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**Datasheet for the decision  
of 15 November 2006**

**Case Number:** T 0210/04 - 3.3.01

**Application Number:** 94305922.0

**Publication Number:** 0638615

**IPC:** C09B 67/04

**Language of the proceedings:** EN

**Title of invention:**

Process for the production of copper phthalocyanine pigment  
and its use

**Patentee:**

TOYO INK MANUFACTURING CO., LTD.

**Opponent:**

Ciba Speciality Chemicals Holding Inc.

**Headword:**

Phthalocyanine pigment/TOYO INK MANUFACTURING

**Relevant legal provisions:**

EPC Art. 54, 56, 84, 111(1), 123(2)(3)

**Keyword:**

"Main request: amendment - implicit disclosure (yes); clarity  
(yes) - no contradiction in the claim arising out of the  
amendments; novelty (yes); inventive step (yes) - obvious  
alternative"

"First auxiliary request: amendment - allowable (yes); clarity  
(yes); remittal to first instance (yes) - fresh process claim"

**Decisions cited:**

G 0002/88; G 0001/03; G 0002/03; T 0002/80, T 0032/82;  
T 0181/82; T 0301/87; T 0472/88; T 0823/96; T 1129/97;  
T 0355/99; T 0412/02

**Catchword:**

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Case Number: T 0210/04 - 3.3.01

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.01  
of 15 November 2006

**Appellant:**

(Patent Proprietor)

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**Respondent:**

(Opponent)

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**Representative:**

-

**Decision under appeal:**

Decision of the Opposition Division of the  
European Patent Office posted 28 November 2003  
revoking European patent No. 0638615 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:**

A. Nuss

**Members:**

P. Ranguis

D. Rogers

## Summary of Facts and Submissions

I. This appeal lies from the decision of the Opposition Division to revoke the European patent No. 638 615 (European patent application No. 94 305 922.0).

II. The second auxiliary request before the Opposition Division comprised a set of eight claims. Independent Claim 1 read as follows:

"1. A process for the production of a copper phthalocyanine pigment, which comprises:

(a) reacting phthalic anhydride or its derivative, urea and a copper source or reacting phthalodinitrile or its derivative and a copper source, to obtain a crude copper phthalocyanine which is selected from halogen-free copper phthalocyanine, monohalogenated copper phthalocyanine and semi-halogenated copper phthalocyanine;

(b) wet-milling the thus obtained crude copper phthalocyanine in the presence of from 2 to 10 parts by weight, based on the crude copper phthalocyanine, of an inorganic salt as a milling aid and from 0.1 to 2.0 parts by weight, based on the crude copper phthalocyanine, of an organic liquid selected from an alcohol and a polyol; and then

(c) removing the inorganic salt and the organic liquid, wherein 0.1 to 20% by weight, based on the crude copper phthalocyanine, of a compound of the following formula (I) is added before or during the wet-milling,



wherein Me represents two hydrogen atoms or at least one metal selected from Al, Fe, Co, Ni, Cu and Zn, Pc is a phthalocyanine residue, each of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is independently a polyoxy lower alkylene group, a hydrogen atom or an alkyl group having 1 to 30 carbon atoms which is optionally substituted with at least one of phenyl, halogen, hydroxyl, carbonyl, carboxyl, ether, ester and acyl and n is an integer of 1 to 8, provided that at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is an alkyl group having at least 10 carbon atoms or a polyoxy lower alkylene group."

III. Notice of opposition had been filed by the Opponent (now Respondent) requesting revocation of the patent as granted in its entirety under Article 100(b) EPC and under Article 100(a) EPC for both lack of novelty and inventive step. *Inter alia* the following documents were submitted in the opposition proceedings:

- (1) US-A-4 278 601
- (3) JP-A-04/320 458 and its English translation
- (4) KR-B-6370 and its English translation
- (12b) Ullmann's Encyclopedia of Industrial Chemistry, Fifth Completely Revised Edition, Vol. A 20: Photography to Plastics, Processing, pages 213 to 242
- (13) JP-A-57 12067 in its English translation
- (22) US-A-2 982 666
- (23) JP-A-01/144475 and its English translation of the abstract and the example 1
- (27) US-A-4 141 904

IV. Regarding the set of claims according to the second auxiliary request (see point II above), the Opposition Division held that the claimed subject-matter was novel

over document (3) due to the feature of Claim 1 "wet-milling the thus obtained crude copper phthalocyanine", which wording excluded any intermediate dry-milling step in contrast to the process according to that document which required such an intermediate step.

With regard to inventive step, the Opposition Division started from document (3) as the closest state of the art in agreement with the Opponent and contrary to the Patentee's opinion that document (4) was a better candidate. The Opposition Division held that confronted with the problem to improve the wet-milling of phthalocyanins, the person skilled in the art would have learnt from document (3) that the therein disclosed wet-milling process gave a product with high tinctorial power, high transparency and vivid hues. The person skilled in the art would have tried to simplify the known process by performing simple routine experiments, first, by omitting the 5 minute pre-milling step. Moreover, the person skilled in the art knew from document (4) that in the case of wet-milling of CuPc pigments in a polyol vehicle plus salt and ammonium additive, a pre-milling step was not necessary. It resulted therefrom that the subject-matter of the second auxiliary request was obvious in view of document (3) taken in combination with (4).

- V. Oral proceedings took place on 15 November 2006.
  
- VI. At the appeal stage, the Appellant (Proprietor of the patent) defended the maintenance of the patent in suit on the basis of a set of eight claims as main request, received with the statement of grounds of appeal, i.e. the letter of 7 April 2004, on the basis of a set of

six claims as first auxiliary request also received with the statement of grounds of appeal on 7 April 2004; and on the basis of a set of nine claims as second auxiliary request received with a letter dated 31 May 2006.

Claim 1 of the main request reads as follows:

"1. A process for the production of a copper phthalocyanine pigment, which comprises:  
(a) reacting phthalic anhydride or its derivative, urea and a copper source or reacting phthalodinitrile or its derivative and a copper source in an organic solvent under atmospheric or elevated pressure, to obtain a crude copper phthalocyanine which is selected from halogen-free copper phthalocyanine, monohalogenated copper phthalocyanine and semi-halogenated copper phthalocyanine;  
(b) wet-milling the thus obtained crude copper phthalocyanine in the presence of from 2 to 10 parts by weight, based on the crude copper phthalocyanine, of an inorganic salt as a milling aid and from 0.1 to 2.0 parts by weight, based on the crude copper phthalocyanine, of an organic liquid selected from an alcohol and a polyol; and then  
(c) removing the inorganic salt and the organic liquid, wherein 0.1 to 20% by weight, based on the crude copper phthalocyanine, of a compound of the following formula (I) is added before or during the wet-milling,



wherein Me represents two hydrogen atoms or at least one metal selected from Al, Fe, Co, Ni, Cu and Zn, Pc is a phthalocyanine residue, each of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is independently a polyoxy lower alkylene group, a hydrogen atom or an alkyl group having 1 to 30 carbon atoms which is optionally substituted with at least one of phenyl, halogen, hydroxyl, carbonyl, carboxyl, ether, ester and acyl and n is an integer of 1 to 8, provided that at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is an alkyl group having at least 10 carbon atoms or a polyoxy lower alkylene group."

Claim 1, the sole independent claim of the first auxiliary request, reads as follows:

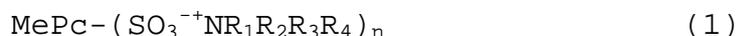
1. A process for the production of a gravure ink composition, which comprises preparing a copper phthalocyanine pigment and dispersing the thus obtained pigment in a mixture of (i) a water-soluble resin or an emulsion resin prepared by solubilizing in water gum rosin, wood rosin, tall oil rosin, lime rosin, rosin ester, a maleic acid resin, a polyamide resin, a vinyl resin, nitrocellulose, cellulose acetate, ethyl cellulose, chlorinated rubber, cyclized rubber, an ethylene-vinyl acetate copolymer resin, a urethane resin, a polyester resin, an alkyd resin, an acrylic resin, gilsonite, dammer, shellac or a mixture of at least two of the above resins with (ii) an alcohol or an ester solvent, wherein the copper phthalocyanine pigment is prepared by a process comprising:

(a) reacting phthalic anhydride or its derivative, urea and a copper source or reacting phthalodinitrile or its derivative and a copper source in an organic solvent

under atmospheric or elevated pressure, to obtain a crude copper phthalocyanine which is selected from halogen-free copper phthalocyanine, monohalogenated copper phthalocyanine and semi-halogenated copper phthalocyanine;

(b) wet-milling the thus obtained crude copper phthalocyanine in the presence of from 2 to 10 parts by weight, based on the crude copper phthalocyanine, of an inorganic salt as a milling aid and from 0.1 to 2.0 parts by weight, based on the crude copper phthalocyanine, of an organic liquid selected from an alcohol and a polyol; and then

(c) removing the inorganic salt and the organic liquid, wherein 0.1 to 20% by weight, based on the crude copper phthalocyanine, of a compound of the following formula (I) is added before or during the wet-milling,



wherein Me represents two hydrogen atoms or at least one metal selected from Al, Fe, Co, Ni, Cu and Zn, Pc is a phthalocyanine residue, each of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is independently a polyoxy lower alkylene group, a hydrogen atom or an alkyl group having 1 to 30 carbon atoms which is optionally substituted with at least one of phenyl, halogen, hydroxyl, carbonyl, carboxyl, ether, ester and acyl and n is an integer of 1 to 8, provided that at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is an alkyl group having at least 10 carbon atoms or a polyoxy lower alkylene group."

VII. The Appellant also filed further evidence including *inter alia* documents

- (28) Experimental Annexes 1 to 4, already submitted in the opposition proceedings with the letter dated 24 February 2003
- (29) Experimental report concerning the effect of inorganic salt milling aid on gloss, already submitted in the opposition proceedings with the letter dated 26 September 2003
- (30) Declaration of Y. Muramatsu, dated 26 March 2004
- (31) Declaration of S. Kato, dated 26 March 2004
- (32) Experimental report to clarify difference between the process disclosed in document (3) and the claimed process

VIII. In response to the statement of grounds of appeal, the Respondent (Opponent) submitted further evidence including *inter alia*, documents

- (33) Experimental report comparing the claimed process and that disclosed in document (3).

With a further letter received on 5 September 2005, the Respondent submitted two further documents, namely

- (34) "The phthalocyanines", Vol. II, Manufacture and applications, CRC Press Inc (1983), Chapter 2, pages 29 to 52
- (35) DE-A-1 161 533

IX. Regarding the main request, the Appellant's arguments may be summarized as follows:

The added feature "wet-milling the thus obtained crude copper phthalocyanine" was not a disclaimer over the disclosure of document (3) but a limitation of the patent to an embodiment wherein the crude copper phthalocyanine, defined by the method for preparing it (step a), was straightforward wet-milled. Such a process derived directly and unambiguously from the content of the application as originally filed.

The crude copper phthalocyanine was unambiguously defined by the method of preparation set out therein. Moreover, the definition of a crude copper phthalocyanine pigment was within the common general knowledge of the person skilled in the art (see document (12b) on page 226, top photograph). There was, furthermore, no contradiction between the expression "the thus obtained" and the fact that a compound of the formula (I) is added before or during the wet-milling. Claim 1 had, therefore, a clear meaning for the skilled person.

The claimed subject-matter was novel over document (3) since no dry-milling step was performed before the wet-milling step. In document (3), the dry-milling step was technically significant and could not be overlooked.

Regarding inventive step, the experimental results submitted with the experimental report (28) showed that the claimed process enabled the production of a copper phthalocyanine pigment with a superior gloss and tinting strength as compared with the pigment obtained

by the process disclosed in document (4). Starting from document (4) as the closest state of the art, the technical problem to be solved could be seen in the provision of a process enabling the production a copper phthalocyanine pigment with a superior gloss and tinting strength.

Even though no improvement could be acknowledged, the claimed subject-matter was a non-obvious alternative over document (4). First, it was significant that in document (4) the salts of CuPc sulfonates were identified as the reaction products of copper phthalocyanine sulfonates with an "amine" rather than a "fatty amine". Furthermore, the process of document (4) was a low-salt process (0.42 parts of salt based on the crude copper phthalocyanine as set out in the sole example) contrary to the claimed process (2 to 10 parts). In addition, document (1) taught that wet-milling had to be conducted in the absence of inorganic salt when a sulfonated phthalocyanine amine derivative was involved. Document (1) taught away from the combination of a high amount of inorganic salt with a sulfonated phthalocyanine amine derivative. Both the choice of the phthalocyanine derivative and the amount of inorganic salt milling aid used in the patent in suit were technically significant so that the present process involved an inventive step.

Regarding the first auxiliary request, the subject-matter of Claim 1 derived directly and unambiguously from the content of the application as originally filed. In particular, support for the mixture of the water-soluble resin or the emulsion resin (i) with an alcohol or an ester solvent (ii) could be found on pages 11-12.

The claims were, furthermore, clear for the same reasons as that set out with regards to the main request.

- X. Regarding the main request, the Respondent's arguments may be summarized as follows:

Claim 1 of the main request contained amendments which extended its subject-matter beyond the content of the application as originally filed, thus contravening Article 123(2) EPC.

First, the feature "in an organic solvent" was an inadmissible generalization.

Furthermore, the feature "wet-milling the thus obtained crude copper phthalocyanine" was introduced to render clear that the crude product did not undergo any physical modification until it was wet-milled. However, such a feature had no basis in the application as filed. Indeed, the application as filed disclosed that the crude product could be obtained by any known methods. Those methods did not exclude a pre-milling step as disclosed in document (27) which indicated that a crude product, before being transformed into a pigment, could be ground whilst in a crude state, or by document (34) which referred to a "ball-milled, crude copper pc". This was also true with respect to Examples 17 or 18 of the patent in suit which related to Pigment Blue 15:1 in  $\alpha$ -form. Such a form could only have been obtained through an intermediate dry-milling step. The fact that the compound of formula (1) might be added before the wet-milling, which corresponded to an additional step

also showed that the exclusion of any intermediate step was not supported.

The selection of a particular crude copper phthalocyanine was also an inadmissible restriction which could not be derived from the application as originally filed wherein copper phthalocyanines were produced by any known methods.

From the above, it could only be concluded that the added feature "the thus obtained crude copper phthalocyanine" could only be seen as a disclaimer to restore novelty over document (3). Such a disclaimer was however inadmissible in view of the decision of the Enlarged Board of Appeal G 1/03 or G 2/03.

The subject-matter of Claim 1 contained a contradiction given that the compound of the formula (1) could be added before the wet-milling. Such an additional step could not be regarded as being in line with the feature "wet-milling the thus obtained crude copper phthalocyanine" and offended against Article 84 EPC.

Even though the Board did not object to Claim 1 under Article 123(2) or 84 EPC, the subject-matter of Claim 1 lacked novelty over the disclosure of document (3). Indeed, the disclosure in the patent in suit, e.g. Example 1, did not exclude that a dry-milling step occurred at the beginning of the process when the various ingredients were not mixed yet.

Regarding inventive step, the document (4) could be considered in a first approach as the closest state of the art. First, it was clear that an error had crept

into the example of this document, wherein the amount of salt, i.e. 120 part, was to be corrected to 1120 parts, as confirmed by documents (1), (12b), (22) and (34). In view of the prior art cited, in particular documents (1), (3), (13), (23), and (35), it was furthermore obvious to use a salt of a sulphonated copper phthalocyanine with a quaternary ammonium having a long-chain alkyl group. Moreover the alleged improvements were only a question of optimization amounting to a bonus effect which did not render inventive the claimed subject-matter.

Regarding the first auxiliary request, the objections made in relation with the main request stand. In addition, the subject-matter of Claim 1 contained further amendments which also gave rise to objections under Articles 123(2) and 84 EPC. The combination of a process for the production of a gravure ink composition involving a specific pigment and a specific vehicle resulted in a selection not supported by the application as filed. Furthermore, from the wording of that claim the skilled person would understand that the phthalocyanine pigment prepared was, due to the feature "dispersing the thus obtained pigment", directly dispersed into the vehicle, whereas the description did not exclude an intermediate drying step.

XI. The Appellant requested that the decision under appeal be set aside and that the patent be maintained upon the basis of:

- (1) Claims 1-8 of the main request or Claims 1-6 of the first auxiliary request, both being submitted with a letter dated 7 April 2004; or

- (2) Claims 1-9 of the second auxiliary request submitted with a letter dated 31 May 2006.

The Respondent requested that the appeal be dismissed.

- XII. At the end of the oral proceedings the decision of the Board was announced.

### Reasons for the Decision

1. The appeal is admissible.

Main request

2. Amendments

- 2.1 In accordance with Article 123(2) EPC, amendments made to a European patent application are only permissible if they do not "contain subject-matter which extends beyond the content of the application as filed". It is established case law of the Boards of Appeal that amendments are only allowable if they can be directly and unambiguously derived from the application as originally filed by a person skilled in the art using common general knowledge.

- 2.1.1 The first amendment concerns step a) related to the known methods of synthesis of the crude copper phthalocyanine (see point IV above). Support can be found for this amendment in the application as filed on page 7, first paragraph. Contrary to the Respondent's contention, the feature "in an **organic** solvent" (emphasis added by the Board) can be derived from the

definition of the solvent on page 7, lines 9-10, namely "a solvent such as alkylbenzene, trichlorobenzene or nitrobenzene" and the reference to the same definition for "organic solvent" on page 1, last paragraph. The person skilled in the art indeed would understand directly and unambiguously that the term "solvent" used on page 7 stands for "organic solvent" as set out on page 1. The feature relating to the crude copper phthalocyanine to be obtained according to step a) being explicitly disclosed (see page 7), the limitation of the claimed subject-matter to this variant is supported by the application as filed.

- 2.1.2 The second amendment concerns the incorporation of the expression "the thus obtained" after the term "wet-milling" (see step b) of Claim 1).

The Board observes that the feature "the thus obtained crude copper phthalocyanine" is not explicitly disclosed in the application as filed. However, an implicit disclosure can nevertheless belong to the content of an European patent application if it relates to matter which is a clear and unambiguous consequence of what is explicitly mentioned (see T 823/96 of 28 January 1997, point 4.5).

In the Respondent's opinion, this feature would extend beyond the content of the application as filed since there was no indication therein that any pre-milling step was excluded before the crude copper phthalocyanine was wet-milled.

By contrast, the Appellant submitted that this feature meant that the crude product was straightforward wet-

milled and relied in support thereof to a part of the application as filed related to the "detailed description of the invention".

This part of the application as filed relates to the finding that when a crude copper phthalocyanine is wet-milled and a phthalocyanine derivative having a different structure from any conventional one is added as an agent for preventing crystal growth and re-aggregation during the wet-milling, the resultant copper phthalocyanine pigment shows excellent fluidity when dispersed in a vehicle for a printing ink or a coating composition and has an excellent clear hue and high tinting strength (see page 6, last paragraph).

In the Board's judgment, this statement implies **that the crude product is directly wet-milled without any transforming intermediate step**. Since step a) defines the crude copper phthalocyanine as a product obtained by a process, it follows that the feature "the thus obtained crude copper phthalocyanine" stands out as a direct consequence of the wording of step a) and derives implicitly but nevertheless directly and unambiguously from the application as filed.

It follows therefrom that the Respondent's objection that this amendment was not supported by the application as filed but was introduced later to restore novelty over document (3) and had to be considered as a disclaimer according to the definition given in the decisions G 1/03 or G 2/03 (see OJ EPO 2004, 413 and 448) is untenable.

Furthermore, it is not significant that it is known from documents (27), or (34) that crude copper phthalocyanine may be milled in a bar mill or ball-milled (see examples 1, 4, 6, and page 36, first line respectively), whilst remaining nevertheless a crude product, as such a step is not required by the subject-matter of the main request and is not a necessary step in any case.

2.1.3 Claim 1 does not, therefore, give rise to any objection under Article 123(2) EPC. The Board is also satisfied that the subject-matter of Claims 2 to 8 meets the requirements of Article 123(2) EPC.

2.2 Since the subject-matter of Claim 1 represents a restriction in comparison to Claim 1 as granted, no objection under Article 123(3) EPC is to be made, either.

### 3. Clarity

3.1 The Respondent objected to Claim 1 under Article 84 EPC due to the alleged contradiction between the fact that the crude product is directly wet-milled due to the feature "the thus obtained crude copper phthalocyanine" whereas a supplemental intermediate step would not be excluded given that the compound of the formula (1) may be added "before" the wet-milling.

3.2 According to the jurisprudence of the Boards of Appeal, in the case where claims have been amended during the opposition proceedings, the Opposition Division and the Board have in principle the power to deal with the clarity issue only if it arises out of the amendments

made to the claims (see decisions T 301/87, OJ EPO 1990, 335, point 3.8; T 472/88, point 2 of 10 October 1990). In the Board's judgment, if the amendment although clear *per se* gives rise to a contradiction in the claims, then this contradiction is to be considered as a lack of clarity (see T 2/80, OJ EPO 1981, 431, point 2) which arises out of the amendment. As the lack of clarity in the claims arises directly from the amendment, the Board is entitled to consider whether the requirements of Article 84 EPC has been fulfilled.

Therefore, although the Board is not in principle empowered to object to the clarity of the feature relating to the fact that the compound of the formula (1) may be added before the wet-milling since it was present in Claim 1 as granted, it must nevertheless verify whether the combination of the added feature that the thus obtained crude copper phthalocyanine is wet-milled and the feature in Claim 1 as granted that the compound of the formula (1) may be added before the wet-milling gives rise to a contradiction.

- 3.3 The clarity requirement of Article 84 EPC relates only to the claims, and consequently, as the EPO's Boards of Appeal have consistently ruled, it demands that these be clear *per se* for a person skilled in the art with general knowledge of the technical field in question, without the need to refer to the description of the patent in suit (see T 2/80, *ibid*, point 2). Thus the meaning of the wording of a claim must be fully evident from the actual terms of that claim, such that it is sufficient in itself to provide useful protection and is therefore unambiguous (see T 412/02 of 16 June 2004, point 5.6 and T 1129/97, OJ EPO 2001, 273, point 2.1.2).

3.4 In the Board's judgment, the sole reasonable meaning of the feature that the compound of the formula (1) is added "before or during" the wet-milling, in the context of Claim 1 which excludes any transforming intermediate step (see point 2.1.2 above) due to the wording "wet-milling the thus obtained crude phthalocyanine", is that the compound of formula (1) may be added at the beginning, before the wet-milling processing has started, or during this process. In particular, the alternative "before" covers in a manner quite clear for the skilled person the embodiment where the mixture is formed before the wet-milling process starts. By the feature "before or during" the wet-milling process is performed "in the presence of" the compound of formula (1). No contradiction arises with the fact that the "thus obtained" crude pigment is wet-milled. Claim 1 properly construed is devoid of any contradiction and is clear in the sense of Article 84 EPC.

4. Novelty

4.1 Document (3) provides a process for producing a pigment wherein a crude copper phthalocyanine is subjected to dry-milling together with a phthalocyanine derivative including *inter alia* a sulphonated phthalocyanine amine derivative such as  $\text{Cu-Pc-}[\text{SO}_3^-\text{.NH}_3^+(\text{CH}_2)_{11}\text{CH}_3]_n$  with  $n = 0.5$  to 4. The resulting product is subjected to a wet-milling in the presence of a milling auxiliary such as sodium chloride and an organic liquid including alcohols and polyols (see Claim 1, paragraphs [0001], [0008], [0011], [0013] and [0014]).

4.2 A claimed invention lacks novelty unless it includes at least one essential technical feature which distinguishes it from the state of the art (see G 2/88, OJ EPO 1990, 93, point 7). The subject-matter of Claim 1 of the present request differs from the disclosure of document (3) in that it does not foresee a dry-milling step before the wet-milling step (see point 2.1.2 above) and for this reason is novel over document (3).

4.3 Document (4) relates to a process for manufacturing a beta-stable copper phthalocyanine. This process comprises charging into a kneader copper phthalocyanine blue crude, polyol(s), salt(s) and 5 to 20% of CuPc derivative(s) such as a salt of CuPc sulfonate and alkyl amine of formula  $\text{CuPc-SO}_3^-\text{NH}_3\text{-R}$ , and then kneading at 120 to 140°C for 6 to 8 hrs (see page 1, first paragraph and page 2, third and last paragraph). The Board observes that it is a generally applied principle for concluding lack of novelty, that there must be a direct and unambiguous disclosure in the state of the art which would inevitably lead to subject-matter falling within the scope of what is claimed (see T 730/01 of 3 February 2004, point 2.2). The essential point in assessing novelty is that it is not sufficient for a finding of lack of novelty of claimed features that such features could have been derived from a prior document. In order to be novelty destroying, there must be a clear and unmistakable teaching of the claimed features in a prior art document (see T 355/99 of 30 July 2002, point 2.2.4).

4.4 In the present case, the subject-matter of Claim 1 differs from document (4) in that the alkylammonium cation  $^+\text{NH}_3\text{-R}$  (R=alkyl) is a generic term which does not unambiguously disclose an ammonium cation  $^+\text{NR}_1\text{R}_2\text{R}_3\text{R}_4$  wherein three of the substituents are a hydrogen atom and the other one is an alkyl group having at least 10 carbon atoms as defined in Claim 1. At least for this reason Claim 1 is already novel over document (4). This was admitted by the Respondent.

4.5 The subject-matter of Claim 1 meets, therefore, the requirement of Article 54 EPC.

5. Inventive step

5.1 Claim 1 of the main request relates to a process for the production of a copper phthalocyanine pigment from a crude copper phthalocyanine obtained by a process as defined in that claim.

5.2 In accordance with the problem-solution approach consistently applied by the Boards of Appeal, it is necessary, as a first step, to establish the closest state of the art which is normally a prior art document disclosing subject-matter aiming at the same objective as the claimed invention and having the most relevant technical features in common.

5.2.1 There has been a debate before the first instance as to the identification of the closest state of the art. The Opposition Division in agreement with the Respondent has considered that document (3) was closer than document (4) whereas the Appellant was of an opposite opinion. At the oral proceedings before the Board, both

parties took document (4) as being the closest state of the art.

- 5.2.2 The Board concurs with both parties that document (4) is closer than document (3) for the following reason.

As set out above, document (3) provides as an essential step a dry-milling step **before** the wet-milling step. It appears that this dry-milling step has an influence on the physical form of the pigment obtained since as a result it contains 9% of  $\alpha$  crystal form (see page 9, lines 5-6). Therefore, the pigment which is subsequently wet-milled is no longer a crude pigment.

By contrast, the process according to document (4) involves the wet-milling of a crude phthalocyanine pigment (see page 2, third paragraph) and for this reason, in the Board's judgment, is the closest state of the art for determining the technical problem to be solved.

- 5.3 Thus, starting from document (4), the technical results or effects successfully achieved by the claimed subject-matter are to be determined for defining the objective technical problem to be solved by the invention.

- 5.3.1 The Appellant argued that in view of document (4) the claimed process resulted from a selection of (a) sulfonated copper phthalocyanine amine salts from all the various phthalocyanine derivatives disclosed therein, (b) the chain length of the alkyl group on the amine moiety of the sulphonated copper phthalocyanine amine salts, and (c) the amount of inorganic salts

present in the wet-milling process. This selection enabled a superior gloss and tinting strength to be achieved, as compared with the process of document (4). In support thereof, the Appellant provided two series of experiments, i.e. documents (28) and (29).

5.3.2 In document (28), the first set of experiments aimed to determine the importance of alkyl chain length in the sulphonated copper phthalocyanine derivative of formula  $CuPc-[SO_3^-NH_3(C_xH_{2x+1})]$  wherein x is 12, 8, 10, 18, 24, i.e. examples "A", "B", "C", "D", "E", respectively, in a process where a crude halogen-free copper phthalocyanine produced by a conventional method was treated according to the patent in suit, in particular, in the presence of 4 parts by weight of milled sodium chloride for 1 part by weight of crude halogen-free copper phthalocyanine (see Experimental Annex 3). Gloss and tinting strength were measured and the results are set out in the Table below.

	A	B	C	D	E
Chain length of alkyl group in sulphonated copper phthalocyanine (parameter x given above)	12	8	10	18	24
Gloss %	78	66	79	79	73
Tinting strength %	100	89	102	100	93

The Appellant having declared at the oral proceedings before the Board that he did not want to rely on the viscosity measurements, the corresponding data are not recited in this table.

In view of the results shown in this table, the Board can accept that an alkyl chain ranging from 10 to 18

carbon atoms provides higher gloss and tinting strength than an 8 carbon atoms chain. However, in chemistry the term "alkyl" is a generic term to define a univalent radical of formula  $-C_nH_{2n+1}$ , n being an integer equal to 1 or higher. In order to acknowledge an improvement for the alkyl substituents with n ranging from 10 (lower limit) to 30 (upper limit), over the whole series of integers within n, it is necessary that there exists a clear improvement at the limits of the range of compounds thus defined. On the one hand the alkyl substituent with n = 8, i.e. "B", does not represent that alkyl group immediately before the lower limit so that an improvement for an alkyl group where n = 10 cannot be clearly discerned. Furthermore, the dramatic decrease in glass and tinting strength noticeable for the alkyl substituent with n= 24, i.e. "E", seriously undermines the occurrence of an improvement up to the upper limit, i.e. up to n = 30. If however a lack of credibility in this respect exists already for an ammonium salt having only one alkyl chain, that is even more the case for the other ammonium salts, namely secondary, tertiary, or quaternary ammonium salts for which no evidence in support of an improvement was produced.

- 5.3.3 The second set of experiments of document (28) submitted by the Appellant intended to demonstrate that in the process for the production of a copper phthalocyanine pigment, the amount of inorganic salt ranging from 2 to 10 parts by weight, based on the crude copper phthalocyanine, was critical for obtaining a superior gloss and tinting strength as compared with the process of document (4) (see Experimental Annex 4).

These experiments were carried out in the same way as the first experiments with the sulphonated copper phthalocyanine derivative of formula  $\text{CuPc} - [\text{SO}_3^- \text{NH}_3(\text{C}_{12}\text{H}_{25})]$ , i.e. derivative "A" in the above table, but in varying the amount of milled sodium chloride as a milling aid. The results are set out in the Table below.

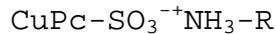
	A	B	C	D
Amount of inorganic salt (parts by weight)	4	2	1	0.6
Gloss %	78	77	74	71
Tinting strength %	100	99	98	92

The Appellant having declared at the oral proceedings before the Board that he did not want to rely on the viscosity measurements, the corresponding data are not recited in this table.

It is observed that with an amount of salt of 0.6 part, i.e. "D", which corresponds more or less to the amount disclosed in the example of document (4), the gloss and tinting strength properties of the obtained compositions are worse than that obtained with the amounts of salts of 4 and 2 parts, i.e. "A" and "B". That finding however cannot rebut the conclusion the Board reached with regard to the first series of experiments (see point 5.3.2 above). Indeed, although this observation may be of a scientific interest, it nonetheless remains that with an amount of inorganic salt within the range defined in Claim 1 an improvement over the whole area defined for the alkyl chain (10 to 30 carbon atoms) is not credibly achieved (see point 5.3.2 above).

- 5.3.4 The second series of experiments, i.e. document (29), sought also to determine the effect of an inorganic salt milling aid on gloss and tinting strength. However, those tests were presumably conducted with the same phthalocyanine derivative as that used by the Respondent in the experiment reported by its letter dated 20 December 2002 (see opposition proceedings), i.e.  $\text{CuPc}-[\text{SO}_3^-\text{NH}_3(\text{C}_{12}\text{H}_{25})]$ . Therefore, these tests cannot be considered as sufficient evidence that an improvement is shown over the whole claimed area for the same reasons as set out above (see point 5.3.3).
- 5.3.5 In the absence of evidence showing any improvement vis-à-vis the closest prior art, i.e. document (4), the technical problem in the light thereof must be reformulated to be the provision of a further process for the production of a copper phthalocyanine pigment obtained from a crude copper phthalocyanine.
- 5.4 In view of the working examples of the patent in suit the Board is satisfied that the technical problem as stated above is solved within the whole claimed area.
- 5.5 It remains to be decided whether or not the claimed solution to the above defined technical problem is obvious in view of the cited prior art.
- 5.5.1 As set out above (see point 4.3 above), the process according to document (4) involves the wet-milling of a crude phthalocyanine pigment. In detail, copper phthalocyanine blue crude, polyol(s), salt(s) and CuPc derivative(s) are charged into a kneader and then kneaded at 120 to 140°C for 6 hours wherein 5 to 20% of

CuPc derivative(s) can be used, among them a salt of CuPc sulfonate and alkyl amine of the formula



(see page 2, third and last paragraphs and page 3, claim).

The sole example in that document describes a process wherein 280 parts of crude copper phthalocyanine, 10 parts of copper phthalocyanine derivative, 100 parts of polyol and 120 parts of salt were charged into a kneader and then kneaded for 7 hours at 130°C. The kneaded mixture is thereafter treated with water and 98% sulphuric acid, stirred and finally filtrated and dried resulting in 190 parts of CuPc pigment (see page 3).

- 5.5.2 Regarding the example, the Respondent contended that the amount of salt added was to be corrected to 1120 parts since it was not credible in view of the disclosure in documents (12b), page 227; (22) in its example 6; (1), column 1, line 54 and (34) on page 37, that such a low amount of salt would have been used. However, in those documents, the Board could not find a reference to document (4). These documents are, therefore, irrelevant to show that an error had crept into the example of document (4). Furthermore, there is no general technical knowledge which could have led the person skilled in the art to think that a misprint had occurred. In view of the above, the Board holds that the example must be taken with the actually printed amount of salt as a part of the prior art.

5.5.3 The Appellant argued that the example of document (4) referred to a low-salt process given that 120 parts of inorganic salt for 280 parts of crude copper phthalocyanine amounted to 0.42 parts of inorganic salts based on the crude copper phthalocyanine. That feature in its opinion clearly distinguished the process of document (4) from the process as claimed where 2 to 10 parts of inorganic salts were required based on 1 part of a crude copper phthalocyanine (see point II above). As an evidence that this low-salt process was known in the art, the Appellant referred to document (1) in which it is stated that sulfonated phthalocyanine amine derivatives could be used to replace an inorganic salt milling agent during a wet-milling procedure (see column 2, line 18 ff).

5.5.4 However, the Appellant provided no evidence in the form of common general knowledge showing that there existed in this technical art a process involving a low amount of salt, the so-called low-salt process, in contrast to another one using a higher amount. For this reason, the line of argumentation based on such a distinction cannot be successful as this distinction has not been substantiated.

5.5.5 In the Board's judgment, the teaching of document (4) is not limited to the sole working example but encompasses all the implementations which can be derived by the person skilled in the art in view of this document. Even though that example discloses a rather small amount of inorganic salt, the general teaching leaves open the amount of salts (see page 2, third paragraph and point 4.3 above). As submitted by the Respondent, the person skilled in the art looking

for appropriate amounts of salts would have considered other documents in the same technical field and dealing, in particular, with salt-grinding of crude copper phthalocyanine for producing copper phthalocyanine pigment. He would have noted in that respect that the traditional wet-milling processes consisted of mixing copper phthalocyanine with seven or eight times its weight of sodium chloride (see document (34), page 37, line 10 ff). Furthermore, he would have also noted that this inorganic salt could be used in an amount of about 4 parts based on the crude phthalocyanine (see document 12b, page 227, example [290] and document (22), example 6). It results therefrom that in a wet-milling process for the production of a copper phthalocyanine pigment, determining the amounts of inorganic salt on the basis of those conventionally used is no more than a routine activity which falls within the competence of the person skilled in the art and is devoid of inventive merits. Moreover, on the basis of the information available to him he would have regarded as appropriate an amount of inorganic salt of around 4 to 8 times its weight based on crude copper phthalocyanine, thereby having an incentive to use amounts of inorganic salts which correspond to those prescribed in Claim 1, i.e. 2 to 10 times as large as that of the crude copper phthalocyanine.

- 5.5.6 Furthermore, document (4) discloses that a salt of CuPc sulfonate and alkyl amine, i.e.  $\text{CuPc-SO}_3^-\text{NH-R}$ , can be used as CuPc derivative. This definition encompasses any alkyl radical, whatever the chain length is, and thus covers a  $\text{C}_{10}$ - $\text{C}_{30}$  alkyl chain. In addition, as submitted by the Respondent, the person skilled in the art would have been directed to use a CuPc derivative

such as  $\text{Cu-Pc} \cdot [\text{SO}_3^- \cdot \text{NH}_3^+(\text{CH}_2)_{11}\text{CH}_3]_n$  (see document (3), top paragraph of page 6 or document (23), English translation). In view of the teaching of document (13), the person skilled in the art would have even had good reason to replace a salt of CuPc sulfonate and alkyl amine, i.e.  $\text{CuPc} \cdot \text{SO}_3^- \cdot \text{NH-R}$  as disclosed in document (4), by a salt of CuPc sulfonate and a secondary or tertiary or quaternary amine (see page 5, first paragraph).

5.5.7 Therefore, in view of the general teaching of document (4) and that of documents (3), (12b), (13), (22), (23) and (34), the presumption prevails that the choice of a particular range of inorganic salt, i.e. 2 to 10 parts by weight, based on the crude copper phthalocyanine, and of a sulphonated copper phthalocyanine amine derivative, said amine being substituted by at least one alkyl substituent ("R") ranging from  $\text{C}_{10}$  to  $\text{C}_{30}$ , would represent an obvious solution to the technical problem defined above (see point 5.3.5). This solution being within the subject-matter of Claim 1, it derives therefrom that Claim 1 does not involve an inventive step over the prior art cited.

5.5.8 The Board has also examined the other evidence submitted by the Appellant.

Y. Muramatsu declares (see document (30)) that the use of a phthalocyanine derivative in the dry-milling step disclosed in document (3) was essential to inhibit the formation of  $\alpha$ -form crystals. It was surprising to him to find that the use of the phthalocyanine derivatives specifically as wet-milling additives improved the fluidity and gloss of a finished pigment. However, in view of document (4) as the closest state of the art

which has already disclosed a wet-milling process involving a phthalocyanine derivative (see points 4.3 and 5.3 above), the declaration of Y. Muramatsu cannot change the conclusion reached by the Board (see point 5.5.7 above).

S. Kato declares (see document (31)) why, if he had been asked to investigate whether or not the dry-milling step could have been omitted from the process disclosed in document (3), he would have carried out wet-milling directly on the crude phthalocyanine product, namely without incorporating a phthalocyanine derivative. However, starting from document (4) which has already explored a wet-milling process in the presence of a phthalocyanine derivative (see points 4.3 and 5.3 above), the declaration of S. Kato cannot change the conclusion reached by the Board (see point 5.5.7 above).

The experimental report (32) aims to compare the properties of a gravure ink A obtained according to the process of document (3) and a gravure ink B obtained according to the process of the patent in suit. However, those experiments do not demonstrate an improvement in view of the closest state of the art, namely document (4), and for this reason are not relevant for assessing inventive step (see T 181/82, OJ EPO 1984, 401, point 5).

5.5.9 Since the Board can only decide on a request as a whole, the main request is to be rejected for lack of inventive step in the sense of Article 56 EPC.

First auxiliary request

6. Amendments

6.1 The subject-matter of Claim 1 of this request relates to a process for the production of a gravure ink composition, which comprises preparing a copper phthalocyanine pigment and dispersing the thus obtained pigment in a vehicle (see point VI above). Support for that feature can be found on page 12, lines 18 to 24 of the application as filed.

6.1.1 Furthermore, the vehicle such as defined in Claim 1 is directly and unambiguously disclosed in the application as filed (see page 11, line 32 to page 12, line 10).

The other technical features of Claim 1 correspond to those of Claim 1 of the main request and for the same reason do not give rise to any objection under Article 123(2) EPC.

6.1.2 The subject-matter of Claims 2 to 6 corresponds to the subject-matter of Claims 3, 4, 6, 7 and 8 of the application as filed respectively.

6.1.3 Since the subject-matter of Claim 1 represents a restriction in comparison to Claim 7 as granted, no objection under Article 123(3) EPC is to be made, either.

6.1.4 In summary, the amendments do not give rise to objection under Article 123(2) and (3) EPC.

7. Clarity

- 7.1 Claim 1 specifies that the preparation of the pigment includes a step c) for removing the inorganic salt and the organic liquid. It derives therefrom that "the thus obtained pigment" to be dispersed is free of inorganic salt and organic liquid. The Respondent argued that the skilled person could understand that the phthalocyanine pigment prepared was, due to the feature "the thus obtained pigment", directly dispersed, whereas the description did not exclude an intermediate drying step (see page 11, lines 11 to 13 of the application as filed corresponding to the disclosure on page 4, lines 41 and 42 of the patent in suit). This discrepancy, so he argued, contravened the requirements of Article 84 EPC.
- 7.2 According to the constant jurisprudence of the Boards of Appeal, the claims must define clearly the object of the invention, that is to say indicate all the essential features thereof. All features which are necessary to obtain the desired effect are to be regarded as essential features (see T 32/82, OJ EPO 1984, 354, point 15). Since the drying step is optional, and, therefore, is not necessary, the objection of the Respondent to it not being referred to in the claim cannot be accepted.
- 7.3 Furthermore, the Respondent argued that if the "thus obtained pigment" did not exclude an additional step, namely a drying step, then the wording "the thus obtained crude copper phthalocyanine" had to be understood in the same way as not excluding an additional step, for instance a grinding in a dry state.

However, there is clearly no relationship between these two phrases as they refer to different products (see points 2.1.2 and 7.2 above). This argumentation is based on an inappropriate mixing up of two **separate** technical features which must be taken solely in their respective contexts. The Respondent's objection is unfounded.

7.4 In view of the above, Claim 1 does not contain any contradiction or ambiguity and is, therefore, clear in the sense of Article 84 EPC.

8. Remittal

8.1 The present request results in substantial amendments in the sense that a further substantive examination has to be carried out as a process for the production of a gravure ink composition was never examined by the Opposition Division.

8.2 The decision under appeal did not have to consider these process claims with the consequence that the Board is faced with a fresh case that has never been examined by the first instance. Although the EPC does not guarantee the parties an absolute right to have all the issues considered by two instances, it is well-recognised that the Board may exercise its discretion under Article 111(1) EPC to remit the case to the first instance in order not to deprive the parties of the possibility of being heard by two instances.

8.3 Under these circumstances, the Board finds it appropriate to exercise the power conferred on it by Article 111(1) EPC to remit the case to the first

instance for further prosecution upon the basis of the first auxiliary request.

**Order**

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

1. The decision under appeal is set aside.
2. The main request is rejected.
3. The case is remitted to the first instance for further prosecution upon the basis of Claims 1-6 of the first auxiliary request.

The Registrar

The Chairman

N. Maslin

A. Nuss