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Datasheet for the decision
of 11 August 2009

Case Number: T 0304/07 - 3.2.07

Application Number: 98908792.9

Publication Number: 0977908

IPC: C23C 22/78

Language of the proceedings: EN

Title of invention:
Conditioning metal surfaces prior to phosphate conversion coating

Patentee:
Henkel AG & Co. KGaA

Opponent:
Nippon Paint Co., Ltd.

Headword:
-

Relevant legal provisions:
EPC Art. 83

Relevant legal provisions (EPC 1973):
-

Keyword:
"Sufficiency of disclosure (all requests-no)"

Decisions cited:
-

Catchword:
-

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Boards of Appeal

Chambres de recours

Case Number: T 0304/07 **-** 3.2.07

DECISION
of the Technical Board of Appeal 3.2.07
of 11 August 2009

Appellant: (Patent Proprietor)	Henkel AG & Co. KGaA Henkelstraße 67 D-40589 Düsseldorf (DE)
Representative:	-
Respondent: (Opponent)	Nippon Paint Co., Ltd. 1-2, Oyodokita 2-chome Kita-ku Osaka-shi, Osaka-fu (JP)
Representative:	Klusmann, Peter Hoffmann - Eitle Patent- und Rechtsanwälte Arabellastraße 4 D-81925 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted 28 December 2006 revoking European patent No. 0977908 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: H. Meinders
Members: H. Hahn
I. Beckedorf

Summary of Facts and Submissions

I. The patent proprietor (appellant) lodged an appeal against the decision of the Opposition Division to revoke European patent No. 0 977 908.

II. An opposition had been filed against the patent in its entirety under Article 100(a) EPC, for lack of novelty and inventive step, and under Article 100(b) EPC, that the patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by the person skilled in the art. With letter of 13 October 2006 the additional ground of opposition under Article 100(c) EPC was raised with respect to claims 4 and 5.

The Opposition Division held that the subject-matter of claims 4 and 5 of the main request (i.e. the patent as granted) met the requirements of Articles 123(2) EPC but that claims 3 and 4 of this request contravened Article 83 EPC. The Opposition Division considered that the subject-matters of the sets of claims according to the auxiliary requests 1 to 3 as filed at the oral proceedings of 21 November 2006 complied with Articles 123(2) and (3) EPC and were novel, particularly with respect to D1 (= EP-A-0 117 599), but held that the subject-matter of claim 1 of each of these auxiliary request did not meet the requirements for inventive step with respect to D1 and the common general knowledge as represented by e.g. D3 (= GB-A-1 137 449).

III. With a communication annexed to the summons dated 24 April 2009 the Board arranged for oral proceedings and presented its preliminary opinion on claims 1-6 of the main request, claims 1-5 of the first auxiliary request, claims 1-6 of the second auxiliary request, claims 1-5 of the third auxiliary request, all as filed together with the grounds of appeal dated 25 April 2007, and claims 1-6 of the fourth auxiliary request, claims 1-5 of the fifth auxiliary request, claims 1-6 of the sixth auxiliary request and claims 1-5 of the seventh auxiliary request, all as filed with letter (dated 14 May 200**9** [sic]) received at the EPO on 16 May 2008.

The Board stated amongst others that the amendments made to claims 1 and 5 of the main request and of the second, fourth and sixth auxiliary request, as well as the amendments made to claims 1 and 4 of the first, third, fifth and seventh auxiliary request were considered not to comply with Article 123(2) EPC. The amendment made to dependent claim 3 of the sixth auxiliary request appeared to contravene Rule 80 EPC. Therefore none of these eight requests appeared to be admissible.

With respect to the issue of sufficiency of disclosure the Board remarked that the Opposition Division's conclusion was based entirely on the arguments of the Opponent. Since the patent had been revoked the onus of substantiation of sufficiency of disclosure appeared to now lie with the appellant, who needs to establish the incorrectness of the contested decision unless the Board considered these arguments to be erroneous (see Case Law, 5th edition 2006, chapter VI.K.5.2), which was, however, not the case. Said conclusion of the Opposition Division seemed to be reasonable and thus it appeared that all requests did not comply with Article 83 EPC.

IV. With letter dated 23 June 2009 received at the EPO on 27 June 2009 the appellant submitted amended sets of claims according to a main request and first to seventh auxiliary requests in combination with arguments concerning the allowability of the amendments made therein.

V. Oral proceedings before the Board were held on 11 August 2009, at which first the issue of sufficiency of disclosure was discussed in respect of all requests. Before the interruption for the deliberation on this issue by the Board both parties had confirmed their respective requests.

(a) The appellant requested that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of the set of claims according to the main request or, alternatively, on the basis of one of the sets of claims according to the first to seventh auxiliary requests, all as filed on 27 June 2009.

(b) The respondent (opponent) requested that the appeal be dismissed.

(c) At the end of the oral proceedings the Board announced its decision.

VI. Claims 1 and 4 of the main request read as follows:

"1. A liquid pretreatment composition, adapted for conditioning metal surfaces prior to a treatment thereof that forms a zinc cations-containing phosphate conversion coating, said pretreatment composition having a pH value in the range of from 4 to 13 and comprising the following components:

(A) a dissolved component being one or more alkali metal and/or ammonium salt(s);
(B) a dispersed component being one or more phosphate(s) of divalent and/or trivalent metal(s) selected from the group consisting of $Zn_3(PO_4)_2$, $Zn_2Fe(PO_4)_2$, $Zn_2Ni(PO_4)_2$, $Zn_2Mn(PO_4)_2$, $Zn_2Ca(PO_4)_2$ including particles with a particle size that is not more than 5 µm; and
(C) a component selected from one or more microparticulate oxides that disperse in aqueous solution in an anionically-charged state;
wherein the concentration of ≤ 5 µm particles of phosphate(s) of divalent and/or trivalent metal(s) is from 0.001 to 30 g/l."

"4. A process for conditioning metal surfaces prior to phosphate conversion-coating treatment thereof, in which said metal surface prior to receiving a zinc cations-containing phosphate conversion coating is contacted with a surface conditioning pretreatment composition as claimed in any of the preceding claims."

VII. Claim 1 of the first auxiliary request reads as follows:

"1. A liquid pretreatment composition, adapted for conditioning metal surfaces prior to a treatment thereof that forms a zinc cations-containing phosphate conversion coating, said pretreatment composition having a pH value in the range of from 4 to 13 and comprising the following components:

(A) a dissolved component being one or more alkali metal and/or ammonium salt(s);
(B) a dispersed component being one or more phosphate(s) of divalent and/or trivalent metal(s), said phosphates consisting essentially of from 0.001 to 30 g/L of dispersed particles with a particle size that is not more than 5 µm; and
(C) a component selected from one or more microparticulate oxides that disperse in aqueous solution in an anionically-charged state;
wherein the dispersed component (B) being one or more phosphate(s) of divalent and/or trivalent metal(s) contains at least one phosphate selected from the group consisting of $Zn_3(PO_4)_2$, $Zn_2Fe(PO_4)_2$, $Zn_2Ni(PO_4)_2$, $Zn_2Mn(PO_4)_2$, $Zn_2Ca(PO_4)_2$."

The remaining claims 2 to 5 of the first auxiliary request correspond to those of the main request.

VIII. Claim 1 of the second auxiliary request differs from claim 1 of the first auxiliary request in that the feature "wherein the dispersed component (B) …" has been replaced by the feature "wherein dispersed component (B) being one or more phosphate(s) of divalent and/or trivalent metal(s) contains phosphate particles of the same chemical type(s) of divalent or trivalent metal cation(s) as does the zinc cations-containing phosphate conversion coating to be formed and said phosphate particles are selected from the group consisting of $Zn_3(PO_4)_2$, $Zn_2Fe(PO_4)_2$, $Zn_2Ni(PO_4)_2$, $Zn_2Mn(PO_4)_2$, $Zn_2Ca(PO_4)_2$".

The remaining claims 2 to 5 of the second auxiliary request correspond to those of the main request.

IX. Claim 1 of the third auxiliary request differs from that of the main request in that the feature
"obtainable by a process comprising the steps of
i) forming a suspension of one or more phosphate(s) of divalent and/or trivalent metals(s) containing at least one phosphate selected from the group consisting of $Zn_3(PO_4)_2$, $Zn_2Fe(PO_4)_2$, $Zn_2Ni(PO_4)_2$, $Zn_2Mn(PO_4)_2$, $Zn_2Ca(PO_4)_2$,
ii) filtering the obtained suspension through a 5-µm filter paper,
iii) adjusting the concentration of one or more phosphate(s) of divalent and/or trivalent metal(s) containing at least one phosphate selected from the group consisting of $Zn_3(PO_4)_2$, $Zn_2Fe(PO_4)_2$, $Zn_2Ni(PO_4)_2$, $Zn_2Mn(PO_4)_2$, $Zn_2Ca(PO_4)_2$ in the suspension,
iv) adding one or more microparticulate oxides to the concentration-adjusted suspension,
v) adding one or more alkali metal and/or ammonium salt(s) to the concentration adjusted suspension, and
vi) adjusting the pH of the concentration-adjusted suspension to the specified value." has been added as final feature.

The remaining claims 2 to 5 of the second auxiliary request correspond to those of the main request.

X. Process claim 1 of the fourth auxiliary request reads as follows:

"1. A process for conditioning metal surfaces prior to phosphate conversion-coating treatment thereof, in which said metal surface prior to receiving a zinc cations-containing phosphate conversion coating composed of one or more phosphate(s) selected from the group consisting of $Zn_3(PO_4)_2$, $Zn_2Fe(PO_4)_2$, $Zn_2Ni(PO_4)_2$, $Zn_2Mn(PO_4)_2$, $Zn_2Ca(PO_4)_2$ is contacted with a surface conditioning pretreatment, said pretreatment composition having a pH value in the range of from 4 to 13 and comprising the following components:

(A) a dissolved component being one or more alkali metal and/or ammonium salt(s);
(B) a dispersed component being one or more phosphate(s) of divalent and/or trivalent metal(s) selected from the group consisting of $Zn_3(PO_4)_2$, $Zn_2Fe(PO_4)_2$, $Zn_2Ni(PO_4)_2$, $Zn_2Mn(PO_4)_2$, $Zn_2Ca(PO_4)_2$ including particles with a particle size that is not more than 5 µm; and
(C) a component selected from one or more microparticulate oxides that disperse in aqueous solution in an anionically-charged state;
wherein the concentration of $\leq$ 5 µm particles of phosphate(s) of divalent and/or trivalent metal(s) is from 0.001 to 30 g/l."

The remaining claims 2 to 4 of the fourth auxiliary request correspond to the features of claims 2, 3 and 5 of the main request, respectively.

XI. Claim 1 of the fifth auxiliary request reads as follows:

"1. A process for conditioning metal surfaces prior to phosphate conversion-coating treatment thereof, in which said metal surface prior to receiving a zinc cations-containing phosphate conversion coating composed of one or more phosphate(s) selected from the group consisting of $Zn_3(PO_4)_2$, $Zn_2Fe(PO_4)_2$, $Zn_2Ni(PO_4)_2$, $Zn_2Mn(PO_4)_2$, $Zn_2Ca(PO_4)_2$ is contacted with a surface conditioning pretreatment, said pretreatment composition having a pH value in the range of from 4 to 13 and comprising the following components:

(A) a dissolved component being one or more alkali metal and/or ammonium salt(s);
(B) a dispersed component being one or more phosphate(s) of divalent and/or trivalent metal(s), said phosphates consisting essentially of from 0.001 to 30 g/L of dispersed particles with a particle size that is not more than 5 µm; and
(C) a component selected from one or more microparticulate oxides that disperse in aqueous solution in an anionically-charged state;
wherein the dispersed component (B) being one or more phosphate(s) of divalent and/or trivalent metal(s) contains at least one phosphate selected from the group consisting of $Zn_3(PO_4)_2$, $Zn_2Fe(PO_4)_2$, $Zn_2Ni(PO_4)_2$, $Zn_2Mn(PO_4)_2$, $Zn_2Ca(PO_4)_2$."

The remaining claims 2 to 4 of the fifth auxiliary request correspond to claims 2 to 4 of the fourth auxiliary request.

XII. Claim 1 of the sixth auxiliary request differs from claim 1 of the fifth auxiliary request in that the feature "wherein the dispersed component (B) …" has been replaced by the feature "wherein dispersed component (B) being one or more phosphate(s) of divalent and/or trivalent metal(s) contains phosphate particles of the same chemical type(s) of divalent or trivalent metal cation(s) as does the zinc cations-containing phosphate conversion coating to be formed and said phosphate particles are selected from the group consisting of $Zn_3(PO_4)_2$, $Zn_2Fe(PO_4)_2$, $Zn_2Ni(PO_4)_2$, $Zn_2Mn(PO_4)_2$, $Zn_2Ca(PO_4)_2$".

The remaining claims 2 to 4 of the sixth auxiliary request correspond to claims 2 to 4 of the fourth auxiliary request.

XIII. Claim 1 of the seventh auxiliary request differs from claim 1 of the fourth auxiliary request in that the feature "obtainable by a process comprising the steps of

i) forming a suspension of one or more phosphate(s) of divalent and/or trivalent metals(s) containing at least one phosphate selected from the group consisting of $Zn_3(PO_4)_2$, $Zn_2Fe(PO_4)_2$, $Zn_2Ni(PO_4)_2$, $Zn_2Mn(PO_4)_2$, $Zn_2Ca(PO_4)_2$,

ii) filtering the obtained suspension through a 5-µm filter paper,

iii) adjusting the concentration of one or more phosphate(s) of divalent and/or trivalent metal(s) containing at least one phosphate selected from the group consisting of $Zn_3(PO_4)_2$, $Zn_2Fe(PO_4)_2$, $Zn_2Ni(PO_4)_2$, $Zn_2Mn(PO_4)_2$, $Zn_2Ca(PO_4)_2$ in the suspension,

iv) adding one or more microparticulate oxides to the concentration-adjusted suspension,
v) adding one or more alkali metal and/or ammonium salt(s) to the concentration adjusted suspension, and
vi) adjusting the pH of the concentration-adjusted suspension to the specified value." has been added as final feature.

The remaining claims 2 to 4 of the seventh auxiliary request correspond to claims 2 to 4 of the fourth auxiliary request.

XIV. The appellant argued essentially as follows:

The specific interpretation of the Opposition Division concerning the zinc phosphate particle size of ≤ 5 µm in a concentration of from 0.001 to 30 g/l according to the invention (see application as originally filed corresponding to the published WO-A-98 39498, page 6, line 18 in combination with page 7, lines 9 to 15) is not correct. It is not true that the person skilled in the art would not be able to determine the amount of these particles in the final pretreatment composition. The application discloses that particles having an excessive size do not harm the invention (see page 8, lines 12 to 20). Comparative example 7 shows that 2 g/l of an average particle size of the phosphate particles of 6.5 µm is not suitable for producing the desired phosphate coating (see page 22, line 32 to page 23, line 8; and page 29, table 4). As can be derived from page 10, lines 17 to 23 of the application as originally filed the function of the microparticulate oxide lies either in adsorbing to the divalent or trivalent metal phosphate or by preventing collisions among the phosphate particles. Hence any aggregated phosphate particles (among themselves or with the microparticulate oxides) are still in accordance with the invention. The person skilled in the art is able to analyze the claimed pretreatment composition by filtering the suspension with a paper filter and thereby removing all particles having a particle size of greater than 5 µm. It is admitted that the application as originally filed discloses only one measuring method for determining the particle size and that this method does not allow distinguishing between the different types of particles (phosphates, oxides, etc.). However, the person skilled in the art knows from his common general knowledge as to how to separate the different components. By combining a filtering step with a 5 µm filter and analyzing the phosphate concentration of the resulting filtrate he is able to determine the concentration of the phosphate particles. The examples of the application teach the person skilled in the art to measure the particle diameter of the phosphate particles after their suspension. If some time has lapsed it is clear to him that he has to apply another filtering step with a 5 µm filter to remove particles in excess of 5 µm particle size. Thus the amount corresponding to the lower value of said phosphate particle concentration range of 1 ppm can always be determined. Example 8 shows that a concentration of 20 ppm phosphate particles already allows to produce a satisfying phosphate coating (see page 18, lines 23 to 34 and page 27, Table 3).

The statement concerning the interpretation of the phosphate and microparticulate oxide particles according to the claims as set out in the grounds of appeal, i.e. that the definitions used in the claims are open as to whether the phosphate and oxide particles are present in their isolated form or are in aggregated from, i.e. partially attached to each other and that the latter would then be in form of a dynamic equilibrium which, however, would not change anything concerning the particle size of the phosphate and oxide particles as such, is taken out of its context by the respondent (see statement of grounds of appeal dated 26 April 2007, page 7, last paragraph).

It is difficult to describe the influence of the pumping/spraying operation on the agglomeration but it is known from the cited documents that mechanical treatment influences the agglomeration. It is sufficient that a suspension according to claim 1 can be produced. This is clearly the case since separate suspensions of zinc phosphate and microparticulate oxide can be produced which can be filtered through a corresponding filter to remove the particles with a size above the claimed size so that they have the features as defined in claim 1 - at least at the beginning - and then to adjust their concentration to the desired one by analytically determining the concentrations of zinc phosphate and oxide and then combining said two suspensions to thereby arrive at the claimed suspension.

Thus the patent in suit clearly discloses ways for producing such a suspension so that the person skilled in the art is enabled to carry out the invention.

Therefore the patent, for the compositions of claim 1 and/or the independent method claims of all requests, complies with Article 83 EPC.

XV. The respondent argued essentially as follows:

The claims of all requests define a pretreatment composition which defines three components. One component is constituted by phosphate particles having a size of ≤ 5 µm which are present in a concentration of from 0.001 to 30 g/l, the second component being the microparticulate oxide particles, the third one being the alkali metal and/or ammonium salt. In order to put the invention into practice it is necessary that the person skilled in the art is able to measure the concentration of these compounds in the final composition. However, the patent in suit only discloses a method for measuring the average particle size of particles dispersed in a solution by a submicron particle analyser, i.e. the Coulter Counter Model-N4 (see patent, examples 1 to 16 and comparative examples 1 to 8). This method, however, does not allow to distinguish between the types of particle, i.e. whether it is a phosphate particle or e.g. an aggregated particle of a phosphate particle and a microparticulate oxide particle, or of two phosphate particles, or of two microparticulate oxide particles.

Taking account of the stabilization of the phosphate particles through the microparticulate oxide particles (see patent, paragraph [0033]) it is clear that there will be a change in particle size. The method now specified by the appellant for this measurement of the particle size and concentration was not disclosed in the application as originally filed. The filtering with a filter paper having a pore size of 5 µm in order to remove phosphate particles greater than 5 µm with a subsequent measurement of the obtained filtrate is neither representative for the composition before nor after the filtering since aggregation will also take place after said filtering step. Hence there is no direct measurement of the particle size disclosed which the person skilled in the art would need for the determination of these individual particles and their parameters in the final composition. It should also be considered that the appellant has never shown any experimental test report proving that the proposed method provides the required information, although it had argued that it would be easy to do so.

Furthermore, the definition of the phosphate particle size as employed by the appellant changed from the one according to the grounds of appeal (see page 7, last paragraph) to the present one: if e.g. the phosphate particle size is 3 µm then an agglomerate of two phosphate particles would have a size of 6 µm - which according to the original definition would still be considered a 3 µm particle - which, however, would be lost by the filtration step. It is known that these compositions have the tendency to agglomerate and that mechanical treatment influences the same.

Therefore the patent and the independent claims of all requests do not comply with Article 83 EPC.

Reasons for the Decision

1. *Admissibility of amendments (Articles 123(2) and (3) EPC)*

1.1 Since the Board comes to the conclusion that claim 1 of all eight requests lacks sufficiency of disclosure (see point 2 below) there is no need to verify whether the amendments made to the sets of claims of the main request and the first to seventh auxiliary request comply with Articles 123(2) and (3) EPC.

2. *Sufficiency of disclosure (Articles 100(b) and 83 EPC)*

2.1 Claim 1 of each of the eight requests under consideration, i.e. composition claim 1 according to the main request and the first to third auxiliary request, and process claim 1 according to the fourth to seventh auxiliary request, defines a liquid pretreatment composition which comprises the three features (A), (B) and (C) (see points VI to XIII above):

Feature (A) defines "a dissolved component being one or more alkali metal and/or ammonium salt(s)".

The "dispersed component" according to said feature (B) is "one or more phosphate(s) of divalent and/or trivalent metal(s) selected from the group consisting of $Zn_3(PO_4)_2$, $Zn_2Fe(PO_4)_2$, $Zn_2Ni(PO_4)_2$, $Zn_2Mn(PO_4)_2$, $Zn_2Ca(PO_4)_2$ including (or "consisting essentially of") particles with a particle size that is not more than 5 µm" and "the concentration of ≤ 5 µm particles of phosphate(s) of divalent and/or trivalent metal(s) is from 0.001 to 30 g/l".

The component according to said feature (C) is "a component selected from one or more microparticulate oxides that disperse in aqueous solution in an anionically-charged state".

2.1.1 Thus claim 1 of each of the eight requests comprises the two features that the specified zinc phosphates either include or consist essentially of particles with **"a particle size that is not more than 5 µm"** and that the concentration of said ≤ 5 µm particles of phosphate(s) **"is from 0.001 to 30 g/l"** (emphasis added by the Board).

2.1.2 On the other hand claim 1 of each of these requests **neither** specifies the particle size **nor** the concentration of the microparticulate oxide(s) of the component according to feature (C). Thus the particle size of the microparticulate oxide particles may be about the same as or may be somewhat smaller than that of the zinc phosphate particles. Furthermore, the concentration of the microparticulate oxide particles may be small compared to the concentration of the zinc phosphate particles of feature (B).

Consequently, all the appellant's arguments based on the preferred particle size of the microparticulate oxide of ≤ 0.5 µm cannot be considered because claim 1 of each of the requests does **not** contain any corresponding limitation. Nor can the term "microparticulate" help in this respect, in view of the relatively small particle size of the zinc phosphates below 5 µm.

2.2 According to Article 83 EPC the European patent application shall disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. Thus the question to be answered is whether the disclosure of the application as originally filed enables the person skilled in the art to prepare the aforementioned pretreatment composition in which the phosphate particles - according to said feature (B) - include or consist essentially of the specified zinc phosphate particles "with a particle size of not more than 5 µm" and which particles are present in a concentration of "from 0.001 to 30 g/l".

2.3 The Board comes to the conclusion that the person skilled in the art is **not** enabled to produce such a pretreatment composition over the entire range of values for these two features for the following reasons:

2.3.1 The application as originally filed only discloses in its examples one measuring method, i.e. a Coulter Counter method using a Coulter Model N4 apparatus, for measuring the average particle size of particles suspended in a solvent. As admitted by the appellant this method does **not** allow determining the type of the suspended particles, i.e. whether said particle is a phosphate or a microparticulate oxide, or an aggregate of one type of them or of both types.

2.3.2 An analytical determination of the concentrations of zinc phosphate and the microparticulate oxide comprised in the pretreatment composition, on the other hand, **cannot** distinguish between particle sizes of the analyzed components.

2.3.3 The measured suspensions according to the examples were obtained by grinding one of the specified zinc phosphates, e.g. $Zn_3(PO_4)_2$, and then converting the ground phosphate into a suspension. According to examples 1 to 15 and the comparative examples 6 and 8 the suspensions were then filtered through a 5 µm filter paper. According to example 16 no filtration took place. In the resulting filtrates - which only comprised the suspended zinc phosphate particles in the solvent - the average particle size was then measured by said Coulter Counter Analyzer and found to be below 5 µm, with the highest measured average value according to example 3 being 4.2 µm (see examples 1 to 15 and comparative examples 1 to 8). According to example 16 said filtration step was omitted and the average particle size measured (see example 16). According to comparative example 7 the specified zinc phosphate was converted into a suspension without grinding and then filtered through a 5 µm paper filter. The phosphate particles remaining on the filter paper were then re-dispersed in water to prepare a suspension which had an average particle size of 6.5 µm (see comparative example 7).

According to all examples - after said measuring step of the phosphate particle size - the concentration of the zinc phosphate is adjusted to the desired value (presumably by diluting the suspension with solvent).

Thereafter the microparticulate oxide is added (according to the majority of the examples Aerosil #300 which has an average primary particle size of 7 nm). The application as originally filed, however, does not specify whether the microparticulate oxide is added as a solid which has to be suspended in the zinc phosphate suspension by mechanical treatment, or e.g. as another pre-formed suspension. Thereafter the alkali metal and/or ammonium salt is added and the pH is adjusted to the specified value.

As a consequence, the particle size of the suspended zinc phosphate particles in the finally prepared liquid pretreatment composition and the concentration thereof has **not** been determined for any of the examples. The application as originally filed thus contains no explicit teaching for the person skilled in the art as to how to determine in the finally prepared pretreatment composition the concentration of the zinc phosphate particles which have a size of no more than 5 µm.

2.3.4 The Board shares the view of the Opposition Division that in the final composition inevitably there will be aggregation between these zinc phosphate particles - said aggregation causing instability of the suspension - and there will also be aggregation of zinc phosphate particles with said oxide particles. This fact was not denied by the appellant.

According to example 3 of the application the **average** particle size of the zinc phosphate in the filtrate was measured to be **4.2 µm** - which taking account of a Gaussian distribution implies the presence of zinc phosphate particles which are larger than 4.2 µm - which would result in a particle size of two aggregated zinc phosphate particles being well above 5 µm. Thus if the average microparticulate oxide particle size is about the same as the particle size of these phosphate particles then filtering the final composition - as correctly argued by the Opposition Division - would remove phosphate particles which as such were smaller than 5 µm but are now larger due to aggregation with other phosphate particles. Such a filtering step would likewise remove aggregates of zinc phosphate and microparticulate oxide particles, thereby resulting in a too low concentration of the ≤ 5 µm phosphate particles.

2.3.5 In this context it is also considered that the water chemistry (e.g. the pH-adjustment), the precise nature of the solids - it is nowhere stated that the alkali metal and/or ammonium salt has to be added as a solid; it could thus be added as a solution or a further suspension - added to the suspension and the mechanical forces exerted on the suspension (if e.g. the microparticulate oxide is added as a solid material which has to be suspended) will inevitably influence the aggregation and thus the particle size of the zinc phosphate particles and their concentration.

2.3.6 Taking account of points 2.3.1, 2.3.2 and 2.3.5 above, the appellant's argument that the application of his common general knowledge by the person skilled in the art would result in a combination of the filtration of the zinc phosphate suspension with a 5 µm paper filter and a subsequent chemical analysis of the zinc phosphate content of the final pretreatment composition, which would allow to determine the concentration of the zinc phosphate particles having a size of not more than 5 µm, cannot hold.

2.3.7 Furthermore, taking account of the general disclosure in the application as originally filed that particles having an excessive size do not harm the invention (see page 8, lines 12 to 20) and particularly of its example 16, it is also not apparent to the person skilled in the art that such a filtering step with a 5µm (paper) filter represents a compulsory step for preparing the desired pretreatment composition, let alone for determining the said concentration of the zinc phosphate particles. The pretreatment composition of example 16 was obtained without such a filtering step and despite of it containing a bimodal distribution of the zinc phosphate particles with peaks at 0.31 µm and **6.5 µm**, the second peak representing **20% of the phosphate**, it was suitable as a conditioner for forming a zinc phosphate coating (see example 16; and page 28, Table 3).

Consequently, the application as originally filed does **not** teach the person skilled in the art to remove all particles being greater than 5 µm.

2.3.8 Likewise, even if the person skilled in the art knows from his common general knowledge as to how to separate different components, this knowledge does not help him to separate two different types of suspended particles having a similar particle size. For example if both the zinc phosphate particles and the microparticulate oxide particles have a size of about 3 µm or 4 µm then the produced agglomerates of the two have sizes of about 6 µm to about 8 µm. Although filtration with a 5 µm paper filter would remove these agglomerates such a procedure is not suggested by the application as originally filed (see point 2.3.7 above) and would reduce the concentration of both components. On the other hand, if he would distinguish chemically between these particles, although knowing their concentration, he would not know their particle sizes.

2.3.9 Example 8 shows that a pretreatment composition with a concentration of 20 ppm phosphate particles - the average phosphate particle size after said 5 µm paper filtering step had been measured to be 0.31 µm - allows producing a satisfying phosphate coating (see page 18, lines 23 to 34 and page 27, Table 3). In this specific case, although the person skilled in the art likewise does not know the amount of the aggregated particles contained in this pretreatment composition, the size of these aggregated particles cannot exceed said 5 µm particle size limit.

Example 8, however, represents no proof that a pretreatment composition having a zinc phosphate content of 1 ppm (= 0.001 g/l) in accordance with the lowest concentration limit specified in claim 1, in case that said phosphate particles have an average particle size of e.g. 4 µm in combination with the same or a larger amount of microparticulate oxide having about the same particle size, would contain 1 ppm of zinc phosphate particles having a size of not more than 5 µm, let alone that it would produce a satisfying zinc phosphate coating.

2.3.10 But even if one were to assume that the skilled person would prepare two separate suspensions, one of zinc phosphate particles and the second one containing the microparticulate oxide particles, and after separately measuring their individual average particle sizes would mix these two suspensions and would then add component (A) and adjust the pH he would still not know the concentration of the zinc phosphate particles having a size of not more than 5 µm due to the aggregation taking place which is caused by the water chemistry (see point 2.3.5 above).

2.3.11 The Board finally remarks that the definition of the process steps for obtaining the pretreatment composition - as e.g. defined in claim 1 of the third auxiliary request - is not suitable for overcoming the objection that the person skilled in the art is not enabled to determine afterwards, in the final pretreatment composition, the concentration of the zinc phosphate particles having a size of not more than 5 µm. Thereby the person skilled in the art is prevented from producing such a pretreatment composition over the entire range of claim 1.

2.4 As the claims 1 of all requests involve the feature of zinc phosphate particles of a size less than 5 µm and in a concentration of from 0.001 to 30 g/l discussed above, the Board considers that the subject-matter of claim 1 of each of the requests does not fulfil the requirements of Article 83 EPC (compare Case Law of the Boards of Appeal of the EPO, 5th edition, 2006, II.A.1 to II.A.4).

Consequently, none of the requests is allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Nachtigall H. Meinders