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**Datasheet for the decision
of 15 July 2010**

Case Number: T 0109/07 - 3.3.05

Application Number: 99935398.0

Publication Number: 1104493

IPC: C25D 13/06

Language of the proceedings: EN

Title of invention:

Electrodeposition baths containing calcium salts

Patentee:

PPG Industries Ohio, Inc.

Opponent:

BASF Coatings GmbH

Headword:

Electrodeposition bath/PPG INDUSTRIES OHIO, INC.

Relevant legal provisions:

EPC Art. 54, 56, 83, 123

Keyword:

"Sufficiency of disclosure (yes)"

"Novelty (main and auxiliary requests): yes"

"Main request: inventive step (no) - obvious alternative - no reasons not to apply the problem solution approach (reasons 4.1.8)"

"Auxiliary request: inventive step (yes) - non obvious alternative"

Decisions cited:

-

Catchword:

-

Case Number: T 0109/07 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 15 July 2010

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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 21 December 2006
rejecting the opposition filed against European
patent No. 1104493 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: G. Rath
Members: H. Engl
C. Vallet

Summary of Facts and Submissions

I. European patent EP-B-1 104 493 was granted with 12 claims. The independent claims 1, 9 and 12 thereof read as follows :

"1. An electrodeposition bath, said electrodeposition bath comprising a resinous phase dispersed in an aqueous medium, said resinous phase comprising:
(a) an active hydrogen group-containing ionic electrodepositable resin, and
(b) a curing agent having functional groups reactive with the active hydrogen groups of (a),
comprising a lead-free electrodeposition bath containing at least one calcium compound selected from calcium acetate, calcium chloride, calcium formate, calcium nitrate, calcium oxalate, calcium molybdate, calcium titanate, calcium fluorosilicate and calcium carbonate present in an amount from about 10 parts per million to about 10,000 parts per million of total calcium and not more than about 200 parts per million soluble calcium, based on electrodeposition bath weight."

"9. A method of electrocoating a conductive substrate serving as a charged electrode in an electrical circuit comprising said electrode and an oppositely charged counter electrode, said electrodes being immersed in an aqueous electrocoating composition according to any of claims 1-8, comprising passing electric current between said electrodes to cause deposition of the electrocoating composition on the substrate as a substantially continuous film."

"12. A coated substrate obtainable by the method of any of claims 9-11."

II. The appeal lies against the decision of the opposition division posted on 21 December 2006 in which it decided that the granted claims of the opposed patent met the requirements of the EPC.

III. The opposition division relied *inter alia* on the following documents:

E1: US-A-4 042 478

E2: Material Safety Data Sheet "Moly-White® 212"
(2 pages)

E5: EP-A-0 336 283

E6: US-A-3 926 761

E8: US-A-4 533 683

E9: US-A-5 380 783

IV. The opposition division rejected the patentee's main request for amendments to the description because they did not meet the requirements of Rule 88 EPC and Article 123(2) EPC. However, the claims of the auxiliary request, which were identical with the claims as granted, were found to meet the requirements of sufficiency of disclosure, novelty and inventive step. In particular, the disclosure of the zinc/calcium/molybdate compound Moly-White 212 in E1 was not considered to be an unambiguous disclosure of calcium molybdate and/or calcium carbonate as required by the claim language. The opposition division also held that, starting from either document E6 or document E1 as closest prior art, there was no incentive in the prior art to use calcium compounds in the specified

amounts in order to obtain electrodeposition baths having the balanced improved properties demonstrated by the opposed patent.

V. The appeal was filed with letter dated 11 January 2007; the statement of grounds of appeal was filed under cover of letter dated 20 April 2007. Also filed were *inter alia* the following new documents and evidence:

B2: Decision of the opposition division *in re* EP-B-1 135 443

B3: Minutes of the oral proceedings before the opposition division *in re* EP-B-1 135 443

B5: A calculation of the amount of calcium in example 3 of E1

B8: A calculation of Ca percentage in the examples of E6

VI. The patentee's (respondent's) observations were received under cover of a letter dated 5 September 2007. Also submitted were claims 1 to 12 as a first auxiliary request.

Further submissions of the appellant were received with letters dated 4 July 2008 and 28 November 2008.

VII. Under cover of letter dated 22 April 2009, the respondent filed an amended set of claims as a first auxiliary request.

Claim 1 of the said auxiliary request differs from claim 1 of the main request in that the term "calcium molybdate" is deleted from the claim.

VIII. The following new documents were submitted during the appeal proceedings:

E10: Letter of Mr John E. O'Neill dated 26 April 2007

E11: Technical Data Sheet "Moly-White 212"

E12: Material Safety Data Sheet "Moly-White"
(10 April 2008)

IX. The arguments of the appellant may be summarised as follows:

Regarding Article 100(b) EPC

The appellant raised four different objections:

a) The claimed upper limit of 200 ppm of soluble Ca was in contradiction to comparison example 6, demonstrating that at 200 ppm soluble Ca very bad "appearance" values were achieved. This shed doubts upon the actual limit for the soluble Ca according to the invention.

b) The patent distinguished between "total Ca", "soluble Ca" and "insoluble Ca-compound". However, it remained unclear whether Ca pigments belonged to the insoluble Ca compounds or not.

c) There was no standard method for determining the "soluble Ca" in an electrodeposition bath. The appellant referred in this context to B2 and B3. These documents related to opposition proceedings *in re* EP-B-1 135 443. The opposition division found insufficiency of disclosure, because the opposed patent was silent on

the method of determining the amount of bismuth trioxide in the claimed electrodeposition bath.

d) According to the claim language, the soluble Ca was not necessarily included in the list of total Ca compounds.

Regarding novelty:

Claim 1 was anticipated by the disclosure of example 3 of E1. According to column 4, lines 31 to 33, the compositions of E1 were specifically designed for electrodeposition baths. Therefore, example 3 disclosed the composition of a sprayable electrodeposition bath. The corrosion inhibitor Moly-White 212 contained calcium molybdate, calcium carbonate and zinc oxide (E2, E9). The calculations submitted by the appellant showed that the amounts of total Ca and of soluble Ca satisfied the conditions recited in the claims of the opposed patent.

Regarding inventive step:

Document E6 concerned the same technical field, namely electrodeposition baths developed for the same purpose as the opposed patent, namely to protect the article coated therewith from corrosion. Therefore, E6 qualified as the closest prior art. The electrodeposition bath disclosed in example 3 of E6 contained 599 ppm of Ca in the form of sparingly soluble calcium molybdate, such that the proportion of soluble Ca must be distinctly lower than 200 ppm.

E6 differed from the opposed patent in that the resins were self-crosslinking. The technical problem starting from E6 was to provide an alternative electrodeposition bath.

The claimed solution was obvious because it was evident to use a separate hardener for the resin instead of a self-hardening resin. Such two-component resins were known from E1, E5 and E8 for anodic and cathodic electrophoretic compositions.

In the alternative, E1 could be considered to represent the closest prior art. The skilled person would have found it obvious to replace the corrosion inhibitor "Moly-White 212" by the molybdates described in E6. Calcium molybdate would have been preferred as being the most environmentally acceptable.

X. The arguments of the respondent may be summarised as follows:

The appellant's arguments concerning Article 83 EPC concerned at best matters of clarity which were not a ground for opposition. The appellant had not even argued that the claimed invention could not be carried out. In any event, example 6 objectively solved the problem stated in the patent.

Novelty

Example 3 of E6 did not relate to an electrodeposition bath, but to a sprayable coating composition. Furthermore, the term "Moly-White 212 - zinc/calcium/molybdate compound" did not clearly and

unambiguously state that calcium molybdate was present and that the requirements of total and soluble calcium were met. It was also not unlikely in view of E2 that the composition of Moly-White had changed over time and in fact was different from what was stated in E1.

Inventive step

The invention related to the effect of insoluble and soluble calcium on corrosion inhibition and appearance. The problem consisted in providing an electrodeposition bath that resulted in an improved balance of appearance and corrosion resistance. The prior art exclusively dealt with the effect of the anion, for example molybdate and chromate, on corrosion inhibition. Calcium was only disclosed in the prior art as a suitable counter-ion. It was not suggested that calcium in itself had a corrosion-inhibiting effect. Furthermore, the claimed limits of total and soluble calcium required for obtaining a balance of corrosion-inhibiting effect and appearance were not derivable from the prior art.

XI. Requests

The appellant requested that the decision under appeal be set aside and that the European patent be revoked.

The respondent requested that the appeal be dismissed, or, in the alternative, that the decision under appeal be set aside and the patent be maintained on the basis of the claims 1 to 12 filed with letter dated 22 April 2009 as a first auxiliary request.

Reasons for the Decision

1. Amendments (auxiliary request)

1.1 Claim 1 is based on claim 1 and the description, page 4, lines 6 to 15, of European patent application EP 99935398.0, published as international application WO-A-00/03070 ("the application as filed"). Furthermore, the term "*calcium molybdate*" has been deleted from the list of calcium compounds.

Claims 2 to 11 are based on claims 2 to 9 and 16 to 19, respectively, of the application as filed.

Claim 12 is based on claims 20 to 22 and the description, page 3, lines 3 to 7, of the application as filed.

1.2 Due to the deletion of "*calcium molybdate*" from the list of calcium compounds, the scope of protection afforded by the amended claims is clearly limited with respect to the claims as granted.

1.3 The requirements of Article 123(2) and (3) EPC are thus met.

2. Objections under Article 100(b) EPC

In the board's view, the question raised by the opponent of whether or not example 6 of Table 1 of the opposed patent exemplifies the claimed invention has no bearing on the requirement of sufficiency of disclosure. It is in particular not relevant for the

requirement of sufficiency of disclosure whether or not a comparative example of the patent actually falls under the scope of the claims or not.

The Ca content of 200 ppm in "comparative" example 6 is not incompatible with the upper limit recited in claim 1 ("*not more than about 200 ppm soluble calcium*"). The board considers that the results shown in "comparative" example 6 in fact demonstrate that an acceptable compromise in terms of appearance (mark 7 in a range of 0 to 10; 10 = no defects; 0 = rough and pinholed) and scribe creep (8 mm, an excellent value) has been obtained. In effect, example 6 outperforms for instance inventive example 9-II (Table 2) so that the skilled person would immediately realise from these results that example 6 is marked as "comparative" by mistake only. Consequently, the board cannot accept the appellant's argument that the results obtained in example 6 were inadequate and, therefore, showed that the invention could not be performed within the entire range. In any event, the appellant did not argue that the example in question (or indeed any other embodiment of the invention) could not be put into practice by the skilled person.

The alleged difficulties in analysing the composition of the claimed electrodeposition baths and in particular its calcium content do not prejudice the skilled person's ability to prepare such baths. Documents B2 and B3 relate to a different case and to an entirely different problem, namely of determining the content of bismuth trioxide in an electrodeposition bath. Therefore, the submission of the parties and the conclusion reached by the opposition division in this

case are not relevant for the present case. The board has no doubt that an electrodeposition bath having the required content of total calcium and not more than the maximum permissible content of soluble calcium can be prepared by weighing in the appropriate amounts of calcium compounds.

The definitions of "total calcium" and "soluble calcium" given in the opposed patent (paragraph [0012]) are sufficiently clear in themselves. The board can see no contradiction in the fact that calcium carbonate is mentioned as a pigment and does not appear in the list of insoluble calcium compounds, as the solubility of calcium carbonate depends for instance on the pH of the bath. The skilled person would have no difficulty in determining whether or not in a particular case calcium carbonate is effectively insoluble or (partly) soluble. Therefore, an objection under Article 84 EPC does not arise, apart from the fact that such an objection would not constitute a valid ground of opposition. Still less is the objection under Article 83 EPC tenable.

3. Novelty (main request, auxiliary request)
 - 3.1 The appellant cited document E1, in particular example 3 thereof, as novelty destroying for the subject matter of the respective claims 1 of the main request and the auxiliary request.
 - 3.1.1 Document E1 (example 3; column 8, line 27 to column 9, line 28) discloses a primer composition for coating steel substrates which is made from a mill base comprising a resin component (epoxy ester and maleinised linseed oil), pigments, talc, defoamer and

the corrosion inhibitor Moly-White 212 (in E3 spelled "Molywhite").

3.1.2 Moly-White 212 is a proprietary corrosion inhibitor made and sold by Moly-White Pigments Group. It contains calcium molybdate, calcium carbonate and zinc oxide (see documents E2, E11, and E12). According to document E9, column 17, lines 46 to 50, Moly-White 212 contains basic zinc calcium molybdate ($ZnO.CaMoO_4$) and has a MoO_3 content of 8.9 wt.-%, a ZnO content of 10.5 wt.-% and a Ca content of 30.6 wt.-%. Document E12 (page 4) mentions a ZnO content of 10 wt.-%, a value not incompatible with the one given in E9, taking into account the expected error margins of analysis and the usual fluctuations in the composition of a technical product.

According to declaration E10, the composition of Moly-White 212 composition has remained unchanged since 1978. The board has no reason to doubt this declaration.

The board concludes that Moly-White 212 contained, at the relevant date of document E1, *inter alia*, the compound calcium molybdate.

3.1.3 The amount of said Moly-White 212 according to example 3 of E1 is 2.67 parts per weight of the mill base, which mill base in turn makes up 74.56 parts per weight of the primer composition. From these data, and taking into account the composition of Moly-White 212 reported in E2, E11 and E12, the appellant calculated a Ca content in the primer composition of between 3354 and 7100 ppm of total calcium, depending on the

(unknown) ratio of calcium molybdate and calcium carbonate in Moly-White 212 (see document B5). Since calcium molybdate is essentially water-insoluble, the claim limit of not more than about 200 ppm of insoluble calcium was satisfied.

The board accepts in the following, in favour of the appellant, that these calculations are essentially correct.

- 3.1.4 The corrosion inhibitor Moly-White 212 is disclosed in E1 only as a constituent of the particular primer composition of example 3. Said primer is explicitly to be applied by spraying to panels of phosphatised steel substrates. E1 does not specifically disclose that Moly-White 212 should be incorporated in a electrodeposition bath. See column 1, lines 12 to 15; column 5, lines 13 to 15; and column 8, line 29, to column 9, line 29. The appellant has however drawn attention to the description, column 4, lines 31 to 44, and the abstract of E1, according to which the coating compositions may be applied by any of the conventional methods, including electrodeposition.

The board is however not convinced that the primer composition of example 3 was *de facto* suitable as an electrodeposition bath in view of its elevated pigment content (44.32% by weight total pigment in the mill base, making approximately 200% by weight, relative to the resin weight, of pigment in the primer). This is about four times the maximum pigment concentration, relative to the film forming constituents, recommended in E1, column 5, lines 9 to 12, for an electrocoating bath. Therefore, the primer composition of example 3 of

E1 differs from the claimed electrodeposition baths at least in this respect. The question of whether the skilled person would have adapted the primer composition disclosed in example 3 of E1, in view of the description, column 4, lines 31 to 44, and the abstract, to the use as an electrodeposition bath, for instance by dilution, is not relevant for the assessment of novelty.

Therefore, the claimed subject matter is novel having regard to document E1.

3.1.5 The appellant has also cited document E5 as novelty destroying.

Document E5 discloses corrosion-protecting coating compositions for cathodic electrodeposition on steel panels. The base resins comprise a resin component A (preferably a polyepoxy resin) and a component B (a compound obtained by reacting a ω -hydroxy alkylamino compound with a metal oxide, a metal acetylacetonate or a metal alcoholate to yield a basic metal complex). In example 5 (Tables 1 and 3) of E5 the metal oxide is calcium oxide, present in an amount of 0.63%, calculated as metal, relative to the weight of the resin. According to the appellant, the composition contains calcium ions, formed *in situ* from CaO and acetic acid (see Table 1, intermediate product B6, and page 6, lines 3 to 5) in an amount satisfying the definitions of the claims of the opposed patent.

3.1.6 However, even assuming in favour of the appellant that calcium acetate was formed *in situ* from CaO and acetic acid, the amount of soluble calcium in the

electrodeposition resin is 0.63% = 6300 ppm, which is far outside the claimed range of not more than about 200 ppm. Therefore, example 5 of E5 cannot destroy the novelty of the subject matter of claim 1 of the opposed patent. Moreover, the board considers that in the compositions disclosed in E5 calcium is present not as calcium acetate, but in the complex form of a metal alcoholate of the general formulae shown in claim 1 of E5. Therefore, the claim condition that the calcium compound is selected from calcium acetate, calcium chloride, calcium formate, calcium nitrate, calcium oxalate, calcium titanate, calcium fluorosilicate and calcium carbonate is not met in E5.

3.2 No further documents have been cited against novelty.

The board, having examined the remaining prior art documents, concludes that claim 1 of the main request satisfies the requirements of Article 54 EPC.

The same applies to process claim 9 and product-by-process claim 12, which refer directly or indirectly back to claim 1, and to the dependent claims 2 to 9, 10 and 11.

3.3 Claims 1 to 12 of the (first) auxiliary request are narrower in scope than the respective claims of the main request and are therefore novel for the same reasons as those given in respect of the main request.

4. Inventive step

4.1 *Main request*

- 4.1.1 The opposed patent concerns electrodeposition baths for the coating of metallic substrates.

The baths comprise a resinous phase, which consists of an electrodepositable resin and a curing agent, the resinous phase being dispersed in an aqueous medium, and a corrosion inhibitor selected from at least one calcium compound selected from calcium acetate, calcium chloride, calcium formate, calcium nitrate, calcium oxalate, calcium titanate, calcium fluorosilicate and calcium carbonate, present in amounts as stated in the claim.

- 4.1.2 The board considers that the most relevant prior art is to be found in documents dealing with electrophoretic coating compositions containing similar corrosion inhibitors, for instance E6.

Document E6 discloses an electrophoretic coating composition comprising an aqueous medium having dispersed therein a polycarboxylic acid binder resin and a sparingly soluble alkaline earth metal molybdate, preferably calcium molybdate. E6 reports that the alkaline earth metal molybdate has a rust-inhibiting effect equally excellent as chromic acid salts. According to example 3, calcium molybdate is employed in an amount of 1.2 parts per 100 parts of aqueous dispersion. See E6, abstract, column 1, lines 8 to 11; column 2, lines 2 to 6; column 2, lines 26 to 43; example 3; columns 5 and 6, Table 1; and claim 1.

The resin component according to E6 is self-hardening.

- 4.1.3 The next step in assessing inventive step is to define the problem underlying the patent in suit in the light of E6.

According to the patent in suit an objective of the invention was to provide lead-free electrodeposition baths which provide improved corrosion resistance of the electrocoated metal substrates, especially untreated steel (page 2, paragraph [0006]). However, since there is no evidence on file showing an improvement in corrosion resistance between the examples of the invention and examples according to E6, the problem to be solved has to be reformulated in less ambitious terms.

- 4.1.4 The technical problem underlying the patent in suit in the light of E6 may thus be seen in the provision of an alternative electrodeposition bath.
- 4.1.5 As a solution to this problem, the patent in suit proposes an electrodeposition bath according to claim 1 of the main request, characterised in that it comprises a resinous phase which contains
- (a) an active hydrogen group-containing ionic electrodepositable resin, and
 - (b) a separate curing agent having functional groups reactive with the active hydrogen groups of (a).
- 4.1.6 The next step is to verify whether the problem has actually been solved.

Invention examples 1 to 5 of the patent in suit illustrate electrodeposition bath compositions containing soluble calcium compounds, whereas those of invention examples 9 and 10 to 15 contain insoluble calcium compounds. According to the invention, certain calcium compounds selected from the list recited in claim 1 and present in an amount indicated in the claim calculated as total calcium and soluble calcium and contained in an electrodeposition bath composition exhibit a corrosion-inhibiting effect. The opposed patent contains undisputed experimental evidence that the calcium compounds effectively reduce corrosion of untreated cold rolled steel panels coated with the claimed electrodeposition bath composition, measured as a reduced "scribe creep" after a salt spray test carried out in accordance with ASTM B117. At the same time, the visual appearance of the coated panels according to the invention, evaluated in terms of surface roughness and pinholing, was rated from the upper range of from 7 to 10 (10 = no defects; 0 = rough and pinholed). It was thus comparable to results obtainable with conventional electrodeposition bath compositions containing for instance the conventional corrosion inhibitor calcium molybdate (see Tables 1, 2 and 3).

In view of this evidence, the board is satisfied that the technical problem is successfully solved over the whole range claimed.

- 4.1.7 It remains to be decided whether the proposed technical solution is obvious in view of the prior art.

The electrophoretic resins according to E6 comprise a resin component which is self-hardening. The question arises whether it was obvious to replace a self-hardening resin by a resin hardening with a curing agent (b).

Electrodeposition resins comprising a separate curing agent, as opposed to self-hardening resins, are *per se* known in the pertinent art (see E1, E8). The respondent has admitted during oral proceedings that it is not *per se* inventive to replace a self-hardening resin by a resin hardening by addition of a curing agent. Further, the use of calcium molybdate as corrosion inhibitor with a polycarboxylic acid binder was known from E6 (example 3, claim 1). There is no evidence in the patent in suit that the calcium molybdate corrosion inhibitor interacts in some specific and surprising way with electrophoretic resins which contain a separate curing agent, as opposed to self-hardening resins.

- 4.1.8 The respondent argued that the invention resided in the teaching that calcium (rather than calcium molybdate) was corrosion-inhibiting. This teaching was not suggested by the prior art. Therefore, the well-known problem-solution approach for assessing inventive step had reached its limits and should not be applied in this particular case, or should at least be applied differently, in order to do justice to the achievements of the invention.

The board cannot accept this argument. The respondent's reasoning implies that following the problem-solution approach one would disregard a positive aspect of the invention counting in favour of the presence of an

inventive step. However, neither the determining of the closest prior art nor the definition of the problem underlying the patent in suit in the light of E6 eliminate any aspects of the invention regarding soluble and insoluble calcium compounds or calcium pigments. When assessing inventive step, document E6 cannot be ignored, as it discloses the same calcium molybdate corrosion inhibitor as the patent in suit.

Even if the gist of the invention was in the discovery of the corrosion-protective activity of calcium in electrodeposition baths, the claims of the main request encompass the embodiment of an electrodeposition bath which comprises a conventional resin composition and the well-known corrosion inhibitor "calcium molybdate" in a conventional amount of from 10 to 10 000 ppm. It is this particular embodiment which renders the claimed subject matter obvious, for the reasons discussed under point 4.1.7.

The board also sees no peculiarity in the present case to justify not relying on the well-tried and proven problem-solution approach for assessing inventive step.

4.1.9 Therefore, the subject matter of claim 1 of the main request lacks an inventive step and the main request must be rejected.

4.2 *Auxiliary request*

4.2.1 Claim 1 of the auxiliary request differs from claim 1 of the main request in that calcium molybdate no longer appears in the list of calcium compounds.

- 4.2.2 The reasoning under points 4.1.1. to 4.1.5 (closest prior art, technical problem, technical solution) applies *mutatis mutandis* to the subject matter of claim 1 of the auxiliary request.
- 4.2.3 Hence, as a solution to the technical problem (4.1.4), the patent in suit proposes an electrodeposition bath according to claim 1 of the auxiliary request, characterised in that it comprises a resinous phase which contains (a) an active hydrogen group-containing ionic electrodepositable resin, and (b) a separate curing agent having functional groups reactive with the active hydrogen groups of (a), and a calcium compound selected from the list of claim 1.
- 4.2.4 It remains to be decided whether the proposed solution is obvious having regard to the prior art.

The corrosion-protective effect of calcium molybdate, known from documents E6 and E1 and exploited in the commercial product Moly-White 212, has generally been attributed in the prior art to the molybdate (MO_3) - moiety, not to the calcium counter-ion. This may be immediately seen from the facts that document E6 advocates the use of any sparingly soluble alkaline earth molybdate, in particular of strontium and calcium molybdate, and that no particular preference is given to calcium over strontium as a counter-ion.

Document E9 discloses poly(arylenesulfide) (PAS) resin compositions showing little tendency to cause metal corrosion and comprising a corrosion inhibitor selected from molybdenum, oxoacids of Mo, sodium, potassium and strontium salts of ortho- and isopolymolybdic acid,

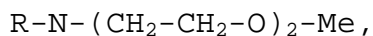
basic calcium molybdates and others (see claim 1). Preferred corrosion inhibitors are basic zinc molybdate, basic zinc calcium molybdate and basic zinc molybdate phosphate (claim 3; example 6, Table 7). The skilled person derives from E9 that apparently the passivating activity is borne by the molybdenum containing moiety and not by the calcium counter-ion.

There is also no indication in the art that any other calcium compound not containing the molybdate moiety could be useful as a corrosion-inhibitor in an electrodeposition bath. Document E7, page 10, line 23 to page 11, line 30, discloses, as examples of passivators in anticorrosive paint compositions, molybdates, vanadates, chromates, stannates, manganates, titanates, phosphomolybdates and phosphovanadates, preferably in the form of salts of a divalent metal, such as zinc, calcium, manganese, magnesium, barium and strontium. Here, too, the passivating activity is attributed to the anion, not to the cation or in particular to the calcium ion.

Document E5 discloses cathodic electrodeposition compositions for the coating of unprimed steel panels comprising lead-free corrosion-protective compounds of the general formulae



or



wherein Me is one of the metals Mg, Al, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Zr, Sn. These compounds are obtainable by reacting a α -hydroxy alkylamino compound with a metal oxide, a metal acetylacetonate or a metal alcoholate to yield a basic metal complex. See page 2, lines 1 to 5; page 2, line 29 to page 3, line 5; claim 1. Ca is only one of the possible metal ions disclosed in E5 and no emphasis is being placed on its particular anti-corrosive effect. The board also considers that the lead-free corrosion protective compounds disclosed in E5 bear no close chemical similarity to the calcium compounds used in the electrodeposition bath compositions of the patent in suit and would thus not have led the skilled person towards the claimed invention.

Documents E11 and E12 are published after the relevant date of the patent in suit and do not therefore form part of the prior art.

In summary, there is no suggestion in the prior art that the calcium compounds listed in claim 1 of the auxiliary request exhibit a corrosion-protective effect in an electrodeposition bath.

- 4.2.5 The same conclusion would be reached if one started - hypothetically - from E1 as the closest prior art. The technical problem would be formulated as above under points 4.1.3 or 4.1.4.

The board is however of the opinion that E1, as regards the subject matter according to claim 1 of the auxiliary request, is further removed than E6, since the only corrosion inhibitor mentioned in E1, namely

Moly-White 212 (or calcium molybdate), does not belong to the list of calcium compounds recited in the claims of the auxiliary request. Moreover, this corrosion inhibitor is disclosed only in combination with the specific primer composition of example 3, explicitly to be applied to panels of phosphatised steel substrates by spraying. E1 does not specifically disclose that Moly-White 212 should be incorporated in electrodeposition baths.

But even if one were to generalise the disclosure of example 3 of E1, one would only arrive at electrodeposition baths containing calcium molybdate as a corrosion inhibitor. As discussed however above under points 4.1 and 4.2.1 to 4.2.5, neither in E1 nor elsewhere in the prior art is there a suggestion that calcium molybdate could be successfully replaced as a corrosion inhibitor in an electrodeposition bath by one of the calcium compounds listed in claim 1 of the auxiliary request.

4.2.6 For these reasons, the subject matter of claim 1 of the auxiliary request involves an inventive step.

The same applies to independent method claim 9 which refers back to claim 1 and to independent claim 12, referring back to claim 9.

Dependent claims 2 to 8, 10 and 11 define particular embodiments of the inventive compositions and methods and are therefore also patentable.

The requirements of Article 56 EPC are thus met for the claims of the auxiliary request.

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 in amended form on the basis of claims 1 to 12 filed with letter dated 22 April 2009 as a first auxiliary request, and a description to be adapted.

The Registrar

The Chairman

C. Vodz

G. Rath