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**D E C I S I O N**  
**of 10 February 2005**

**Case Number:** T 0191/03 - 3.3.6  
**Application Number:** 94931336.5  
**Publication Number:** 0726935  
**IPC:** C11D 3/10  
**Language of the proceedings:** EN

**Title of invention:**

Control of calcium carbonate precipitation in automatic dishwashing

**Patentee:**

THE PROCTER & GAMBLE COMPANY

**Opponent:**

Henkel KGaA

**Headword:**

Calcium carbonate precipitation/PROCTER & GAMBLE

**Relevant legal provisions:**

EPC Art. 83, 54, 56

**Keyword:**

"New ground for opposition: not admissible without the consent of the Patent Proprietor"

"Claimed invention sufficiently disclosed (yes)"

"Novelty (yes): weight ratio of complexing agent to carbonate source to be calculated disregarding water of hydration"

"Inventive step (no): increased ratio of complexing agent to carbonate source obvious to try in the light of the known properties of the complexing agent"

**Decisions cited:**

G 0010/91

**Catchword:**

-



Case Number: T 0191/03 - 3.3.6

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.6  
of 10 February 2005

**Appellant:** Henkel KGaA  
(Opponent) VTP (Patente)  
D-40191 Düsseldorf (DE)

**Representative:** -

**Respondent:** THE PROCTER & GAMBLE COMPANY  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 13 December 2002  
rejecting the opposition filed against European  
patent No. 0726935 pursuant to Article 102(2)  
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 reject the opposition against the European patent No. 0 726 935, relating to an automatic dishwashing detergent composition.

This patent was granted with a set of 11 claims, claim 1 reading as follows:

"1. A granular or powder-form automatic dishwashing detergent composition comprising by weight

a) from 1% to 50% of a carbonate source selected from the group consisting of salts of carbonate, bicarbonate, sesquicarbonate, percarbonate and mixtures thereof;

b) a weight ratio of calcium complexing component to said carbonate source of at least 0.9, wherein the calcium complexing component is a pH adjusting agent selected from sodium citrate, citric acid and mixtures thereof; and wherein said composition has a pH from 7 to 12; and

c) from 0.5% to 20% of a dispersant polymer wherein the dispersant polymer is a modified polyacrylate having a molecular weight of less than 15,000 and containing as monomer units: (a) from 90% to 10% by weight acrylic acid or its salts; and (b) from 10% to 90% by weight of a substituted acrylic monomer or its salt having the general formula:

$-\left[ \left( C(R^2)C(R^1)(C(O)OR^3) \right) \right] -$  wherein the incomplete valences inside the square braces are hydrogen and at least one of  $R^1$ ,  $R^2$  or  $R^3$  is a 1 to 4 carbon alkyl or hydroxy alkyl group;  $R^1$ ,  $R^2$  can be hydrogen and  $R^3$  can be hydrogen or alkali metal salt."

Dependent claims 2 to 11 relate to specific embodiments of the composition of claim 1.

II. In its notice of opposition the Opponent sought revocation of the patent on the grounds of Articles 100(a) and (b) EPC and referred *inter alia* to the following documents:

(1): WO-A-95/05440;

(2): WO-A-93/17089; and

(3): US-A-4530766.

III. In its decision the Opposition Division found that

- the skilled person would have not found any difficulty in preparing a product as claimed and would have been also able to determine the weight ratio of complexing agent to carbonate source both by excluding or including in this calculation the water of hydration which could be contained in the complexing agent; furthermore, no evidence had been provided that the claimed composition could not be prepared throughout the whole range of claimed pH values; the claimed invention was thus sufficiently disclosed;

- the weight ratio of complexing agent to carbonate source of claim 1 had to be calculated without taking into account any possible water of hydration contained in the citric acid or sodium citrate as shown in the examples of the patent in suit wherein all concentrations were based on the weight of active materials;

- disregarding the amount of water of hydration contained in the sodium citrate of the compositions A to E of document (1), the weight ratio of complexing agent to carbonate source in such compositions was below 0.9; the claimed subject-matter was thus novel over the compositions of document (1);

- as regards inventive step, the skilled person would not have modified both the ratio of sodium citrate to carbonate source and the type of polymer used in the examples of document (2) in order to further reduce the calcium carbonate deposition during washing;

- the claimed subject-matter thus involved an inventive step.

IV. An appeal was filed against this decision by the Opponent (Appellant).

During the written proceedings the Appellant referred additionally *inter alia* to the documents

(5): "Waschmittelchemie", Dr. Alfred Hüthig Verlag GmbH, Heidelberg, 1.edition, 1976, pages 91 to 99; and

(7): US-A-4203858.

The Respondent (Patent Proprietor) filed under cover of a letter dated 25 January 2005 amended claims according to the first to sixth auxiliary requests.

Each claim 1 of these auxiliary requests differs from claim 1 according to the main request as follows:

**First auxiliary request** - the weight ratio of complexing agent to carbonate source is of **at least 1.0** and the **upper limit** of the concentration of **carbonate source** is **deleted**;

**Second auxiliary request**: the weight ratio of complexing agent to carbonate source is of **at least 1.0** and the **upper limit** of the concentration of **carbonate source** is specified to be **49.75%**;

**Third auxiliary request**: the weight ratio of complexing agent to carbonate source is of **at least 1.0**;

**Fourth auxiliary request**: the claim contains at the end a **disclaimer excluding** compositions according to claim 1 of document (1), i.e. compositions comprising the **specific amine oxides** of that document;

**Fifth auxiliary request**: the claim specifies that the claimed composition does not contain **amine oxides**;

**Sixth auxiliary request**: the claim specifies that the composition comprises **10 to 35% of carbonate, bicarbonate or mixtures thereof**.

Oral proceedings were held before the Board on 10 February 2005 in the absence of the Respondent which had been as duly summoned as the Appellant.

V. The Appellant submitted in writing and orally *inter alia* that

- the patent in suit suggested that the technical problem underlying the claimed invention had been solved only by compositions having a pH of less than 9.5;
- therefore the claimed invention could not be performed throughout the whole claimed range of pH values of 7 to 12;
- the description of the patent in suit did not clarify whether the possible water of hydration of the citric acid or sodium citrate had to be taken into account in the calculation of the weight ratio of these components to the carbonate source; in fact the "active" concentrations used in the examples of the patent in suit could have been calculated only by excluding the impurities present in commercial products but not the possible water of hydration;
- the skilled person thus would have not been able to know if a prepared composition fell within the scope of claim 1 or not;
- the claimed invention was thus not sufficiently disclosed;
- at least the amendments to claim 1 according to the first, second, fourth and fifth auxiliary requests filed during the appeal proceedings contravened Article 123(2) EPC;
- the subject-matter of the claims according to the main request lacked novelty in the light of document (1).

As regards inventive step the Appellant argued that

- citric acid and sodium citrate were known builders able to reduce the precipitation of calcium carbonate as shown, e.g. in document (5);

- it was thus obvious for the skilled person, starting from the teaching of document (2), to increase the amount of sodium citrate used in composition IV in table I of this document within the limits indicated in the description in order to further reduce the precipitation of calcium carbonate;

- moreover, the polymers used in the patent in suit were known dispersing agents for calcium carbonate which had already been used in automatic dishwashing compositions as shown in documents (3) and (7);

- such polymers did not bring about any further technical effect as shown in the patent in suit and it was thus obvious for the skilled person to use them instead of that specifically indicated in the examples of document (2);

- the claimed subject-matter thus lacked an inventive step.

Furthermore, the Appellant argued for the first time in a letter dated 7 January 2005 that some amendments contained in the claims and in the description of the patent as granted amounted to an inadmissible broadening of the originally disclosed subject-matter



and raised therewith a new ground of opposition under Article 100(c) EPC.

VI. The Respondent submitted *inter alia* that

- it did not consent to the introduction of the new ground of opposition under Article 100(c) EPC raised by the Appellant;

- the objections raised by the Appellant in regard to Article 83 EPC concerning the ratio of complexing agent to carbonate species concerned the clarity of the claims and Article 84 EPC and had thus to be disregarded;

- the Appellant did not bring any evidence that the claimed composition could not be prepared throughout the claimed range of pH values;

- since the wording of the claims did not explicitly mention the hydrates of citric acid or sodium citrate, the water of hydration which could be present in commercial products had not to be considered in the calculation of the weight ratio of complexing agent to carbonate source of claim 1, as supported by the use of concentrations expressed as "actives" in the examples of the patent in suit;

- not considering the water of hydration, the examples A to E of document (1) were not novelty destroying;

- the state of the art did not suggest that by increasing the weight ratio of citric acid or sodium citrate to carbonate source used in document (2) and by

using a specific polymer the calcium carbonate precipitation could be further reduced;

- the claimed subject-matter thus involved an inventive step.

VII. The Appellant requests that the decision under appeal be set aside and that the patent be revoked.

The Respondent requests in writing that the appeal be dismissed or that the patent be maintained on the basis of any of the first to sixth auxiliary requests filed under cover of a letter dated 23 January 2005.

### **Reasons for the Decision**

1. Respondent's main Request

1.1 *Admissibility of the new ground of opposition*

The Appellant argued for the first time under cover of a letter dated 7 January 2005 that some amendments contained in the claims and in the description of the patent as granted contravened the requirements of Article 123 EPC (see point V above) and raised therewith a new ground of opposition under Article 100(c) EPC.

The Respondent and Patent Proprietor requested this new ground of opposition to be disregarded (see point VI above).

It is established jurisprudence of the Boards of Appeal of the EPO that new grounds of opposition can be raised in appeal proceedings only with the consent of the Patent Proprietor (see G 10/91, OJ EPO 1993, 420, point 3 of the headnote).

This consent having not been given by the Respondent, the new ground for opposition under Article 100(c) EPC has to be considered inadmissible.

## 1.2 *Sufficiency of disclosure*

1.2.1 The Appellant argued that the claimed invention was not sufficiently disclosed on different grounds (see point V above).

The Board finds that:

- at the priority date of the patent in suit there existed commercially available anhydrous and hydrated forms of sodium citrate and citric acid;
- all these commercially available species could have been used for preparing the claimed composition;
- claim 1 indicates specifically the compounds citric acid and sodium citrate without water of hydration as the complexing agent to be considered for calculating the weight ratio of complexing agent to carbonate source; the wording of claim 1 is thus in itself clear;
- the examples of the patent in suit wherein all the indicated concentrations and the weight ratio of complexing agent to carbonate source are based upon the

weight of the active components support this interpretation of the wording of claim 1 according to which said weight ratio should be calculated disregarding the water of hydration which could be present in commercially available forms of sodium citrate or citric acid;

- the Board cannot thus follow the Appellant's opinion that the "active" concentrations used in the patent in suit would only exclude the impurities present in a commercial product and not the possible water of hydration;

- moreover, said weight ratio of claim 1 contains as a term the carbonate source as a whole and not just the carbonate ion derivable from it; therefore, the whole weight of the indicated carbonate sources, including e.g. percarbonate, should be considered in the calculation of the weight ratio of complexing agent to carbonate source;

- the Appellant did not bring any evidence that the claimed composition cannot be prepared throughout the claimed range of pH values.

1.2.2 The Board has thus no reason to depart from the decision of the first instance that the claimed invention complies with the requirements of Article 83 EPC (see points 2.1 to 2.3 on pages 4 and 5 of the grounds for the decision and point III above).

Since the patent has to be revoked on other grounds further details are unnecessary.

1.3 *Novelty*

1.3.1 Since the weight ratio of complexing agent to carbonate sources should be calculated without taking into account the water of hydration which can be contained in commercially available forms of citric acid or sodium citrate, the weight ratio of sodium citrate to carbonate sources in the examples A to E of document (1) is of less than 0.9.

1.3.2 The Board has thus no reason to depart from the decision of the first instance that the subject-matter of claim 1 is novel over document (1) (see point III above).

1.4 *Inventive step*

1.4.1 The patent in suit and, in particular, the subject-matter of claim 1, relates to a granular or powder-form automatic dishwashing detergent (ADD) composition having a pH of 7 to 12, comprising a carbonate source, citric acid and/or sodium citrate in a weight ratio of at least 0.9 to the carbonate source and a modified polyacrylate dispersant polymer having a molecular weight of less than 15,000 (see page 2, line 48 to page 3, line 3).

As explained in the patent in suit, the carbonate sources used in ADD compositions, though contributing to the overall performance, lead to the precipitation of calcium carbonate which forms an undesirable film on tableware or on the dishwashing machine itself. Polyacrylate dispersants were thus often used for

preventing carbonate precipitation (see page 2, lines 24 to 28).

The technical problem underlying the patent in suit is therefore generally defined in the description of the patent in suit as the provision of alternative effective means for controlling the carbonate precipitation (see page 2, lines 28 to 37).

- 1.4.2 Document (2) relates to the preparation of ADD compositions of a specific pH having a reduced precipitation of calcium carbonate (see page 1, lines 1 to 5 and page 5, lines 18 to 22) and deals thus also with the technical problem addressed to in the patent in suit of preventing calcium carbonate deposition. The Board thus takes this document as the most suitable starting point for the evaluation of inventive step of the claimed subject-matter. All parties agreed with this finding.

Document (2) discloses in table I a composition IV differing from the subject-matter of claim 1 of the patent in suit insofar as the ratio of sodium citrate to carbonate sources (without taking into account the water of hydration) is 0.81, i.e. less than 0.9, and in that the used polymeric carboxylate dispersing agent is Sokalan CP5, i.e. an acrylic acid/maleic acid copolymer having a molecular weight of about 70,000.

- 1.4.3 The Respondent defined the technical problem underlying the claimed invention, seen in the light of the teaching of document (2), as the provision of an alternative composition which provides a further reduced precipitation of calcium carbonate.

Example I of the patent in suit suggests that the precipitation of calcium carbonate is further reduced as the weight ratio of sodium carbonate to sodium citrate approaches 1.0 (page 11, lines 39 to 40). Furthermore, the tests in table 3 of the patent in suit show that a composition having a ratio of said complexing agent to carbonate source of 1.0 provides less filming than a composition having a lower ratio of 0.5 or 0.3, even if such compositions comprise a greater amount of the modified polyacrylate dispersing agent (see compositions B vs. A and C).

The Board finds thus credible that the claimed composition solved the above mentioned technical problem.

- 1.4.4 Document (2) suggested to use compositions having a pH of between 9.0 and 10.0, 2.5 to 20% of alkali metal carbonate, 10 to 60% of bicarbonate, 10 to 50% of trisodium citrate dihydrate and 5 to 30% of a polymethacrylate (see passage bridging pages 4 and 5).

Therefore the Board finds that document (2) already suggested to use also compositions having amounts of sodium citrate much greater than the combined amounts of carbonate sources and thus having a weight ratio of sodium citrate to carbonate sources of greater than 0.9 and even greater than 1.0.

A comparison of the formulation III and IV of table I of this document shows also that an increase of the amount of sodium citrate from 30 to 35% and a reduction of the amount of carbonate sources from 50 to 43% leads

to a substantial reduction in calcium carbonate precipitation (see table III on page 15).

This behaviour is the Board's view not surprising, since it was well known at the priority date of the patent in suit that citrate ions are able to complex calcium ions and thus to reduce calcium carbonate precipitation (see e.g. document (5), page 96, last four lines and table 3). As explained in document (5) the capacity of a complexing agent of preventing the precipitation of calcium carbonate depends on the respective ratio of complexing agent to calcium ions and thus also on the weight ratio to the carbonate source binding with these ions (see page 95, lines 7 to 15 below table 3 and passage bridging pages 97 and 98).

Therefore, the notional skilled person would have expected that an increase of the amount of the known complexing agent sodium citrate would be likely to reduce the formation of calcium carbonate precipitate.

The Board concludes that the notional skilled person, in order to further reduce the calcium carbonate precipitation of a composition like that of example IV of table I of document (2), would have tried a composition having a greater ratio of complexing agent to carbonate source, i.e. a ratio of 0.9 or even 1.0 within the limits set by the frame formulation disclosed in the passage bridging pages 4 and 5 of this document.

- 1.4.5 As already mentioned above, the dispersing polymer used in the patent in suit, though supporting the efficiency



of the composition by means of its dispersing capacities, had been found not to contribute to the reduction of filming brought about by the claimed compositions and thus not to contribute to the solution of the technical problem underlying the claimed invention (see page 12, lines 36 to 37).

Moreover, the selected modified polyacrylates were known dispersing agents for calcium carbonate (see document (3), column 1, lines 3 to 25) which had already been used for their properties in ADD compositions of the prior art (see document (7), column 3, line 58 to column 4, line 16 and 50 to 57 and example 15 on table 1).

Therefore, it would have been obvious for the notional skilled person to use these known dispersing agents of lower molecular weight instead of the polyacrylate Sokalan CP5 specifically used in the examples of document (2).

1.4.6 The Board concludes that the subject-matter of claim 1 of the Respondent's main request lacks an inventive step and thus the appeal succeeds as regards the Respondent's main request.

2. Respondent's first to sixth auxiliary requests

2.1 Each claim 1 according to the Respondent's first to sixth auxiliary requests differs from claim 1 of the main request as follows:

**First auxiliary request** - the weight ratio of complexing agent to carbonate source is of **at least 1.0**

and the **upper limit** of the concentration of **carbonate source** is **deleted**;

**Second auxiliary request**: the weight ratio of complexing agent to carbonate source is of **at least 1.0** and the **upper limit** of the concentration of **carbonate source** is specified to be **49.75%**;

**Third auxiliary request**: the weight ratio of complexing agent to carbonate source is of **at least 1.0**;

**Fourth auxiliary request**: the claim contains at the end a **disclaimer excluding** compositions according to claim 1 of document (1), i.e. compositions comprising the **specific amine oxides** of that document;

**Fifth auxiliary request**: the claim specifies that the claimed composition does not contain **amine oxides**;

**Sixth auxiliary request**: the claim specifies that the composition comprises **10 to 35% of carbonate, bicarbonate or mixtures thereof**.

2.2 All the additional features of each claim 1 of the first to sixth auxiliary requests were already disclosed in document (2), which already suggested compositions having a weight ratio of sodium citrate to carbonate source of at least 1.0 (see point 1.4.4 above), not containing any amine oxide (see frame formulation in the passage bridging pages 4 and 5) and comprising at least 12.5% of sodium carbonate and bicarbonate (see page 5, lines 5 and 6).

Since all these different features were already known from document (2), the same arguments put forward against the main request as regards inventive step apply *mutatis mutandis* to all the auxiliary requests.

The Board concludes therefore that the subject-matter of claim 1 of any of the auxiliary requests lacks an inventive step.

- 2.3 Since the Respondent's auxiliary requests fail already on this ground there is no need to discuss the other objections raised against them by the Appellant.

## **Order**

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

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

G. Rauh

P. Krasa