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**Datasheet for the decision  
of 17 June 2014**

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**Title of invention:**  
Benefit agent delivery systems

**Patent Proprietor:**  
The Procter & Gamble Company

**Opponent:**  
Henkel AG & Co. KGaA

**Headword:**  
Perfume delivery system / THE PROCTER & GAMBLE COMPANY

**Relevant legal provisions:**  
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**Keyword:**  
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**Catchword:**



**Beschwerdekammern  
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Case Number: T 1780/11 - 3.3.06

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.06**  
**of 17 June 2014**

**Appellant:** THE PROCTER & GAMBLE COMPANY  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 6 June 2011  
revoking European patent No. 1436374 pursuant to  
Article 101(3)(b) EPC.**

**Composition of the Board:**

**Chairman** L. Li Voti  
**Members:** P. Ammendola  
U. Lokys

## Summary of Facts and Submissions

- I. This appeal is from the decision of the Opposition Division revoking European patent No. 1 436 374.
- II. The Opponent had sought revocation of this patent on the grounds of, *inter alia*, lack of inventive step (Article 100(a) EPC in combination with Articles 52(1) and (2) and 56 EPC) in view of, *inter alia*, document

D1 = EP 0 971 024 A1.

The Patentee had replied to the grounds of opposition with a letter dated 15 January 2010 which was enclosed with an amended set of eight claims as the sole Patentee's request.

- III. Claim 1 of such request (hereinafter **amended claim 1**) reads:

"1. *A perfume delivery system suitable for delivering a perfume to the surface of a substrate, which perfume delivery system comprises a granular or liquid composition matrix for laundering or treating fabrics or cleaning hard surfaces, hair or skin, to which is separately added:*

*A) an amine compound selected from polyethyleneimines having a molecular weight greater than 150 Daltons, and having at least about 10% of its amino groups in the form of primary amino groups; and*

*B) a perfume selected from Damascone, alpha-Damascone, beta-Damascone, delta-Damascone, iso-Damascone, beta-Ionone, lilial, alpha-n-hexylcinnamic aldehyde, alpha-n-amylcinnamic aldehyde, cymal, lyral, butylcinnamic aldehyde,*

*datilat, helional, triplal, melonal, and mixtures thereof;*  
*in a weight ratio of amine compound to perfume ranging from 50:1 to 1:1;*  
*and wherein when said amine compound and said perfume are exposed to and preferably deposited onto a substrate surface via contact of said surface with an aqueous solution or dispersion of said delivery system, the perfume provides its benefit to said surface for a longer period of time than when said amine compound is not present."*

The following abbreviations of the claim's wording are used below:

**"PD system"** indicates the **perfume delivery system**;

**"PEI"** indicates the **polyethyleneimine** ingredient "A" with primary amino groups;

**"PEI/p weight ratio"** indicates the **weight ratio** at which the **PEI** and the **perfume** ingredient are separately added to the composition matrix;

**"perfume benefit"** indicates the **benefit** provided by the **perfume** to surfaces, when these latter are exposed to the PEI and the perfume via contact with aqueous solutions or dispersion of the PD system

and

**"permanence of perfume benefit"** indicates the period of time in which the **perfume benefit** is provided to said surfaces.

IV. In the decision under appeal the Opposition Division decided to revoke the patent in suit because the subject-matter of amended claim 1 was found an obvious alternative to the perfume-containing detergent compositions (that also undisputedly are PD systems) disclosed in the examples of document D1 comprising the ingredient labelled "ARP2", i.e. a preformed "*amine reaction product*" of **PEI** and **perfume** (below the **PEI+p product**).

V. The Patentee (hereinafter the Appellant) appealed this decision and reported in its statement of grounds of **appeal** the results of further **experiments** (below the **appeal experiments**).

The Opponent (hereinafter Respondent) in its reply only disputed the compliance of amended claim 1 with Article 56 EPC.

VI. At the oral proceedings the Parties only presented arguments as to the issue of inventive step for amended claim 1.

The Appellant **requested** that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of claims 1 to 8 submitted with the letter dated 15 January 2010.

The Respondent **requested** that the appeal be dismissed.

VII. The Parties' arguments can be summarised as follows:

The **Appellant** rebutted the Opposition Division's conclusion that the subject-matter of amended claim 1 lacked of inventive step vis-à-vis the prior art disclosed in document D1, because this citation did not

disclose the possibility to obtain PD systems by adding separately the PEI and the perfume into the composition matrix. Moreover, the technical teachings in this citation only motivated the person skilled in the art to use a lower PEI/p weight ratio. This would be apparent from the instruction in [0115], and from all relevant examples of this prior art, in which the PEI/p weight (and molar) ratio was always below 1.

At the oral proceedings the Appellant admitted that the permanence of perfume benefit achieved by the claimed PD system appeared not necessarily superior to that achieved in the prior art, but argued that no teachings in document D1 rendered possibly predictable the "surprising" effect proved by the appeal experiments: i.e. the surprising fact that increasing the PEI/p weight ratio prolonged the permanence of perfume benefit.

The Appellant acknowledged that this surprising effect was not explicitly mentioned in the patent in suit, which also contained examples wherein the PEI/p weight ratios below 1 were used. Nevertheless, in its opinion, the fact that the range defined for the PEI/p weight ratio in amended claim 1 was disclosed in paragraph [0031] of the patent in suit as being most preferred, necessarily implied that the same range had to correspond to the embodiments of the patented PD system for which the permanence of perfume benefit was maximized.

Hence, the PD system defined in amended claim 1 provided a "surprisingly" long permanence of perfume benefit and, thus, the decision of the Opposition Division that it was just an obvious alternative to the prior art was incorrect.

The **Respondent** disputed this line of argument stressing that the wording bridging pages 23 and 24 of document D1 necessarily implied the alternative to add as such the PEI and the perfume into the composition matrix. Moreover, the patent in suit, although referring in paragraph [0005] to the prior art disclosed in document D1, did not even allege that the permanence of the perfume benefit obtained when using not previously reacted PEI and perfume had to be at least comparable, let alone superior, to that obtained when using the preformed PEI+p product.

Nor would the appeal experiments render credible that the PEI/p weight ratio required in amended claim 1 ensured the achievement of a surprising technical effect. It stressed in particular the fact that at least in one case (example D of table 1) the appeal experiments achieved the highest value for perfume release when the PEI/p weight ratio was not the maximum tested, and that there was no experiment carried out at a PEI/p weight ratio outside the claimed range (e.g. at PEI/p weight ratios between 0 and 1).

Hence, the appeal experiments would not justify to depart from the finding of the Opposition Division.

### **Reasons for the Decision**

*Inventive step - amended claim 1 (of the sole Appellant's request)*

1. The claimed invention

Amended claim 1 (see III *supra*) defines a PD system by means of the method for its preparation: the claim requires this PD system to result from the separate addition to the composition matrix of (at least) a PEI (as defined in "A") and (at least) a perfume (as defined in "B") at a PEI/p weight ratio "ranging from 50:1 to 1:1".

2. The closest prior art

It is common ground between the Parties that the closest prior art is any of the perfume-containing granular or liquid detergent formulations (i.e. PD systems) exemplified in document D1, which contain the preformed PEI+p product labelled "ARP2" (see in this citation e.g. samples C to E in Example 1).

From paragraph [0215] of document D1 it is apparent that the PEI+p "ARP2" product is prepared by reacting a PEI with primary amine groups (undisputedly falling under the definition "A)" of claim 1 at issue), with a perfume (undisputedly falling under the definition "B)" of claim 1 at issue).

2.1 Thus, and taking into account that also these PD systems of document D1 undisputedly succeed in prolonging the permanence of perfume benefit (see, e.g. paragraphs [0003], [0006], [0014] and [0114] of document D1), the Board concurs with the Parties that any of the above-identified samples disclosed in Example 1 of document D1 represents a suitable starting point for the assessment of inventive step.

2.2 The Boards consider it appropriate to additionally mention at this point that this citation unambiguously focuses (see paragraphs [0112] to [0114] in combination



with e.g. the synthesis example III in paragraphs [0212] to [0215]) on the separate reaction of (the primary amino groups of) the PEI with the perfumes (which are ketones or aldehydes) to produce the PEI+p product which is isolated and then added to the composition matrix. According to document D1 it is the PEI+p reaction product that produces a delayed release of the perfume and, thus, ensures prolonged permanence of perfume benefit (see paragraphs [0116] to [0118]). It is of particular relevance in view of the reaction producing the PEI+p product, that paragraph [0113] reminds the skilled reader of document D1 not only of the **equilibrium** reaction between primary amino groups (such as those present in PEI) and the ketone/aldehyde (i.e. the perfumes) reagents, reaction that leads to the formation of imines, but also of the possible competitive reaction, when the perfume is a ketone with an  $\alpha,\beta$ -unsaturation, which latter reaction produces  $\beta$ -amino ketones.

3. The technical problem solved

- 3.1 The Board notes that the whole disclosure of the patent in suit only attributes to the claimed PD system the technical effect of achieving longer permanence of perfume benefit in comparison to when no PEI (i.e. only the perfume) is added to the composition matrix.

Nor has the permanence of perfume benefit provided by the claimed PD system been proved (e.g. by subsequently filed comparative examples vis-à-vis the prior art or on the basis of theoretical considerations) to be superior to that already achieved in the prior art of departure. This fact has also been conceded by the Appellant at the oral proceedings before the Board.

3.2 The Appellant's line of argument presented at the hearing on the basis of the appeal experiments (see VII *supra*) appears, however, to imply that the claimed subject-matter solved a different technical problem (such as e.g. that of providing a further PD system producing a "surprisingly" long permanence of perfume benefit).

Thus the Board considers it appropriate to discuss at this point this argument of the Appellant.

3.2.1 In the appeal experiments (see tables 1 and 2 on page 4 of the statement of grounds of appeal) there are reported measures of the amounts of perfumes still present above six washed fabric samples, after drying for 40 minutes. The fabric samples had been washed using washing compositions all containing the same amount (0.05% by weight) of perfume and either no PEI (comparative example) or 0.05%, 0.15%, 0.45% and 1.35% by weight of a not further specified PEI (invention examples).

No experiments are directed to compositions having a PEI/p weight ratio of less than 1:1.

According to the Appellant's reasoning, the reported values proved the technical effect that, for a given amount of perfume, the permanence of perfume benefit actually achieved by the presently claimed PD systems increases when increasing the PEI/p weight ratio within the range now required in amended claim 1. Hence, the permanence of perfume benefit actually achieved by the claimed PD system was - although not necessarily superior or comparable to that produced by the PD system of document D1 prepared starting from the same amount of perfume - at least "surprising", because

document D1 contained no teaching rendering predictable such technical effect.

- 3.2.2 The Board remarks, however, that a positive influence of an increment of the PEI/p weight ratio (when these two ingredients are added unreacted into the composition matrix) on the permanence of perfume benefit, was already predictable in view of the teachings of document D1.
- 3.2.3 Indeed, in the Board's judgment and contrary to the Appellant's opinion, the sentence bridging pages 23 and 24 of document D1 (which reads "Preferably the amine reaction product is preformed before incorporation into the laundry and cleaning compositions" emphasis added by the Board) appears to necessarily imply the disclosure of the alternative possibility of generating *in situ*, at least to some substantial extent, the PEI+p product, at some stage during the preparation, storage or use of the PD system.

The Appellant has disputed this finding without, however, indicating which other different reasonable technical meaning could be given to that wording.

Thus, the Board sees no reason to come to a different conclusion.

Hence, the Board finds implied in document D1 the alternative to add unreacted the PEI and the perfume to the composition matrix, in the expectation that these two ingredients may react (at least to some substantial extent) also *in situ*, e.g. during the storage or possibly even during the washing.

3.2.4 In the Board's opinion, a skilled person, aware of the teachings in document D1 (see 2.2 *supra*), would expect a positive influence onto the permanence of perfume benefit of any increase of the PEI/p weight ratio (at constant weight of perfume) when these two ingredients are added unreacted, already because the expected reaction between the PEI and the perfume to form at least the imine PEI+p product is taught in document D1 to be an equilibrium reaction. A skilled person would predict in such a reaction - like in any other similar chemical equilibrium reaction - that an increase of the initial concentration of one (or both) of the two reagents normally results in a measurable increase of the final concentration of the produced compound at the equilibrium. Thus, in the present case, the teachings of document D1 render predictable for the skilled person that an increase in the PEI/p weight ratio, as shown in the appeal experiments, increases the final concentration (formed *in situ*, e.g. already in liquid PD systems or possibly during their final use) of the imine PEI+p reaction product, which is responsible for the prolonged permanence of perfume benefit.

In view of the above considerations, the Board comes to the conclusion that the Appellant's line of argument on the "surprising" technical effect is not convincing.

3.3 Under such circumstances the technical problem credibly solved vis-à-vis the prior art is found to be just that of providing a further PD system capable of conferring prolonged permanence of perfume benefit (in comparison to when only the perfume is added to the composition matrix), i.e. the provision of an alternative to the prior art.

4. The solution and its success

4.1 The patent in suit proposes to solve the relevant technical problem by the PD system defined in amended claim 1, wherein the PEI and the perfume are separately added to the composition matrix at the specified PEI/p weight ratio.

4.2 The Board has no reason to doubt that the posed technical problem is solved across the whole scope of claim 1 at issue.

5. Obviousness of the solution

5.1 It is undisputed that the claimed subject-matter differs from the examples of the prior art of departure only in that the PEI and the perfume are separately added to the composition matrix at a specified weight ratio.

Thus the assessment of inventive step boils down to the question as to whether a skilled person, searching for an alternative from the PD system disclosed in the (above identified) examples of document D1 containing the preformed PEI+p reaction product, considered or not obvious to instead directly add the PEI and the perfume as such in the composition matrix, and to do this at a PEI/p weight ratio falling under the range defined in amended claim 1.

5.2 It is apparent to the Board, that this skilled reader would take into consideration the alternative PD systems, which, as discussed above (see 3.2.3 *supra*), are implicitly disclosed in document D1 itself, i.e. those obtainable by adding the PEI and the perfume as such, i.e. not previously reacted, in the expectation

to form *in situ* (at least some) PEI+p product. The skilled person thus would also envisage, as alternative embodiment, the separate addition to the detergent matrix of the PEI and the perfume used for preparing the product "ARP2" of the cited examples of D1.

5.3 To arrive at the subject-matter of claim 1 at issue, the skilled person thus only needs to select further a PEI/p weight ratio for the two relevant ingredients (to be added unreacted) that falls under the range now present in claim 1 as amended.

5.4 In the Appellant's opinion the claimed PEI/p weight ratio could not possibly result in an obvious manner from document D1 since this citation only prompted the skilled person to use these two reagents at PEI/p weight ratio lower than 1.

5.4.1 The teachings of document D1 that the Appellant has indicated as suggesting such lower PEI/p weight ratios are:

i) that provided in paragraph [0115] of document D1 where it is stated, in respect of the reaction profile among primary amino groups and the ketones or aldehydes described in the preceding paragraphs [0112] to [0114], that "... *the perfume ingredient is **typically present in equimolar amounts** to the amine function so as to enable the reaction to take place and provide the resulting amine reaction product.*" (emphasis added by the Board)

and

ii) that implicitly provided in the synthesis example given in paragraph [0215] of document D1

(describing how to produce the PEI+p product "ARP2") wherein the PEI/p weight (and molar) ratio used for the reaction is lower than 1.

- 5.4.2 As to paragraph [0115] of document D1, the Board notes that this paragraph reads after the passage specifically indicated by the Appellant: *"Of course, **higher amounts are not excluded and even preferred** when the amine compound comprises more than one amine function. When the amine compound has more than one free primary amine group, several different perfume raw materials can be linked to the amine compound"*. Therefore, the teaching of this paragraph is not confined to the use of only equimolar amounts of the reagents and encompasses the use of greater amounts of ketones or aldehydes.

Moreover the Board remarks that, like any other teaching referring to molar ratios, the instruction given in this paragraph implies weight ratios of the two reagents (a monofunctional perfume and a polyfunctional PEI), which depend on their molecular weights (in the present case the molecular weight of the perfume and the molecular weight of the PEI divided by the number of primary amino groups per macromolecule). Since the teachings on "equimolar" or "larger than equimolar" amounts in this paragraph of document D1 are not confined to a specific pair of perfume and PEI with a specific content of primary amino groups, these teachings contain no univocal instruction at all as to a specific PEI/p weight ratio and, contrary to the Appellant's allegation, do not exclude the possibility of using PEI/p weight ratios of 1:1 or more.

5.4.3 The synthesis example reported in paragraph [0215] appears to indicate the use of PEI/p weight (as well as of (primary amino groups)/perfume molar) ratios lower than 1. However, this example only provides information as to how to produce and isolate a PEI+p product, in particular the  $\beta$ -amino ketone preformed product "ARP2" (see, for example, paragraph [0215], last line).

Moreover, the use in this example of PEI/p weight ratios and molar ratios (primary amino groups)/( $\alpha$ , $\beta$  unsaturated ketone) that are lower than 1, is in the the Board's view just the consequence of the aimed isolation of a preformed  $\beta$ -amino ketone PEI+p product.

Hence, the used amounts of PEI and perfume of the example appear to have a specific aim and they are not necessarily to be applied as taught in the above discussed paragraph [0115] when carrying out the suggested alternative of adding the PEI and the perfume separately to the detergent matrix.

5.4.4 Accordingly, in the Boards's view, document D1 does not preclude the skilled person to possibly take into consideration PEI/p weight ratios of 1 or more also when choosing to add separately to the detergent matrix the PEI and the perfume used in the preparation of compound "ARP2".

5.4.5 Thus, the selection of the PEI/p weight ratio range given in amended claim 1 is found to be an arbitrary choice, also deprived of inventive merits, among the PEI/p weight ratios that a skilled person would take into consideration for carrying out the (implicitly) suggested alternative of an *in situ* reaction among these ingredients.



- 5.5 Accordingly, the skilled person searching for alternative to the prior art, arrives at the subject-matter of amended claim 1 without exercising any inventive skill just upon considering the teachings of document D1 *per se*. Hence, the claimed PD system offers an obvious solution to the posed technical problem.
6. Thus, the Main Request is found not to comply with the requirements of Article 56 EPC and cannot be allowed.

## Order

### **For these reasons it is decided that:**

The appeal is dismissed

The Registrar:

The Chairman:



D. Magliano

L. Li Voti

Decision electronically authenticated