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**D E C I S I O N**  
**of 10 November 2004**

**Case Number:** T 0087/00 - 3.3.6

**Application Number:** 94908344.8

**Publication Number:** 0687293

**IPC:** C11D 3/39

**Language of the proceedings:** EN

**Title of invention:**  
Bleaching Agents

**Patentee:**  
Unilever N. V., et al

**Opponent:**  
The Procter & Gamble Company

**Headword:**  
Exothermic decomposition/UNILEVER

**Relevant legal provisions:**  
EPC Art. 56

**Keyword:**  
"Inventive step (no): obvious modification of a known process"

**Decisions cited:**  
T 0835/99, T 0936/96

**Catchword:**  
-



Case Number: T 0087/00 - 3.3.6

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.6  
of 10 November 2004

**Appellants:** Unilever N. V.  
(Proprietors of the Weena 455  
patent) NL-3013 AL Rotterdam (NL)

und

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**Representative:** Elliott, Peter William  
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**Respondent:** The Procter & Gamble Company  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 8 December 1999  
revoking European patent No. 0687293 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** P. Krasa  
**Members:** L. Li Voti  
U. J. Tronser

## Summary of Facts and Submissions

I. The present appeal is from the decision of the Opposition Division to revoke the European patent No. 0 687 293, concerning the stabilization of water-insoluble organic peroxyacids against exothermic decomposition initiated by heat.

II. In its notice of opposition the Opponent sought revocation of the patent *inter alia* on the grounds of Article 100(a) EPC, in particular because of lack of novelty and of inventive step of the claimed subject-matter.

The following documents were *inter alia* cited in support of the opposition:

(1): Organic Peroxides, Vol. III, 1972, pages 342 to 347;

(3): EP-A-0349220

(4): US-A-4917811

III. In its decision, the Opposition Division found *inter alia* that

- the claims of the then pending requests either contravened the requirements of Article 123(2) EPC or lacked novelty in the light of document (4).

IV. An appeal was lodged against this decision by the Patent Proprietors (Appellants).

Oral proceedings, which were not attended by the Respondent (Opponent), although duly summoned, were held before the Board on 10 November 2004.

The Appellants withdrew at the oral proceedings all the previously filed requests and filed an amended set of two claims to be considered by the Board as the only pending request.

Claim 1 of this request reads as follows:

"1. A process for enhancing the stability against exothermic decomposition initiated by heat of a substantially water-insoluble organic peroxyacid, which comprises precipitating the peroxyacid in the presence of a binding agent for transition metal ions such that 0.3 to 3.0% by weight of the binding agent, as calculated on the total weight of binding agent and peroxyacid, remains in contact with the peroxyacid and a final pH of from 3.5 to 6.0 is obtained, wherein the binding agent is selected from sodium dihydrogen orthophosphate and disodium hydrogen orthophosphate."

Claim 2 is dependent on claim 1 and relates to a specific embodiment of the claimed process.

V. The Appellants submitted during oral proceedings that

- the claims complied with the requirements of Articles 84, 123(2) and 54 EPC and that the claimed invention was sufficiently disclosed.

As regards inventive step they submitted *inter alia* that

- the claimed process differed from that disclosed in document (3) insofar as

- (a) the orthophosphate had to be added to the organic peroxyacid solution or suspension before its precipitation, e. g. in the quenching step of the oxidation reaction leading to the formation of the peroxyacid, instead of during the washing step of a wet cake of the peroxyacid, i. e. after its precipitation, as required in document (3) and
- (b) it required specific amounts of the orthophosphate to remain into contact with the peroxyacid;
- the technical problem solved by the claimed invention, seen in the light of document (3), amounted to the provision of an alternative and more convenient method for bringing the specific orthophosphate into contact with an organic peroxyacid, thereby providing its stabilization;
- the claimed process was preferred according to the description of the patent in suit and rendered superfluous a subsequent washing of the final peroxyacid product with an orthophosphate solution;
- moreover, examples 3 and 4 of the patent in suit showed that an increased stability of the peroxyacid could be achieved also by means of disodium hydrogen orthophosphate which resulted not to be effective when used in a washing method as disclosed in document (3).

VI. The Respondent submitted in writing inter alia that

- the claims did not comply with the requirements of Article 123(2) or 84 EPC;

- the claimed invention was not sufficiently disclosed;
- the cited prior art already taught how to improve the stability upon storage of water-insoluble peroxyacids by means of the same type of transition metals binding agents used in the patent in suit;
- no difference existed between the so-called heat induced instability of peroxyacids dealt with in the patent in suit and the instability dealt with in the cited prior art;
- the claimed subject-matter thus lacked an inventive step.

VII. The Appellants request that the decision under appeal be set aside and that the patent be maintained on the basis of claims 1 and 2 as submitted at the oral proceedings.

The Respondent requests in writing that the appeal be dismissed.

### **Reasons for the Decision**

1. *Articles 54, 83, 84 and 123(2) EPC*

The Board is satisfied that claims 1 and 2 of the only request maintained at the oral proceedings before the Board comply with the requirements of Articles 54, 84

and 123(2) EPC and that the claimed invention is sufficiently disclosed.

Since this request fails on other grounds there is no need to give further details.

2. *Article 56 EPC*

2.1 The starting point for the evaluation of inventive step

2.1.1 The present invention and in particular claim 1 relates to a process for enhancing the stability of water-insoluble organic peroxyacids against exothermic decomposition initiated by heat (see page 2, lines 5 to 6 and 20 to 22 in combination with page 3, lines 10 to 15).

As explained in the description of the patent in suit it was known at the priority date of the patent that exothermic decomposition of organic peroxyacids can be caused by heat and also by local heating generated by friction or shock and that, when the so-called self-accelerating decomposition temperature is reached, such a decomposition becomes a runaway reaction leading to ignition and detonation (see page 2, lines 18 to 19, 37 to 40 and page 3, lines 4 to 6).

The description of the patent in suit acknowledges that organic peroxyacids undergoing exothermic decomposition do not display storage stability; however, it tries to distinguish between a heat induced decomposition and a decomposition caused during storage by the presence of impurities or other materials, e. g. transition metals (see page 2, lines 27 to 31).

As explained, for example, in document (1) (page 343, lines 12 to 28 and page 344, lines 17 to page 345, line 1), the organic peroxyacid decomposition is an exothermic reaction and, during storage, both the thermal instability as well as the instability caused by the presence of impurities and heavy metals potentially coexist and can affect each other; e. g. contamination of the peroxyacid can lead to a local temperature rise. This behaviour can be found at different degrees in any kind of organic peroxyacid.

Since the decomposition of a peroxyacid is exothermic independently from its cause, the Board finds thus that it cannot be distinguished upon storage between the stabilization of a peroxyacid against exothermic decomposition originated by impurities or heavy metals and one originated, e. g., by local heating. Moreover, claim 1 does not limit the claimed process to stabilization with regard to the previously discussed self-accelerating decomposition and encompasses stabilization against any exothermic decomposition occurring below the self-accelerating decomposition temperature.

The Board thus concludes that claim 1 relates to a process for stabilizing a water-insoluble peroxyacid against an exothermic decomposition independently from its cause.

- 2.1.2 Document (3) discloses a process for stabilizing specific acid sensitive water-insoluble organic peroxyacids against decomposition upon storage by washing a wet cake of the peroxyacid with an aqueous



solution of an orthophosphate of the same type as used in the patent in suit i. e. sodium dihydrogen orthophosphate or disodium hydrogen orthophosphate (see page 2, lines 4 to 7; page 4, lines 2 to 20).

Document (4) relates instead to the stabilization of organic peroxyacids by cogranulation with a great amount of orthophosphate granules (see column 1, line 63 to column 2, line 27).

Since both documents (3) and (4) relate to the same technical problem of stabilizing water-insoluble organic peroxyacids against exothermic decomposition and the process of document (3), including the addition of an orthophosphate solution as in the patent in suit (see point 2.1.3 hereinafter), has more features in common with the process of the patent in suit than the process of document (4), the Board takes document (3) as the most suitable starting point for the evaluation of inventive step.

- 2.1.3 The claimed process involves the step of precipitating the peroxyacid in the presence of a binding agent for transition metal ions selected from sodium dihydrogen orthophosphate and disodium hydrogen orthophosphate in a way such that 0.3 to 3.0% by weight of the binding agent, as calculated on the total weight of binding agent and peroxyacid, remains in contact with the peroxyacid and a final pH of from 3.5 to 6.0 is obtained. The wording of claim 1 does not contain any further limitation in regard to further process steps, e. g. washing or drying steps, necessary for the recovery of the final product.

The above mentioned process step of claim 1 can be carried out, as explained in the patent in suit, during the conventional preparation of the peroxyacids, e. g. during the quenching of the oxidation reaction, by treating the reaction mixture with ice and an aqueous solution of the orthophosphate (see page 3, lines 52 to 56 and page 6, lines 37 to 39).

As explained in the patent in suit, the orthophosphate is not only adsorbed at the surface of the precipitated particles of peroxyacid but also trapped within said particles (see page 4, lines 13 to 14 and page 6, lines 46 to 48).

The final product of the process of document (3) (see point 2.1.2 above) contains residual amounts, i. e. small amounts, of orthophosphate remaining within the peroxyacid product so that its pH is maintained within the range of 3.5 to 6.0, i. e. the same pH range as required in the process of the patent in suit, and the stability of the peroxyacid is improved. Moreover, document (3) teaches that further subsequent aqueous washing steps should not be carried out after the treatment with aqueous orthophosphate in order not to reduce the achieved stability (see page 3, lines 11 to 16 and page 6, lines 22 to 27).

Therefore the process of document (3) differs from that of the patent in suit only insofar as

- an orthophosphate solution is added in a washing step of the already precipitated wet peroxyacid and not after synthesis of the peroxyacid but

before its precipitation as required in claim 1 of the patent in suit and

- it does not precisely specify how much orthophosphate remains in contact with the peroxyacid in the final product.

## 2.2 The technical problem

2.2.1 The Appellants, referring to examples 3 and 4 of the patent in suit, argued during oral proceedings that the claimed method enabled the notional skilled person to achieve an increased stability of the treated organic peroxyacid also by means of disodium hydrogen orthophosphate which was found not to be effective in a washing method as disclosed in document (3) (see point V above). The stabilizing effect achieved by means of the claimed process and that of document (3) would thus be different.

The Board finds that example 4 shows indeed that this orthophosphate is not able to stabilize the treated peroxyacid when it is applied during the washing of a dichloromethane solution of a commercial sample of the same type of peroxyacid used in example 3 (see page 6, line 52 to page 7, line 2).

However, examples 3 and 4 relate to the treatment of two different starting materials, one being a phthalimido-6-peroxyhexanoic acid prepared as indicated in example 3 and the other being a commercially available phthalimido-6-peroxyhexanoic acid product purified by dissolving it into dichloromethane; furthermore, the treatment of example 4 does not

correspond to that disclosed in document (3) since it relates to the washing of a peroxyacid solution and not to the washing of a solid wet cake of the peroxyacid as required in document (3), which to the contrary indicates the disodium hydrogen orthophosphate as suitable stabilizer.

Therefore, these examples cannot show any advantage of the claimed process over the process disclosed in document (3).

As these arguments were brought by the Appellants for the first time during the oral proceedings before the Board with regard to the restriction of the claimed subject-matter to only two claims during oral proceedings, the responsibility for the support of the alleged evidence lies with the party bringing the arguments for the first time, in this case the Appellants.

Therefore, in the determination of the objective technical problem underlying the claimed invention, the Board has in the present case to disregard this alleged technical effect as not having been convincingly proven.

- 2.2.2 The Appellants submitted during oral proceedings that the objective technical problem underlying the claimed invention, seen in the light of the teaching of document (3), had to be formulated as the provision of an alternative and more convenient method for incorporating the selected orthophosphates into a water-insoluble organic peroxyacid, thereby achieving its stabilization.

The Board notes that the description of the patent in suit reads, for example, that the claimed process leads to a beneficial enhancement of the stability so that it is possible to wash the peroxyacid further without losing the enhanced stability. According to the description the obtained peroxyacid product is thus more robust than products obtained in other ways (page 3, lines 45 to 47).

Example 3 of the patent in suit, the only example showing an embodiment of the invention according to claim 1, shows that the precipitation of the synthesized peroxyacid from a solution containing disodium hydrogen orthophosphate leads after washing with demineralised water to a product which is said to have substantially the same stability as the same product before the washing step (page 6, lines 45 to 46). Further washing steps of the precipitated product with orthophosphate are thus not necessary.

However, the patent in suit does not contain any comparison with the same product of example 3 being treated in a different way with orthophosphate and subsequently washed with water. In fact, the product treated in example 4 is not comparable with that of example 3 for the reasons set forth in point 2.2.1 above and the product of example 5 is obtained by dry-mixing with orthophosphate without further washing steps (page 7, lines 15 to 16).

The Board finds thus that, on the basis of the available evidence, a peroxyacid treated according to the claimed process maintains its stability even after one washing step with water and does not need to be

further washed with an orthophosphate solution, at least in the specific case of example 3.

The Board thus accepts that the technical problem underlying the claimed invention is that defined by the Appellants during oral proceedings and that this technical problem has been convincingly solved.

### 2.3 Evaluation of inventive step

2.3.1 The process of document (3), includes, similarly to the patent in suit, the addition of a solution of orthophosphate leaving residual amounts, i. e. small amounts, of orthophosphate into the peroxyacid (page 6, lines 25 to 27).

The Appellants did not provide any evidence that the selected specific amounts of 0.3 to 3% by weight of orthophosphate remaining into contact with the peroxyacid would bring about any particular advantage exceeding those achieved by the process of document (3).

Therefore, this technical difference, not making any contribution to the solution of the technical problem underlying the claimed invention, has to be disregarded in the assessment of inventive step (see Case Law of the Boards of Appeal of the EPO, 4<sup>th</sup> ed. 2001, point I.D.6.5 on pages 121 and 122).

2.3.2 In the Board's view the notional skilled person, starting from the teaching of document (3) and faced with the technical problem of providing alternative, more convenient ways for bringing the orthophosphate into contact with the organic peroxyacid, thereby

providing a product of comparable stability having a pH in the desired range, would have taken into consideration the other conventional process steps of preparation of the peroxyacid product which involve the addition of an aqueous solution and could be expected to enable the incorporation of the orthophosphate into the final product, thereby providing a peroxyacid with the desired pH.

Consequently, the notional skilled person would have taken into consideration only process steps occurring after the synthesis of the peroxyacid.

The **only** conventional process steps wherein such an addition occurs after synthesis are the quenching step of the oxidation reaction leading to the formation of the peroxyacid, which step enables the precipitation of the peroxyacid product, and subsequent aqueous washing steps of the precipitated product (see e. g. page 4, lines 2 to 5 of document (3)).

Since document (3) already suggested the addition of the orthophosphate solution during a washing step of the solid precipitated product, the **only** alternative that the notional skilled person could have chosen is, in the Board's judgement, the addition of the orthophosphate solution during the quenching precipitating step.

As previously explained, the process of document (3), including the treatment of a solid wet cake of the peroxyacid with a solution of an orthophosphate, leads to a final product having residual amounts of orthophosphate contained in the solid peroxyacid.

In the light of this teaching the notional skilled person would have thus expected that the shifting of the addition of the orthophosphate solution to an earlier step of the process of preparation of the solid, for example, during the quenching precipitating step, would also result in a solid product containing some orthophosphate and having the pH necessary for improved stability, thus rendering not essential a further washing treatment of the solid product with aqueous orthophosphate and thus rendering the process more convenient.

Since there was no technical prejudice that would have prevented the notional skilled person to try this step, it was obvious for him to try this **only possible** alternative (see e. g. T 0835/99, unpublished in OJ EPO, point 1.3.2 of the reasons for the decision, wherein it was similarly decided that, being known to apply a quenching agent to a fabric from an aqueous bath in order to achieve a specific effect, it was obvious for the notional skilled person, in the absence of any technical prejudice, to apply the same quenching agent to a fabric from an aqueous bath in other process steps different from that disclosed in the prior art for exploiting its known beneficial effect).

The Board concludes that this modification of the process disclosed in document (3) cannot be considered to represent an inventive step.

- 2.3.3 The Board notes also that even if the solution of a particular aspect of the technical problem identified and discussed hereinabove, i. e. the provision of a



peroxyacid product able to maintain its stability even after one washing step with water (see point 2.2.2) would have been considered to represent an additional technical advantage over the process of document (3), the claimed method could not be considered to be inventive over the cited prior art, since the solution to the technical problem underlying the claimed invention was already obvious for the reasons set forth above (see point 2.3.2) (see e. g. T 0936/96, unpublished in OJ EPO, point 2.6 of the reasons for the decision).

2.3.4 The Board concludes that the subject-matter of claim 1 thus does not amount to an inventive step.

## **Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

G. Rauh

P. Krasa