, it is not apparent to the Board what difficulties a skilled person would encounter in preparing e.g. the (hypothetical) formulation proposed by the Appellant as an embodiment of claim 1 allegedly not possessing the aimed stability (i.e. a formulation comprising 49,9 wt% of some cationic surfactant and only 0.1 wt% of the ternary blend).

- 2.4 Hence, in the Board's judgement, none of the two objections represent serious grounds, supported by verifiable facts, justifying the conclusion that the claimed invention is not disclosed in a manner sufficiently clear and complete for it to be carried out, without undue burden, by the person skilled in the art. The patent as granted is thus not objectionable under Article 100(b) EPC.

Main request - Lack of inventive step

3. The invention

- 3.1 The invention concerns ALLD formulations comprising surfactant and hydrophobic dye components (see paragraph [0001] and claim 1 of the patent in suit).
- 3.2 According to the description of the patent in suit (see in particular paragraphs [0005], [0050] and [0051]) the ALLD formulations of the invention are supposed to "reduce" the precipitation of the hydrophobic shading dyes "with time", or to "effectively solubilise the dye over long periods of time". Herein below the term **improved stability** is used to indicate such (vaguely

defined) level of stability of dye solubilisation allegedly featured by the patented ALLD formulations.

4. The closest prior art

Both parties considered that the liquid detergent composition described in Example 1 of D3 is an ALLD formulation comprising about 0.007 wt% of a mixture of two specific shading dyes, as well as 17 wt% of a LAS and 7 wt% of a NI. It is undisputed that one of the two dyes (i.e. the dye of Formula I reported on column 2 of D3) meets the definition of "*hydrophobic dye*" given in paragraph [0020] of the patent in suit and the Board sees no reason to take a different stance.

5. The technical problem according to the Respondent

5.1 The patent in suit appears to implicitly identify the technical problem addressed by the patented invention in vaguely worded passages of the description (see 3.2, *supra*).

5.2 The Respondent thus essentially argued that the technical problem solved according to the patent in suit could thus be seen in the provision of ALLD formulations comprising "*hydrophobic dyes*" and having improved stability (in terms of a reduced precipitation tendency of the hydrophobic shading dyes over "long" periods of time).

6. The solution

As the solution to this technical problem the patent in suit proposes ALLD formulations characterised in that they comprise

"(a) 0.000001 to 0.01% of a hydrophobic dye,

(b) between 10 to 50 wt% of a surfactant mixture, the surfactant mixture comprising: (i) a non-ionic surfactant; and (ii) an anionic surfactant selected from the group consisting of: linear alkyl benzene sulphonate (LAS), alkyl sulphate, and alkyl ethoxylated sulphate, and,

(c) that balance adjuncts to 100 wt %,

wherein the weight ratio of the total content of linear alkyl benzene sulphonate and alkyl sulphate:non-ionic:alkyl ethoxylated sulphate is 1:0.5 to 3:0.5 to 3, and the alkyl ethoxylated sulphate is an alkyl ethoxylated sulphate having between 1.0 to 1.5 ethylene oxide units."

7. Alleged success of the proposed solution

7.1 The experimental data in Annex 4 (repeating also those already reported in Example 1 of the patent in suit) demonstrate that formulations according to the invention comprising 15 wt% of different ternary blends - all containing an AE₁S surfactant - actually lead to improved stability, in the sense that they solubilize certain hydrophobic shading dyes more stably than the corresponding comparative formulations only differing in that the AE_nS has instead 3 ethylene oxide units, i.e. is a AE₃S.

7.2 Thus, the question arises whether it is plausible that a similarly improved stability is also observable across the remainder of the ambit of claim 1. In particular, considering that claim 1 does not imply any precise minimum level of the amount of the ternary

blend present in the composition, see 1.3, *supra*), it must also be assessed whether it is plausible that an improved stability is also displayed by those embodiments of the claimed ALLD formulation in which the ternary blend only represents a very low portion of the surfactant mixture.

7.3 In this respect, the Board notes the following:

7.3.1 As convincingly stressed by the Appellant and not disputed by the Respondent, it is well-known that aqueous formulations containing large amounts of surfactants (as the claimed formulation) are complex systems wherein the surfactants may, depending on (even small) variations of their molecular structure, form different aggregated structures within the liquid formulation, the latter thereby having different physical-chemical properties.

7.3.2 This well-known fact appears to be of relevance in the present case, since the data reported for the comparative formulations e.g. in Example 1 of the patent in suit confirm that even a relatively limited modification of the molecular structure of only one of the three surfactants present (i.e. the replacement of the AE₁S ingredient of the ternary blend by the corresponding AE₃S, see in particular [0051] of the patent) can cause a substantial decrease of the stability of dye solubilisation. In this respect, Tables 1.1 and 1.2 of the patent show significant differences in terms of the relative amount of dye that remains solubilised after 8 days ("%dye8"), when comparing pairs of tertiary blends differing **only** in that the "SLES" surfactant used is either "SLES(1EO)" or "SLES(3EO)".

- 7.3.3 In addition, claim 1 even embraces ALLD formulations in which most (and even substantially all) the surfactants are, for instance, **cationic** and, thus,
- can not only be totally **different** from those of the ternary blend disclosed in the patent in suit as being responsible for the desired stability,
 - but may even be surfactants of the classes that the patent itself suggests to incorporate preferably in very limited amounts only (see paragraph [0017] of the patent in suit), presumably in view of their predictable detrimental effect on the stability of dye solubilisation.
- 7.3.4 Even in the absence of experimental evidence, there are thus very good reasons for considering it unplausible that an improved stability will be obtained in all those embodiments encompassed by claim 1 wherein the ternary blend only represents a very small fraction of a total surfactant mixture, let alone in the presence of further surfactant components that can be expected to be detrimental to the stability.
- 7.3.5 The Respondent did not provide evidence possibly supporting its allegation to the contrary, i.e. that even a very small amount of ternary mixture might nevertheless produce a (possibly very small) improvement of stability, e.g. evidence showing a relationship between the level of stability and the relative amount of ternary blend regardless of the other surfactants possibly present in the mixture).
- 7.3.6 The Board thus holds that the Respondent did not discharge the burden of proof resting with it, in this specific constellation, to convincingly show that an improved stability of the formulation is indeed

achieved across the whole ambit of claim 1.

7.4 The Board concludes, therefore, that the technical problem addressed in the patent in suit is not solved across the whole ambit of claim 1.

8. The reformulated technical problem successfully solved

8.1 The Respondent argued that the technical problem actually solved across the whole ambit of claim 1 should at least be seen in the less ambitious one of providing further ALLD formulations containing shading dyes, i.e. of providing an alternative to the prior art.

8.2 Even this reformulation of the technical problem has been disputed by the Appellant arguing that the ingredient "*hydrophobic dye*" in claim 1 as granted was not necessarily a shading dye.

8.3 For the Board, it turned out to be apparent (for the reasons given below) that even considering (*arguendo*) this technical problem, the solution thereto proposed by claim 1 at stake remains obvious. Hence, the Board did not consider it necessary to arrive to a conclusion as to which is the correct reformulation of the technical problem. In the following reasoning it is, instead, assumed (*arguendo*) in favour of the Respondent that the technical problem plausibly solved across the whole ambit of claim 1 is the one indicated under 8.1, *supra*.

8.4 Obviousness of the proposed solution

8.4.1 In the present case the assessment of inventive step boils down to the question whether a skilled person,

searching for an alternative to the ALLD composition of Example 1 of D3, would have considered it obvious to modify this composition such as to arrive at a composition falling within the ambit of claim 1 as granted.

8.4.2 The Board notes in this respect that the person skilled in the art would first consider what is taught in D3 itself with regard to possible alternative embodiments of a liquid detergent as exemplified in Example 1 thereof.

8.4.3 Proceeding in this manner, the person skilled in the art would find several suggestions as to alternative ingredients suitable for realizing the liquid detergent of D3. In particular, he/she would find in column 5, starting at line 59, a section describing several anionic detergents which may be employed in this liquid detergent. In this section the sentence in column 6, lines 36 to 42, discloses the possibility of using "sulfated condensation products of polyethoxyethanols with fatty alcohols". It is undisputed that this expression is normally used to identify AE_nS surfactants in general and, thus, that this teaching also encompasses the possibility of using e.g. AE_1S surfactants.

8.4.4 The Board concludes, therefore, that this explicit teaching of D3 itself suggests, as one out of several equally obvious possibilities, to solve the posed technical problem by replacing in part or completely the anionic surfactant ingredient (i.e. the LAS) of Example 1 of the same citation by any AE_nS surfactant, more particularly by any AE_1S surfactant.

- 8.4.5 AE₁S surfactants are well known commercial products, as illustrated e.g. by the list of alkyl sulphates with a variety of degrees of alkoxylation given in the last paragraph on page 6 of D5 and ultimately not disputed by the Respondent. Thus, one amongst many viable ways to implement the explicit teaching of D3 discussed above (see 8.4.3, *supra*) is to replace in part or in full the LAS contained in the composition of example 1 by one of these commercial AE₁S surfactants.
- 8.4.6 No ingenuity is required in carrying out such replacement to whatever extent, i.e. it is equally obvious to replace with a commercial AE₁S surfactant e.g. 0.1, 10, 99 or 100 wt%, or any other percentage, of the amount of LAS present in the composition of Example 1 of D3. In particular, it is also obvious to carry out such replacement for percentages of the amount of LAS (such as from 40 to 70 wt%) that would result in the presence of the ternary blend in the resulting formulation so obtained.
- 8.4.7 The Board holds, therefore, that having regard to D3 taken alone, it would have been obvious for the person skilled in the art to solve the posed technical problem by replacing, for instance, between 40 and 70 wt% of the LAS ingredient of Example 1 with a commercial AE₁S surfactant, thereby arriving at ALLD formulations as claimed in granted claim 1.
- 8.4.8 Accordingly, the Board concludes that a person skilled in the art seeking to solve the stated technical problem would arrive at the subject-matter of claim 1 at issue without particular ingeniousness.
- 8.5 Hence, in the Board's judgement, the subject-matter of claim 1 as granted does not involve an inventive step

(Article 52(1) and 56 EPC) and is thus objectionable under Article 100(a) EPC.

8.6 Thus, the Respondent's Main Request is not allowable.

1st Auxiliary Request

9. Non-admittance into the appeal proceedings

9.1 The 1st Auxiliary Request was filed with letter of 11 January 2018, i.e. shortly before the oral proceedings of 31 January 2018.

9.2 It is apparent and undisputed that the filing of this 1st Auxiliary Request is intended to overcome the issues of insufficient disclosure and lack of inventive step already raised against claim 1 as granted in the statement of grounds of appeal (see sections 3., 4.2 and the beginning of section 5.2 thereof).

9.3 The Respondent argued that the late filing of this request was due to the fact that it had only become aware of the possible relevance of these objections after having received the Board's communication.

9.4 This justification did not convince the Board, if only because the relevance of the definition of ingredient "(b)" for the proper consideration of the ambit of in granted claim 1 was already apparent in the Appellant's statement of grounds of appeal (see the passages of the statement referred to under 9.2, *supra*).

9.4.1 Thus, the filing of the 1st Auxiliary Request only after the receipt of the Board's communication is **not** justified. The Respondent could and should have filed

the 1st Auxiliary Request with its reply to the Appellant's objections under Articles 83 and 56 EPC in the statement of grounds.

9.4.2 This request was thus not filed in compliance with Article 12(2) RPBA (requiring the reply to contain the Respondent's complete case) and its contested admittance was thus a matter for the Board's discretion under Article 13(1)RPBA.

9.5 Finally, the modification introduced in claim 1 of the 1st Auxiliary Request vis-à-vis claim 1 as granted raised new issues, at least under Article 123(2) EPC: Indeed, the incorporation, into the definition of the "*surfactant mixture*", i.e. ingredient "(b)", of the wording "*wherein a surfactant other than defined in (i) and (ii) is present at levels of less than 3 wt.%*" only appears to be clearly disclosed in the application as filed as a feature of the total formulation (see e.g. claim 13 of the application as filed). In the first paragraph on page 5 of the patent application as filed, it is not clear whether the "*less than 3%*" feature relates to the "*surfactant mixture*" or to the total "*formulation*".

Thus, the wording added in the definition of ingredient "(b)" in claim 1 at issue could imply a meaning differing from the meaning it has in the context of claim 13 of the application as filed.

9.5.1 Hence, this late-filed request was also found to lack clear formal allowability.

9.6 Therefore the Board decided, in the exercise of its discretion under Article 13(1) RPBA, not to admit the 1st Auxiliary Request into the proceedings.

New 2nd Auxiliary Request - Admittance into the proceedings

10. The New 2nd Auxiliary Request was filed at the oral proceedings before the Board.
- 10.1 It is manifestly a modification of the set of claims according to the 1st Auxiliary Request filed with the Respondent's reply to the statement of grounds of appeal, i.e. in accordance with Art.12(2) RPBA, and still pending as 4th Auxiliary Request.
- 10.2 The only modification introduced by such New 2nd Auxiliary Request, compared to the pending 4th Auxiliary Request, i.e. the insertion of "*the proviso that the total amount of hydrophobic dye is 0.000001 to 0.01 wt%*" was carried out in an attempt to overcome an objection in view of Article 123(3) EPC first raised by the Appellant against said 4th Auxiliary Request at a late stage of the proceedings.
- 10.3 Moreover, the Appellant did not demand the non-admittance of the 1st Auxiliary Request filed with the statement of grounds of appeal, or of the pending New 2nd Auxiliary Request.
- 10.4 Therefore, the Board saw no reason for disregarding this request pursuant to Article 13(3) RPBA, despite its late filing.

New 2nd Auxiliary Request - Ambit of claim 1

11. Claim 1 - meaning of the definition of ingredient "(a)"

The Board considers it expedient to preliminarily assess the construction of the definition of ingredient "(a)" in claim 1 of the New 2nd Auxiliary Request.

11.1 The mandatory presence of this ingredient in the claimed ALLD formulation is expressed at the beginning of the claim reading

"1. An aqueous laundry liquid detergent formulation comprising:
(a) 0.000001 to 0.01 wt% of a hydrophobic dye ...".

11.1.1 In accordance with the usual reading of patent claims directed to chemical compositions, the wording "*comprising*" would allow for the possibility of more than one ingredient belonging to the chemical class "*hydrophobic dye*" being contained in the claimed ALLD formulations.

11.1.2 However, when more than one of such ingredients is present, then the indication, in the definition of the upper limit of "*0.01 wt%*", only retains sense if the claim is construed as setting this specific numerical value as the upper limit for the **total** relative amount of hydrophobic dye ingredients contained in the formulation.

11.1.3 Accordingly, the Board holds that the introductory part of claim 1 under consideration including feature "(a)" must be construed as requiring that the one or more ingredients qualifying as "*hydrophobic dye*", i.e. all of them, must be present therein in relative amount(s) such that their **total** relative amount constitutes from 0.000001 to 0.01 wt% of the formulation.

11.2 With regard to the further specification of the "*hydrophobic dye*" ingredient in the subsequent phrase of claim 1 at stake reading

"wherein the hydrophobic dye is blue or violet and selected from: a) mono-azo dyes and b) anthraquinones which do not contain alkyl chains" (emphasis added by the Board),

the Board considers it self-evident that in this phrase "wherein" can only refer to the ALLD formulation as previously described (i.e. means the same as "in the ALLD formulation having the features already mentioned in the preceding portion of this claim"), and

"the hydrophobic dye" can only reasonably refer to the same formulation's ingredients(s) described as "a hydrophobic dye" in the first passage of claim 1 already construed above.

11.2.1 Thus, adopting the construction of the introductory part of claim 1 as set out under 11.1.3 *supra*, this second passage of claim 1 can only reasonably mean that all the ingredients of the formulation qualifying as "hydrophobic dye" (and whose total amount must constitute from 0.000001 to 0.001 wt% of the formulation) are, additionally, required to have a colour that is "blue or violet" and to be either a "mono-azo dye" or an "anthraquinone" dye devoid of alkyl chain(s).

11.3 Hence, the Board holds that the two passages of claim 1 considered above must reasonably be construed as implying that all the (one or more) ingredient(s) that qualify as "hydrophobic dye" must

- be present in such amounts such that their total amount constitutes from "0.000001 to 0.01 wt%" of the formulation and
- be "blue or violet", and

- be *"selected from: a) mono-azo dyes and b) anthraquinones which do not contain alkyl chains"*.

11.4 The Board also concludes, therefore, that the *"proviso"* present at the end claim 1 at stake is only a clarifying repetition of the first of these three requirements and, thus, contributes no further element to the definition of the ingredient *"(a)"*.

New 2nd Auxiliary Request - allowability of the amendments to the claims

12. Compliance with Article 123(2)EPC

12.1 Claim 1 at stake results from the literal additive combination of the wording of claims 1 and 7 of the application as filed, complemented by the *"proviso"*.

12.2 Considering the non-limiting nature of said *"proviso"* and since claim 7 of the application as filed, via its dependency on claim 6, also refers back to claim 1, the Board holds that the subject-matter of claim 1 of the New 2nd Auxiliary Request is identical to the one of of claim 7 of the application as filed.

12.3 The Appellant argued that claim 7 of the application as filed, depending on claim 6 only, provided no adequate basis for the amended claim 1 according to the request at issue, because original claim 6 did not mention *"anthraquinones"* but rather *"anthraquinone benzodifuranes"*. Consequently, the *"anthraquinones which do not contain alkyl chains"* mentioned in original claim 7 had necessarily to be understood not literally, but as referring to *"anthraquinone benzodifuranes"* with no alkyl chains.

- 12.4 The Board rejects this objection because the proposed construction of claim 7 of the application as filed is not appropriate for the following reasons.
- 12.4.1 The person skilled in the art of dyes reading claim 6 of the application as filed immediately recognises that this claim identifies (as alternative "*hydrophobic dye*" ingredients) several different well-known classes of dyes. The wording "*anthraquinone benzodifuranes*" combines the names of two dye classes thereby creating an expression that is not in accordance with the IUPAC nomenclature rules for chemical compounds and, thus, is not a standard name for a chemical compound or class thereof.
- 12.4.2 Moreover, it is also self-evident to the skilled reader of the application as filed that the name of the chemical group "*anthraquinone*" (or "*anthraquinones*") is conventionally used to identify a class of dyes (those comprising such group in their structure). This is illustrated, for instance by the multiple occurrence of the term "*anthraquinone*" in the table entitled "Usage Classification of Dyes" on pages 544 and 545 of D1, as well as by the disclosure of a general structural formula for "*anthraquinone dyes*" in the lower half of page 8 of the application as filed.
- 12.4.3 Furthermore the chemical group name "*benzodifuranes*" is also commonly used to identify another class of dyes. This was ultimately not contested by the Appellant.
- 12.4.4 Accordingly, the only reading of original claim 6 that is technically plausible for the skilled person is that each of the two terms in the expression "*anthraquinone benzodifuranes*" indicates a distinct class of dyes and, thus, that this claim also refers to the well-known

"anthraquinone" class of dyes. Thus, there is no reason for construing the term "anthraquinones" in original claim 7 differently from its literal meaning.

12.5 The Board concludes that claim 1 of the New 2nd Auxiliary Request is not objectionable under Article 123(2) EPC.

12.6 The Board is satisfied that also the remaining claims 2 to 11 of this request find a basis in the claims of the application as originally filed and, thus, are not objectionable under Article 123(2) EPC.

13. Compliance with Article 123(3) EPC

The Board is satisfied that the claims 1 to 11 of the New 2nd Auxiliary Request are not objectionable in view of Article 123(3) EPC either. As this is undisputed, no further reasons need to be given in this respect.

14. Compliance with Article 84 EPC

14.1 The Board is also satisfied that the claims 1 to 11 of the New 2nd Auxiliary Request do not result from amendments rendering these claims objectionable under Article 84 EPC.

14.2 Since the Appellant has raised no objection against the claims of the 2nd Auxiliary Request in view of Article 84 EPC, no further reasons need to be given in this respect.

New 2nd Auxiliary Request - Sufficiency of the disclosure

15. The Board is satisfied that the reasons given above (reasons 2 to 2.4) as regards sufficiency of the

disclosure of the patented formulation apply, *mutatis mutandis*, also to the more narrowly defined formulations claimed according to the New 2nd Auxiliary Request.

New 2nd Auxiliary Request - Inventive step

16. The subject-matter of claim 1 at stake differs from that of claim 1 as granted in that the former is limited to ALLD formulations wherein the hydrophobic dye(s) has(have) to be blue or violet and selected from mono-azo dyes and anthraquinone dyes which do not contain alkyl chains.

Hence, the claimed formulation may still comprise only a very low relative amount of ternary blend in the surfactant mixture "(b)".

16.1 The reasons (see from 4 to 7.4, *supra*) for which the Board concluded that Example 1 of D3 represents the closest prior art and that the technical problem addressed in the patent in suit is not solved across the whole ambit of granted claim 1 also apply to claim 1 now at stake. Hence, also the subject-matter of this latter claim only successfully solves a technical problem that is less ambitious than the one that can be derived from the patent in suit.

16.2 The technical problem successfully solved

16.2.1 The Board finds that, since the "*hydrophobic dye*" ingredient of the formulation of claim 1 at stake is limited to dyes that are undisputedly shading dyes, the technical problem actually solved across the whole ambit of claim 1 can be seen in providing further ALLD formulations containing shading dyes, i.e. of providing

an alternative to the prior art ALLD shading formulation (D3/example 1).

16.2.2 The Appellant's objection that even this less ambitious technical problem would not be solved across the whole ambit of claim 1 because the claimed formulation could as well comprise other shading dyes (e.g. a yellow shading dyes), possibly interfering with the whitening effect of the blue or violet shading dyes, is rejected as based on an interpretation of claim 1 that is manifestly unrealistic. This is apparent when simply considering that it makes no technical sense to add, to laundry treatment compositions mandatorily containing a blue or violet shading dye, an ingredient that is already known to be detrimental to the sought-for shading effect.

16.3 Non-obviousness of the proposed solution

16.3.1 Document D3 *per se* contains no element of information that could suggest to the person skilled in the art a modification leading to a formulation falling within the ambit of claim 1 at issue.

More particularly, in order to arrive at an ALLD formulation according to claim 1 at issue the person skilled in the art

- would not only have to replace the surfactant mixture used in Example 1 of D3 by another surfactant mixture selected from the alternatives embraced by the general teaching of D3 itself,

- but would also have to replace the blue hydrophobic dye with alkyl chains described in Example 1 (i.e. the "1,4-bis(2-ethylhexylamino) anthraquinone" also mentioned in claim 1 of D3, whose structure is depicted Formula I on column 2 of D3), identified as mandatory

ingredient in D3, despite the total absence in D3 of any suggested alternative in this direction.

- 16.3.2 The Appellant did not argue that one of the prior art documents cited in the course of the proceedings contained a pointer to the possibility of incorporating, into liquid detergents in general, a blue or violet hydrophobic mono-azo or anthraquinone dye devoid of alkyl chains, let alone in an aqueous liquid detergent comparable to the one disclosed in D3 / Example 1.

Absent any proof to the contrary, the person skilled in the art seeking to solve the technical problem posed was thus not induced to replace the specific hydrophobic dye mandatorily contained in the detergent composition of Example 1 of D3, by a another hydrophobic dye as specified in claim 1 at issue.

- 16.4 Hence, in the Board's judgement, the subject-matter of claim 1 involves an inventive step (Articles 52(1) and 56 EPC). Consequently, the same is true as regards the subject-matter of dependent claims 2 to 11.

Conclusion

17. The claims according to the Respondent's New 2nd Auxiliary Request comply with the requirements of the EPC.

Order

For these reasons it is decided that:

- The decision under appeal is set aside.
- The case is remitted to the Opposition Division with the order to maintain the patent on the basis of claims 1 to 11 according to the "New 2nd Auxiliary Request", filed during the oral proceedings, and a description to be adapted where appropriate.

The Registrar:

The Chairman:



D. Magliano

B. Czech

Decision electronically authenticated