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Datasheet for the decision of 8 May 2015

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Language of the proceedings: EN

Title of invention:
CORROSION PROTECTION AGENTS FOR TREATING GLASSWARE SURFACES

Patent Proprietor:
THE PROCTER & GAMBLE COMPANY

Opponent:
Henkel AG & Co. KGaA

Headword:
Corrosion protection agents/The Procter & Gamble Company

Relevant legal provisions:
EPC Art. 52(1), 54(1), 56

Keyword:
Novelty - (yes)
Inventive step - (no) - Main Request - (yes) - First Auxiliary Request

Decisions cited:
T 1188/00

Catchword:

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Case Number: T 0366/12 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 8 May 2015

Appellant: (Opponent)	Henkel AG & Co. KGaA Henkelstrasse 67 40589 Düsseldorf (DE)
Representative:	Düffels, Arno Tido Henkel AG & Co. KGaA VTP Patente 40191 Düsseldorf (DE)
Respondent: (Patent Proprietor)	THE PROCTER & GAMBLE COMPANY One Procter & Gamble Plaza Cincinnati, OH 45202 (US)
Representative:	Yorquez Ramirez, Maria Isabel Patent Department Procter & Gamble Technical Centres Limited Whitley Road Longbenton Newcastle upon Tyne NE12 9TS (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 12 December 2011 concerning maintenance of the European Patent No. 1673428 in amended form.**

Composition of the Board:

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

Summary of Facts and Submissions

I. The appeal by the Opponent lies from the interlocutory decision of the Opposition Division concerning maintenance of European Patent 1 673 428 in amended form.

II. Independent Claims 1, 15 and 17 held allowable by the Opposition Division (then pending Main Request filed with letter dated 10 October 2011) read as follows (amendments to the respective claims as granted made apparent by the Board):

"*1. A domestic, institutional, industrial, and/or commercial corrosion protection agent for treating glassware surfaces comprising:*
a) an effective amount of a zinc-containing layered material, ***wherein said zinc-containing layered material comprises one or more of the following: basic zinc carbonate, copper zinc carbonate hydroxide, hydroxy double salts where the metal is solely zinc,*** ~~***phyllosilicate containing Zn^{2+} ions***~~***, zinc hydroxide acetate, zinc carbonate hydroxide, zinc hydroxide chloride, zinc copper carbonate hydroxide, zinc hydroxide lauryl sulfate, zinc hydroxide nitrate, zinc hydroxide sulfate, and mixtures thereof,*** *and*
b) ~~*optionally,*~~ *an adjunct ingredient.*"

"~~16~~***15.*** *A domestic, institutional, industrial, and/or commercial treatment system for reducing glassware surface corrosion in an automatic dishwashing appliance, said treatment system comprising a kit comprising:*
(a) a package;
(b) a corrosion protection agent for treating glassware surfaces comprising an effective amount of a zinc-

containing layered material, ***wherein said zinc-containing layered material comprises one or more of the following: basic zinc carbonate, copper zinc carbonate hydroxide, hydroxy double salts where the metal is solely zinc,*** ~~***phyllosilicate containing Zn^{2+} ions***~~***, zinc hydroxide acetate, zinc carbonate hydroxide, zinc hydroxide chloride, zinc copper carbonate hydroxide, zinc hydroxide lauryl sulfate, zinc hydroxide nitrate, zinc hydroxide sulfate, and mixtures thereof;***

(c) ~~*optionally,*~~ *an adjunct ingredient; and*

(d) instructions for using said corrosion protection agents."

"~~18~~***17.*** *A domestic, institutional, industrial, and/or commercial composition of matter in an automatic dishwashing appliance comprising wash liquor comprising a corrosion protection agent comprising a zinc-containing layered material* ***wherein said zinc-containing layered material comprises one or more of the following: basic zinc carbonate, copper zinc carbonate hydroxide, hydroxy double salts where the metal is solely zinc,*** ~~***phyllosilicate containing Zn^{2+} ions***~~***, zinc hydroxide acetate, zinc carbonate hydroxide, zinc hydroxide chloride, zinc copper carbonate hydroxide, zinc hydroxide lauryl sulfate, zinc hydroxide nitrate, zinc hydroxide sulfate, and mixtures thereof;*** *wherein said wash liquor comprises from about 0.0001 ppm to about 100 ppm of said zinc-containing layered material, and* ~~*optionally*~~ *an adjunct ingredient in said wash liquor during the wash cycle in an automatic dishwashing appliance.*"

III. The patent in suit had been opposed in its entirety on the grounds of Articles 100 (a) (lack of novelty and inventive step) and (b) EPC.

The evidence cited during the opposition proceedings include the following documents:

D2: R. Bruce King, Encyclopedia of Inorganic Chemistry, Volume 8, John Wiley & Sons, 1984, pages 3-13;

D4: WO 94/03574 A1; and,

D6: EP 0 387 997 A2.

IV. In the decision under appeal, the Opposition Division *inter alia* came to the conclusions that the subject-matter of Claims 1 to 18 according to the then pending Main Request was sufficiently disclosed, novel over *inter alia* D6 and inventive, *inter alia* when taking D6, or even D4, as the closest prior art.

V. With its statement setting out the grounds of appeal, the Appellant submitted a new document, namely

D9: Print-out from Römpp Online, Keyword "Zinkcarbonate", 2012, single page.

It argued that the subject-matter of the claims held allowable by the Opposition Division lacked novelty, *inter alia* over D6, and was not inventive, *inter alia* taking D6, or even D4, as the closest prior art, *inter alia* in combination with D2 or D9.

VI. In its reply, the Respondent (Patent Proprietor) maintained that the subject-matter of the claims held allowable by the Opposition Division was novel and inventive, also over D6. With said reply, it nevertheless submitted a further amended set of claims as First Auxiliary Request.

VII. Under cover of two further letters, the Respondent submitted two further sets of amended claims as Second and Third Auxiliary Requests, clean copies of the First to Third Auxiliary Requests as well as adapted description pages.

VIII. Oral proceedings were Held on 8 May 2015. As regards the Main Request, the debate focused on the issues of novelty and inventive step of the subject-matter of Claim 1 over D6 taken as the closest prior art, taking also into account D2 and D9. The Respondent filed new First and Second Auxiliary Claim Requests, in replacement of the previously pending First to Third Auxiliary Requests. The only objection raised with respect to the new First Auxiliary Request was an inventive step objection based on D4 taken as the closest prior art.

IX. Independent claims 1, 14 and 16 according to the First Auxiliary Request submitted at the oral proceedings differ from corresponding claims 1, 15 and 17 of the Main Request in that the clause feature defining the zinc-containing layered material is, respectively, amended so as to read as follows (amendments made apparent by the Board):

" *..., wherein said zinc-containing layered material comprises one or more of the following: basic zinc carbonate* ***having the formula*** $\boldsymbol{[ZnCO_3]_2 \cdot [Zn(OH)_2]_3}$, *copper zinc carbonate hydroxide,* ~~*hydroxy double salts where the metal is solely zinc*~~*, zinc hydroxide acetate,* ~~*zinc carbonate hydroxide*~~*, zinc hydroxide chloride, zinc copper carbonate hydroxide, zinc hydroxide lauryl sulfate, zinc hydroxide nitrate, zinc hydroxide sulfate, and mixtures thereof, ...*"

Dependent claims 2 to 13, 15, and 17 thereof are directed to more specific embodiments of the subject-matters of Claims 1, 14 and 16, respectively.

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

The Respondent (Patent Proprietor) requested that the appeal be dismissed, or in the alternative, that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of the claims according to one of the First or Second Auxiliary Requests submitted at the oral proceedings.

XI. The arguments of the Appellant of relevance for the present decision can be summarised as follows:

Main Request

Lack of novelty over D6

D6 concerned automatic dishwashing and protection from glass corrosion, which was provided with insoluble inorganic zinc salts, such as zinc basic carbonate, as apparent from claims 1 and 5 thereof. Page 4 of the description of D6 also mentioned an approximate formula for the zinc basic carbonate, without however giving any details on its structure, e.g. whether it was layered. Since D6 did not disclose that the structure was not layered, and since it was known that e.g. hydrozincite was a zinc basic carbonate having a layered structure, it could be assumed that the zinc basic carbonate of D6 had the same layered structure as the zinc basic carbonate mentioned in paragraph [0021] of the patent in suit, i.e. was the very same material.

Consequently, the agent according to Claim 1 was not new.

Lack of inventive step over D6

If, nevertheless, the claimed layered structure were seen as a difference over the agent disclosed by D6, then the claimed agent would not be inventive in the light of the agent disclosed by D6, for the following reasons:

The patent in suit contained comparative examples which showed the effect of the presence of layered zinc structures over non-layered ones. However, the closest embodiment of D6 was a zinc basic carbonate, despite the fact that its structure (layered or non-layered) was not apparent from D6. In this respect, no comparative examples were present in the patent in suit, nor had they ever been submitted separately, which could show that some effect, which was attributable to the layered structure of the zinc-containing material, was achieved.
As regards the alleged advantages mentioned in paragraph [0009] of the patent in suit (such as reduced cost of manufacture, lesser amounts of agent, reduced impact on thickening agents and reduced interference with the bleach agent, hence better cleaning performance for tea and stains), it was not apparent which of them, if any, was achieved with the corrosion protection agent according to the pending claims, compared to the zinc basic carbonate of D6. In this respect, since according to D9 hydrozincite, a preferred material according to the patent in suit, was insoluble, no difference over D6 could be invoked therefrom. Also, none of these advantages specifically related to the layered structure of the zinc-containing

material. Furthermore, the comparative tests submitted in the opposition proceedings were a comparison with ZnO, not with a zinc basic carbonate such as hydrozincite. Hence, the onus to prove any alleged improvement over D6 was on the Patent Proprietor, and had not been discharged. Although the Appellant had no evidence disproving that a layered structure with zinc generally provided an advantage in glass corrosion protection, it nevertheless was convinced that the zinc basic carbonate material disclosed by D6 was a material as claimed, which thus provided the very same invoked effect. Hence, there was no evidence of any advantage arising from the layered structure of the claimed protection agent.

Consequently, the problem effectively solved over D6 was merely the provision of an alternative zinc-containing protection agent.

It was generally known (cf. e.g. D2 or D9) that hydrozincite was a a naturally occurring zinc basic carbonate having a layered structure. Hence, the skilled person starting from D6 and seeking an alternative would obviously try using hydrozincite as corrosion protection agent, thereby directly arriving at the agent of Claim 1.

First Auxiliary Request

Lack of inventive step over D4

The Appellant held that the closest prior art document was D4, which disclosed hydrotalcite, which had a layered structure, as glass corrosion protection agent. Since no comparative tests had ever been provided with respect to the use of hydrotalcite, the problem solved over D4 was again merely the provision of an alternative glass corrosion protection agent. Since

zinc was a known glass corrosion protection agent, and since layered structures containing zinc, such as hydrozincite, were well known too, the skilled person seeking an alternative agent would obviously have replaced hydrotalcite with a zinc-containing layered structure. The claimed subject-matter of the First Auxiliary Request was thus obvious.

XII. The counter-arguments of the Respondent of relevance for the present decision can be summarised as follows:

Main Request

Novelty over D6

Novelty of the protection agent of Claim 1 could not be attacked based on "assumptions" regarding the disclosure of D6 but only on the basis of what was directly and unambiguously disclosed therein. D6 did not explicitly disclose a zinc-containing material having a layered structure. In assessing whether a layered structure was implicitly disclosed in D6, it had to be read as it would have been red on its filing date. D6 (page 3) disclosed the use of insoluble zinc salts, gave some examples thereof, including zinc basic carbonate, for glassware corrosion protection, without, however, indicating any specific structural formula thereof. It was generally known that a material having a same chemical formula/symbol might have different configurations (e.g. diamond or graphite for carbon). The actual configuration of the zinc basic carbonate of D6 could not be assumed on the basis of a balance of probability. So, D6 did not disclose a zinc-containing material with a layered structure as claimed. Thus, the claimed protection agent was new.

Inventive step over D6

D6 was the closest prior art document but disclosed insoluble zinc salts and preferred zinc oxide as corrosion protection agent. Instead, as apparent from paragraph [0027] of the patent in suit, the zinc-containing layered material as claimed comprised a layered brucite structure with cationic charges which interacted with the negatively charged glass surface, leading to more efficient deposition of the zinc compound on the glass surface. The zinc ions within the layered structure were labile, hence could readily fill in the vacancies in the glass structure, thus effectively preventing glass corrosion. For this reason, less protection agent could be used, hence with reduced costs, compared to the use of ZnO. It was clearly apparent from the comparative tests filed with letter dated 9 November 2011 that a layered zinc-containing structure as claimed was more efficient in glass corrosion prevention than ZnO as used according to D6. As regards "zinc basic carbonate", D6 merely disclosed that it performed as ZnO, but not better. Hence, an improvement over zinc basic carbonate had also been shown. It was not possible to know precisely which zinc basic carbonate material was actually disclosed by D6. Therefore, the problem solved was the provision of an agent providing better glass corrosion protection. The burden to disprove the comparative examples of the Patent Proprietor over the most preferred material of D6 was on the Appellant, but had not been discharged.

Since no hint whatsoever could be found in the cited prior art towards an agent providing the proven improvement in glass corrosion protection, the claimed agent was not obvious over D6.

First Auxiliary Request

Inventive step over D4

D4 was concerned with objectives such as prevention of filming and spots, not glass corrosion, and could not be the closest prior art document, unless retrospectively. If it were nevertheless considered as an appropriate starting point, then the following should be considered: An agent comprising a hydrotalcite as disclosed in D4 was not claimed by the patent in suit. None of the agents defined in Claim 1 at issue were disclosed in D4, i.e. there was no similarity whatsoever between D4 and the patent in suit in this respect. D4 taught materials that could be used as glass corrosion protection agents, and in this respect was sufficient in itself. Consequently, the skilled person could not derive the claimed agent from D4 in an obvious manner. The claimed agent was thus inventive.

Reasons for the Decision

Main Request

Novelty

1. Over document D6

1.1 Document D6 (see Claim 1), the only prior art document cited by the Appellant against novelty, concerns a "liquid automatic dishwashing detergent composition" comprising *inter alia*" an amount of an insoluble inorganic zinc compound, having an average particle

size less than about 250 microns, that will provide the composition with from about 0.01% to about 1.0% zinc".

1.2 The list of suitable zinc compounds specifically mentioned in D6 (paragraph bridging Pages 3 and 4) includes *inter alia* "zinc oxide" and "**zinc basic carbonate (approximately $Zn_2(OH)_2CO_3$)**". No further details are expressly indicated in D6 as regards the structure of said zinc basic carbonate.

It is not contested that the quoted formula is one amongst several (having different ratios of hydroxide and carbonate ions to zinc) representing zinc basic carbonates. What is contested by the Respondent is the assertion of the Appellant that the zinc basic carbonate corresponding to this formula necessarily had a layered structure.

1.3 In this respect, common general knowledge at the effective filing date of the patent in suit has to be taken into account, which is illustrated by e.g. D2.

1.3.1 According to D2 (Point 6.3, page 4441, right column, last paragraph, first sentence) "Another important structure in the chemistry of hydroxy (and carbonate) derivatives of zinc is the so-called CdI_2 (or brucite, $Mg(OH)_2$)) structure". This structure might be represented as depicted in Figure 1 on page 4442 of D2.

1.3.2 Moreover, the following is stated in D2 (page 4443, left column, first paragraph): "... because different layer sequences are possible, there is a very large number of closely related structures (more than 80 such structures have been characterized). Zinc hydroxide, for example, exists in a number of forms based on this structure but with **differing layer sequences**; one of

them has the simple CdI_2 structure, others have more complex layer sequences and one, the γ-form, has an entirely different structure consisting of **rings** of three tetrahedral $Zn(OH)_4$ units which are linked through their remaining vertices into infinite columns (Figure 2)" (emphasis added by the Board).

1.3.3 Still further according to D2 (page 4443, left column, first sentence below Figure 2, sentence bridging left and right columns, Figure 3(d), first paragraph of the right column), "A number of zinc hydroxy compounds are based on the CdI_2 layer structure but with zinc ions attached to the outside of the layer." One of them, shown in Figure 3(d), is the compound hydrozincite, $Zn_5(OH)_6(CO_3)_2$, which is a preferred "*zinc-containing layered material*" according to the patent in suit (see e.g. Claim 2).

1.4 For the Board, it follows from the quoted passages of D2 that:

(a) One of the components of the zinc basic carbonate, namely zinc hydroxide, can have a simple brucite, thus layered, structure, or more complex layer sequences, or, however, a columnar structure ("γ-form").

(b) Zinc hydroxide has not always a layered structure, i.e. layers are not inherent.

(c) "Hydrozincite $Zn_5(OH)_6(CO_3)_2$" has a layered structure.

1.5 D6 is silent on the morphology/structure of the "zinc basic carbonate" referred to therein, and no evidence was brought up showing that it inherently had to have a layered structure as required by Claim 1.

Hence, in the Board's judgement, D6 does not directly

and unambiguously disclose a corrosion protection agent according to Claim 1 at issue, i.e. comprising a "*zinc-containing layered material*".

2. The subject-matter of claim 1 is thus novel over D6 (Articles 52(1) and 54 EPC).

Inventive step

The invention

3. The invention concerns zinc-containing corrosion protection agents for treating glassware surfaces, for examples dishes and glasses (paragraph [0001] of the patent in suit).

The closest prior art

4. At the oral proceedings before the Board, it was common ground between the parties that D6 was the most appropriate starting point for the assessment of inventive step of the subject-matter of Claim 1 of the Main Request. Considering the similarities between the patent in suit and D6 in terms of problems addressed and the compositions concerned, the Board has no reason to take a different stance in this respect.

4.1 More particularly, D6 discloses (page 4, lines 16 to 29) that since most of the insoluble zinc material remains in essentially the same form throughout the dishwashing process, it is important that the particle size of the insoluble inorganic zinc salt be small enough so that it passes through the dishwashing process without adhering to dishware. Accordingly, insoluble inorganic zinc salts in the dishwashing process are not a problem if their average particle

size is kept below 250 micrometers, preferably below 100 micrometers when zinc oxide is used as the zinc salt.

4.2 In this respect, D6 illustrates in its Example III a liquid automatic dishwashing detergent composition comprising, as the insoluble zinc compound homogeneously dispersed therein, zinc oxide having a particle size of less than 100 micrometers. This automatic dishwashing detergent composition provides enhanced protection against glassware corrosion in the dishwasher (D6: page 18, lines 27 to 29). Other compositions were obtained by replacing the zinc oxide in whole or in part with alternative insoluble inorganic zinc salts selected from *inter alia* "zinc basic carbonate" having an average particle size of less than 250 micrometers (D6: page 18, lines 29 to 33).

4.3 Hence, D6 discloses *inter alia* a corrosion protection agent for treating glassware in automatic dishwashing processes comprising an effective amount of a zinc-containing material, i.e. zinc basic carbonate and an adjunct ingredient (surfactant, builder), i.e. an agent with all the features of Claim 1 at issue, except for the requirement that the zinc-containing material has to be "*layered*". This was no longer in dispute at the oral proceedings.

The technical problem according to he Respondent

5. At the oral proceedings before the Board, the Respondent maintained that, in the light of the closest prior art (agent referred to in 4.3, *supra)*, the technical problem was to provide a zinc-containing corrosion protection agent for glassware treatment

which was improved in terms of glass corrosion prevention.

The solution

6. The patent in suit as amended proposes to solve this problem by providing the corrosion protection agent for treating glassware surfaces as defined in Claim 1 at issue, which is characterized in that it comprises "*an effective amount of a zinc-containing* ***layered*** *material*" (emphasis added by the Board).

The alleged success of the solution

7. As regards the better results allegedly attributable to the use of the claimed layered Zn-containing layered material, the Respondent presented the following arguments:

i) Owing to its cationic charge and layered structure, the claimed zinc-containing material was attracted by the negatively charged glass surface, where it made available the labile zinc ions contained therein: Therefore, it performed better in glass corrosion prevention than the agents disclosed in D6. In this connection it referred to paragraph [0027] of the patent in suit.

ii) This better performance was proven by the evidence filed by the Patent proprietor during the opposition proceedings with letter dated 9 November 2011.

7.1 For the Board, argument i) referring to the particular physico-chemical mechanism involved appears to be plausible, since in accordance with common general knowledge (see e.g. D2, Figure 3(d)). However, the main

question remains whether an improvement is achieved over the agent (comprising zinc basic carbonate) according to the closest prior art identified under point 4.3, *supra*.

7.2 As regards argument ii), the Board notes that the evidence filed during the opposition proceedings consists of photographs supposed to show that hydrozincite ("HZ" hereinafter), i.e. a zinc-containing layered material according to Claim 1 at issue, is more effective than ZnO (as disclosed by D6) in providing a same level of glass corrosion protection.

7.2.1 These comparative tests were carried out with two commercial automatic dishwashing detergent products, i.e. "Titan cascade Pure Rinse Powder" (Titan hereinafter) and "Saturn Cascade Complete" (Saturn hereinafter). Neither the composition nor the morphology (e.g. particle size) of these products is disclosed in the test report.

7.2.2 Titan was tested in combination with respectively no HZ, 0.1, 015 and milled HZ. Saturn was tested in combination with milled HZ, ZnO and 0.15 HZ in 17 cycles. Two kinds of glass surfaces were treated, "Luminarc" and "Eng Highball" in GE 2000 for 50 cycles. For the Board, the following is apparent from the results shown by the photographs:

(a) Titan or Saturn with milled HZ appear to give the best corrosion protection (smallest white areas);

(b) Already 0.1 added HZ appears to greatly reduce corrosion compared to the use of Titan alone;

(c) 0.15 added HZ reduced corrosion compared to the use of Saturn alone;

(d) For the Luminarc glass surfaces tested, the addition of ZnO to Titan does does not lead to

better results that obtained using Titan together with 0.1, 0.15 or milled HZ;

(e) However, for the Eng Highball glass surface, it is not even clearly apparent that Titan + ZnO performs worse than Titan with 0.1, 0.15 or milled HZ.

7.2.3 Considering *inter alia* that these tests
- do not reproduce Example III of D6,
- are silent as to the particle size of the ZnO used,
- do not show any effect for any other layered zinc basic carbonate than hydrozincite and
- do not show an improvement for both glass types treated,
the Board concludes that they do not convincingly demonstrate that compared to some specific embodiment of D6, the alleged improvement in terms of better deposition, thus better corrosion protection is actually achieved across the whole ambit of Claim 1 at issue.

7.3 Furthermore, it is noted that the prior art according to D6 was not acknowledged in the application as filed, i.e. at the time when the technical problem as retained in paragraph [0004] of the patent in suit was formulated.

7.3.1 The general statement in paragraph [0003] of the patent in suit of "*another approach is to use insoluble zinc salt to control the release of Zn^{2+} ions in the rinse to avoid filming*" does not appear to be an acknowledgement of the full teaching of D6.

7.4 The examples contained in the patent in suit compare agents containing or not containing hydrozincite or zinc hydroxy sulfate. They do thus not represent a

comparison with the closest prior art agents of D6 (comprising zinc basic carbonate).

7.5 D6 too addresses the problem of glass corrosion prevention, which it solves by the use of zinc basic carbonate. No evidence is on file convincingly showing a better performance of the claimed agent over said agent according to D6 across the whole ambit of Claim 1 at issue.

7.5.1 In the present case, the onus of proof was on the Respondent, and not on the Appellant, because the Respondent formulated a new, more ambitious, technical problem (compared to the one mentioned in paragraph [0004] of the patent in suit) at the oral proceedings before the Board, which can only be taken into account if it is at least foreshadowed in or derivable from the application as filed and, moreover, effectively solved across the whole breadth of the claim at issue (see e.g. T 1188/00 of 30 April 2003, Reasons, points 4.5 to 4.9).

7.5.2 As apparent from the above considerations, the Respondent has not, however, discharged the burden to prove the achievement of an improvement across the whole breadth of Claim 1 at issue.

7.5.3 The question whether the technical problem formulated by the Respondent can actually be derived from the application as filed can be left open, considering that there is no evidence showing that, compared to the zinc basic carbonates of D6, a better performance in glass corrosion prevention is effectively attained by any zinc-containing layered material.

Reformulation of the technical problem

8. Since the problem effectively solved cannot be formulated in terms of an improvement over the closest prior art D6, it has to be reformulated in a less ambitious way.

In accordance with paragraph [0004] of the patent in suit, it can be seen in the provision of further corrosion protection agents for treating glassware surfaces.

Success of the claimed solution

9. Considering in particular the results in terms of glass corrosion protection shown in the examples of the patent in suit and in the comparative tests submitted with letter dated 9 November 2011, the Board accepts as plausible that the less ambitious technical problem is effectively solved by the agents comprising a layered zinc-containing material from the list comprised in Claim 1 at issue. This was not in dispute.

Obviousness

10. It remains to be decided whether the claimed solution was obvious to the skilled person aiming to solve the technical problem posed, having regard of common general knowledge and the state of the art.

11. According to D6 (Claim 1; page 4, lines 16-29; page 18, lines 30-34) zinc oxide may be replaced in whole or in part with alternative zinc salts selected from *inter alia* "zinc basic carbonate", with much emphasis put on the particle size of the insoluble zinc compounds used. According to D6, "zinc basic carbonate" is one of

several known and available compounds, suitable to be used as alternative agent for glassware surface corrosion protection in automatic dishwashing.

11.1 D6 is silent on the structure of zinc basic carbonate, apart from the approximate formula disclosed on Page 4, line 1, which however does not directly and unambiguously reveal any configuration of the material it represents, let alone a layered structure. Also, D6 does not address any effect, let alone a particular physico-chemical corrosion protection mechanism to be brought about by the nature, morphology or phases of the mentioned zinc basic carbonate.

11.1.1 Hence, D6 imposes no limitation whatsoever on the nature (e.g. naturally occurring, synthetic or corrosion product of zinc material) or on the morphology (layered or not; number and kind of phases) of the zinc basic carbonate which may be used as the zinc-containing component of the agent.

11.2 It is not in dispute that the term "zinc basic carbonate" as used in D6 designates a class of zinc hydroxide carbonate compounds which was generally known at the effective filing date of the patent in suit (D2, Page 4443, left column, first paragraph, and paragraph bridging left and right columns on the same page; Figure 3(d)).

According to D2, almost all the compounds belonging to the class "zinc basic carbonate" have a layered structure, and D6 contains no indication that the exception, i.e. a zinc basic carbonate with a non-layered structure was to be used as the zinc basic carbonate.

11.3 Hence, in the Board's judgement, the skilled person seeking to solve the technical problem posed (Point 4.3, *supra*) would consider, as one amongst several alternative possibilities readily available to him upon reading D6, the use of a layered zinc basic carbonate, thereby arriving at agents encompassed by the subject-matter of Claim 1 at issue without ingenuity.

11.4 The Board concludes that the subject-matter of claim 1 at issue does not involve an inventive step (Article 52(1) and 56 EPC).

11.5 The Appellant's Main Request is thus not allowable.

First Auxiliary Request

Admissibility

12. The request at issue was only filed in the course of the oral proceedings before the Board.

12.1 The filing of these amended claims is considered to be a reaction to the development of the debate on inventive step at oral proceedings, and to the view expressed by the Board that the subject-matter of Claim 1 according to the Main Request lacked an inventive step. It addresses and overcomes the finding of the Board without raising any further complex questions. The Appellant did not object to the late filing of this request.

12.2 The Board thus decided to admit this request into the proceedings despite its late filing (Article 114(2) EPC and Articles 12(4) and 13(1)(3) RPBA).

Allowability of the amendments

13. The appellant did not raise objections under Articles 84, 123 (2) or (3) or Rule 80 EPC against the amendments made. The Board has no reason to take a different stance on these issues.

Novelty

14. Compared to Claim 1 of the Main Request, Claim 1 of the First Auxiliary Request has a more limited ambit.

14.1 More particularly, the "*basic zinc carbonate*" which may be used as the the "*zinc-containing layered material*" is strictly limited to restricted to the material having the specific formula "$[ZnCO_3]_2 \cdot [Zn(OH)_2]_3$". This formula not only specifies the ratios of hydroxide and carbonates to zinc, but (by virtue of the square brackets) also the coordination of zinc carbonate and zinc hydroxide (e.g. two layers of zinc carbonates with three layers of zinc hydroxide, in analogy with the layered structure shown in Figure 3(d) of D2).

14.2 The Board is satisfied that D6 does not even implicitly disclose any such zinc basic carbonate. No novelty objection was raised by the Appellant.

14.3 The subject-matter of claim 1 is thus novel (Article 5(1) and 54 EPC).

Consequently, the subject-matters of independent Claims 14 and 16 directed, respectively, to a treatment system and a composition of matter comprising the novel agent according to Claim 1, and the subject-matter of dependent Claims 2 to 13, 15 and 17, are also novel.

Inventive step

15. The sole attack presented by the Appellant against the claims according to the request at issue is an inventive step attack based on document D4.

The closest prior art

16. D4 not closest prior art

16.1 It is established case law of the boards of appeal of the EPO that the closest prior art for assessing inventive step is normally a prior art document disclosing subject-matter conceived for the same purpose or aiming at the same objective or addressing the same technical problem as the claimed invention and having the most relevant technical features in common, i.e. requiring the minimum of structural/compositional modifications.

16.2 As regards the objectives/technical problem

16.2.1 D4 (page 3, lines 1 to 7) aims to provide a machine dishwashing composition having improved performance on glass appearance, i.e. having improved reduction to films and spots formation on the articles cleaned therewith. Another object of D4 is to provide a rinse aid composition. According to D4 (page 1, lines 24 to -31), visual "appearance" is affected by a film formed on the cleaned article, which results in a dull surface when dry, or spots formed on an article upon drying. Both phenomena cause the article to have an "unclean" visual appearance. It is acknowledged in D4 (page 2, lines 6 to 12) that it was known to incorporate an effective level of a suitable layered clay material (page 2, lines 14-20) in machine dishwashing

compositions to reduce the problem of film and spot formation on the washed article, thereby improving the so-called "glass appearance". Such improvement was due (D4: page 2, lines 22 to 27) to the very large surface provided in solution by the layered clay, which picked up food fragments, especially proteins and protein/fat complexes, that would otherwise redeposit onto the washed articles, hence via a mechanism of adsorption.

16.2.2 D4 (Page 11, lines 13 to 14)) only mentions glass corrosion incidentally as follows: "Zinc salts, both soluble and insoluble zinc salts, can also be incorporated as adjuncts for minimizing glass corrosion".

16.2.3 For the Board, it is apparent from the quoted passages that glass corrosion protection as dealt with in the patent in suit is not the primary problem addressed by D4. Whereas the primary objective of D4 is reduction of filming and spotting to improve glass appearance, the primary objective of the patent in suit is the reduction of glass corrosion.

16.3 Indeed, D4 appears to have been retrospectively taken as the closest prior art only on the basis of a consideration of one of the aspects of the solution proposed by the patent in suit, namely the layered structure of the material, hence with hindsight (i.e. starting from the solution rather than from the objectives).

Already for this reason, D4 is not, in the Board's judgement, the closest prior art for the assessment of inventive step according to the problem-solution approach.

17. D6 closest prior art

More particularly, D4 it is not a closer prior art than D6 (see points 4, *supra*). D6 thus remains the most appropriate starting point for the assessment of inventive step of the subject-matter of the claims according to the First Auxiliary Request.

Technical problem, solution and success of the solution

18. There is no reason requiring a reformulation of the technical problem posed (Point 8, *supra*).

The solution according to Claim 1 of the First Auxiliary Request no longer encompasses every layered basic zinc carbonate but is limited, in this respect, to the one "*having the formula* $[ZnCO_3]_2 \cdot [Zn(OH)_2]_3$".

The Board has no reason to question that this specific layered zinc compound also provides the aimed for glass corrosion protection.

Obviousness

19. Neither D6, nor any other prior art document relied upon by the Appellant discloses said very specific basic zinc carbonate compound.

D4 (Claim 1) discloses a machine dishwashing composition comprising a builder or builder mixture, buffering and/or alkaline agent, characterized in that it further comprises an effective level of a hydrotalcite compound, a layered material which is used as adjunct for improving glass appearance (Claim 2). The only hydrotalcite mentioned in D4 (see page 6, line 9) which comprises zinc and carbonate is the compound

having the formula $[Zn_4Al_2(OH)_{12}](CO_3)\cdot xH20$ and a compound with the formula of the basic zinc carbonate defined in claim 1 at issue does not fall under the definition of a hydrotalcite as given in D4, expressing a very different molecular structure. For the Board, the only relevant disclosure of D4 is that "zinc salts, both soluble and insoluble zinc salts, can also be incorporated as adjuncts for minimizing glass corrosion" (page 11, lines 13-14). This disclosure do not represent any hint to use a zinc-containing layered compound having the specific formula defined in Claim 1. Nor does the fact that hydrotalcite has a layered structure constitute such a hint without the benefit of hindsight.

20. The Board concludes that providing agents according to claim 1 at issue was not obvious to the skilled person having regard to the state of art.

21. The subject-matter of Claim 1 thus involves an inventive step (Article 52(1) and 56 EPC).

Consequently, the subject-matters of independent Claims 14 and 16 directed, respectively, to a treatment system and a composition of matter comprising the non-obvious agent according to Claim 1, and the subject-matter of dependent Claims 2 to 13, 15 and 17, also involve an inventive step.

Conclusion

22. The claims according to the First Auxiliary Request are, thus, allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent on the basis of the following documents:
- Claims 1 to 17 of the First Auxiliary Request filed during the oral proceedings,
- Figures 1 and 2 of the patent as granted,
- the description to be adapted where appropriate.

The Registrar: The Chairman:

D. Magliano B. Czech

Decision electronically authenticated