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**D E C I S I O N**  
**of 8 January 2004**

**Case Number:** T 0143/02 - 3.2.5

**Application Number:** 93306149.1

**Publication Number:** 0582466

**IPC:** B41M 5/00

**Language of the proceedings:** EN

**Title of invention:**

An inkjet recording paper and a manufacturing process thereof

**Patentee:**

NIPPON PAPER INDUSTRIES CO., LTD.

**Opponent:**

OJI PAPER COMPANY, LIMITED

**Headword:**

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**Relevant legal provisions:**

EPC Art. 83, 54, 56

**Keyword:**

"Sufficiency of disclosure (yes)"

"Main request - novelty (yes) - inventive step (yes)"

**Decisions cited:**

T 0225/93

**Catchword:**

-



Case Number: T 0143/02 - 3.2.5

**D E C I S I O N**  
**of the Technical Board of Appeal 3.2.5**  
**of 8 January 2004**

**Appellant:**  
(Opponent)

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**Representative:**

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**Respondent:**  
(Proprietor of the patent)

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**Representative:**

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**Decision under appeal:**

**Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
4 December 2001 concerning maintenance of  
European patent No. 0582466 in amended form.**

**Composition of the Board:**

**Chairman:** W. Moser  
**Members:** P. E. Michel  
W. R. Zellhuber

## Summary of Facts and Submissions

- I. The appellant (opponent) lodged an appeal against the interlocutory decision of the Opposition Division maintaining European patent No. 0 582 466 in amended form.

In the decision under appeal, it was held that the grounds of opposition submitted by the appellant did not prejudice the maintenance of the patent as amended.

- II. Oral Proceedings were held before the Board of Appeal on 8 January 2004.

- III. The appellant requested that the decision under appeal be set aside and the European patent No. 0 582 466 be revoked in its entirety.

The respondent (patentee) requested as a main request that the appeal be dismissed. As an auxiliary request, the respondent requested that the decision under appeal be set aside and that the patent be maintained on the basis of a claim 1 differing from claim 1 of the main request by substituting the feature that the binder includes a cationic polymer electrolyte "in a proportion of 5-20 weight % of the total weight of binder" for the feature that the binder includes a cationic polymer electrolyte "in a proportion of 1-30 weight % of the total weight of binder".

- IV. Claim 1 of the patent as maintained by the Opposition Division reads as follows:

"1. An ink jet recording paper comprising a base paper wherein at least one surface has a recording layer, this recording layer containing at least 45 weight % of a pigment and no more than 55 weight % of a binder, and the air permeability of the whole recording paper being no more than 1,000 seconds according to the method of J.TAPPI No. 5B, the surface roughness by ten point height according to JIS B0601 on the recording layer surface being no more than 5  $\mu\text{m}$  characterized in that the binder includes a cationic polymer electrolyte in a proportion of 1-30 weight % of the total weight of binder, that the specific surface area of the pigment lies in the range 40-600  $\text{m}^2/\text{g}$ , and that the gloss at 75 degree of the recording layer surface is at least 70%."

V. The following documents were referred to in the appeal proceedings:

D2: JP-A-61-209189, together with a translation into English

D5: JP-A-2-274587, together with a translation into English

D8: EP-A-0 529 308

D12: JP-A-2-113986, together with a translation into English

D13: Experimental Report by Satoshi Araki, Oji Paper Co., Ltd.

D16: "Carbon Black Science and Technology", ed. Donnet et al, pages 116 to 120

D17: JP-A-63-49478, together with a translation into English

D18: JP-A-62-158084, together with a translation into English

D19: JP-A-4-91981, together with a translation into English

VI. In written and oral proceedings, the appellant argued essentially as follows in respect of the main request:

In the absence of an indication of the method used to determine the specific surface area of the pigment, the invention is not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. The value of the specific surface area of the pigment depends upon the method.

The present case is very similar to that decided in T 225/93. According to this decision, in the absence of an indication of the method used to determine the specific surface area of calcium carbonate, the invention is not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

The cited documents, for example, documents D8 and D18, refer specifically to the use of the BET method.

Document D16 describes three different methods for determining the surface area of carbon black which would be applicable to the pigment of the patent in suit. Whilst the decision of the Opposition Division

argues that, from the use of trade names and surface areas given in the examples, the method of measurement could be determined, it is noted that Finesil CM-F may have different surface areas (see document D8, Table 1 on page 7).

The subject-matter of claim 1 lacks novelty in view of the disclosure of document D8, considered as comprised in the state of the art according to Article 54(3) EPC. The treatment of the coated paper with an aqueous solution containing 3% of a cationic electrolyte as disclosed in document D8 inevitably results in the binder including a cationic polymer electrolyte in a proportion of 1-30 weight% of the total weight of binder as required by claim 1 of the patent in suit.

As stated at page 4, line 4 of document D8, the coating contains a cationic polymer. The treatment of the coated paper with a solution of the cationic polymer thus results in impregnation of the binder. It makes no difference whether the polymer is mixed with the coating solution or subsequently applied. 1-30 weight % is a broad range. The use of more than 1% is necessary in order to achieve any effect, in particular water resistance. The use of more than 30% would be avoided, since the material is expensive.

The subject-matter of claim 1 lacks an inventive step. The closest prior art is represented by document D12. The subject-matter of claim 1 of the patent in suit is distinguished over the recording paper of Example 1 of this document by:

- (a) the recording layer containing at least 45 weight % of a pigment and no more than 55 weight % of a binder; and
- (b) the binder including a cationic polymer electrolyte in a proportion of 1-30 weight % of the total weight of binder.

As regards feature (a), no effect requiring an inventive step is achieved by a slight increase in the ratio of pigment to binder. In addition, the description of document D12 discloses an overlapping range. Finally, the disclosure of document D18 makes it obvious to use more pigment. Thus, page 7, lines 6 to 13 proposes the use of from 2 to 100, preferably 20 to 90, parts binder based on 100 parts by weight of pigment. The coating composition of Example 3 of document D18 includes 100 parts by weight of pigment out of a total of 167 parts, which is 59.9% by weight.

As regards feature (b), it is noted that the list of suitable binders at page 5 of document D12 includes water-soluble acrylic resin prepared by addition of a quaternary ammonium acrylate, that is, a cationic polymer. Further, at page 8, lines 10 to 13 of document D12, it is suggested that agents for imparting water resistance can be mixed in the coating composition. Cationic polymers are well known in the art of ink jet printing papers as water proofing agents. The coating composition of Example 3 of document D18 includes a cationic resin in an amount of 7 parts by weight out of a total of 67 parts of binder, which is 10.4% by weight of the binder. Documents D5, D17 and D19 also suggest the use of a cationic polymer electrolyte.

Thus the disclosure of document D12, either alone or in combination with documents D5, D17, D18 or D19, renders the subject-matter of claim 1 obvious.

VII. In written and oral proceedings, the respondent argued essentially as follows in respect of the main request:

In the absence of an indication of the method used to determine the specific surface area of the pigment, the person skilled in the art will assume that the BET method is used. Other methods would not be seriously considered. The invention is thus disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

There is no evidence to show that treatment of the coated paper with an aqueous solution containing 3% of a cationic polyelectrolyte as disclosed in document D8 inevitably results in the binder including a cationic polymer electrolyte in a proportion of 1-30 weight % of the total weight of binder. The subject-matter of claim 1 is thus novel.

The closest prior art is Example 1 of document D12. The object of the invention is as set out in the patent in suit at page 2, lines 40 to 42, in particular to provide an ink jet recording paper having a recording layer of high surface smoothness and having good ink absorption qualities. As stated in the patent in suit at page 2, lines 16 to 18, attempts to obtain increased ink absorption result in a reduction in print density.



According to the invention, the amount of pigment is increased, thus improving ink absorption, and the non-ionic surfactant is replaced by a cationic polymer, which prevents an accompanying reduction in print density. This is shown in the Table at page 3 of the respondent's submission of 2 December 2003.

The only coating composition disclosed in document D18 which includes a cationic polymer is that of Example 3. In the Example, this coating composition is applied to a sheet which has already been coated with a layer as described in Example 1. The only other mention of a cationic polymer in document D18 is at page 7, lines 14 to 18, where it is stated that "...cationic resins, cationic surfactants and cation-modified inorganic particles can also be added as a water resistance-imparting agent". There is thus no teaching in document D18 which would induce the person skilled in the art to modify the recording paper of Example 1 of document D12 in such a way as to arrive at the recording paper as claimed in claim 1 of the patent in suit. Considering document D18 as a whole, the cationic polymer is unimportant. It is further noted that the coating composition of Example 1 of document D12 already includes a non-ionic surfactant, so that it would not be obvious to replace this by a cationic polymer.

Document D5 teaches at page 3, lines 14 to 18, that a cationic resin cannot be included in a one-part coating solution. The teaching of this document would thus lead away from the selection of the water-soluble acrylic resin referred to at page 5 of document D12. Documents D17 and D19 also do not lead the person skilled in the

art to the selection of the water soluble acrylic resin as a constituent of the binder.

The subject-matter of claim 1 thus involves an inventive step.

## **Reasons for the Decision**

### Main Request

#### 1. *Sufficiency of disclosure*

1.1 The sole point at issue between the parties as regards sufficiency of disclosure is whether or not the invention is disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art in the absence of an indication of the method used to determine the specific surface area of the pigment.

1.2 In the judgement of the Board, in the absence of an indication of the method used to determine the specific surface area of the pigment, the person skilled in the art would assume that it is most likely that the BET method is used. This assumption could then be tested in the light of the information given in the Examples of the patent in suit. Thus, Example 2 uses Syloid 600 supplied by Fuji Davison Co. Ltd., which is stated to have a specific surface area of 600 m<sup>2</sup>/g. Similarly, Comparative Example 2 uses FK700 from Degussa Ltd., which is stated to have a specific surface area of 700 m<sup>2</sup>/g. It is thus possible for the person skilled in the art to test the hypothesis that the BET method is

used or to ascertain which alternative method was used without an undue burden.

1.3 Whilst it was decided in decision T 225/93 that the absence of an indication of the method used to determine the specific surface area of calcium carbonate prevented the disclosure from satisfying the requirement of Article 83 EPC, in that case there was no information in the patent in suit which would have enabled the skilled person to determine which method should be used without an undue burden.

## 2. *Novelty*

2.1 It is alleged by the appellant that the subject-matter of claim 1 lacks novelty in view of the disclosure of document D8, considered to be comprised in the state of the art according to Article 54(3) EPC.

2.2 This document does not, however, specify whether or not the binder includes a cationic polymer electrolyte in a proportion of 1-30 weight % of the total weight of binder. Example 1 of document D8 specifies that, after the paper has been coated with a coating composition containing a binder, the coating is treated with a 10% aqueous solution of calcium formate as a coagulant and an aqueous solution containing 3% of a cationic polyelectrolyte.

2.3 There is, however, no evidence available to the Board which would suggest that such a treatment would inevitably result in the binder including a cationic polymer electrolyte in a proportion of 1-30 weight % of the total weight of binder as required by claim 1 of

the patent in suit. There is also no evidence to support the contention of the appellant that at least 1 weight % of the cationic polymer would be required in order to achieve any useful effect.

2.4 The subject-matter of claim 1 is thus novel and satisfies the requirements of Article 54 EPC.

3. *Inventive step*

3.1 Closest prior art

The closest prior art is represented by document D12 and, in particular, Example 1 thereof.

Example 1 discloses an ink jet recording paper wherein at least one surface has a recording layer, this recording layer containing 40.4 weight % of a pigment and 56.6 weight % of a binder, as set out in paragraph 8.1 of the decision of the Opposition Division. As shown in the experimental report constituting document D13, referring in particular to page 2, lines 9 and 10 and to Table 1 at page 8, the ink jet recording paper also satisfies the criteria for air permeability, surface roughness, specific surface area of the pigment and gloss at 75° of the recording layer surface as specified in claim 1.

The subject-matter of claim 1 is thus distinguished over this prior art in that:

- (a) the amount of pigment is increased and the amount of binder reduced; and

- (b) the binder includes a cationic polymer electrolyte in a proportion of 1-30 weight % of the total weight of binder.

As illustrated by the experiments carried out by the respondent and shown in the table appearing at page 3 of the respondent's submission of 2 December 2003, these features enable an improvement in ink absorption whilst avoiding an unacceptable decrease in print density.

### 3.2 Object of the invention

The object of the invention is thus to provide an improved ink jet recording paper having a better ink absorption whilst avoiding an unacceptable decrease in print density.

### 3.3 Solution

The solution as claimed in claim 1 is not suggested by the prior art.

As regards document D12 itself, a list of suitable binders is set out at page 5, lines 20 to 31. This list includes "water-soluble acrylic resin prepared by addition of a quaternary ammonium acrylate", i.e. a cationic polymer. There is, however, no incentive to use this material in a proportion of 1-30 weight % of the total weight of binder.

Document D5 proposes treating the recording layer with an aqueous solution containing a cationic polymer electrolyte. As stated at page 6, lines 27 and 28, this

avoids problems of thickening or coagulation of the coating solution which would occur if the cationic polymer electrolyte were to be added to the coating solution. Document D5 does not suggest that this treatment can have any effect as far as ink absorption and print density are concerned. Whilst document D5 suggests that the treatment with a cationic polymer electrolyte contributes to the gloss (page 8, line 8), it is not clear whether the degree of gloss obtained is better or worse than that obtained according to Example 1 of document D12, owing to the use of a different method of measurement. Example 1 of document D12 results in a paper having a gloss of 90% measured in accordance with JIS 8142 (cf. Table 1, page 11). Document D5 promises a specular gloss of 50% or more (cf. page 8, line 18), but measured in accordance with JIS-Z8741 (cf. page 11, lines 17 to 20). Document D5 thus does not suggest to the person skilled in the art that Example 1 of document D12 should be modified so that the binder includes a cationic polymer electrolyte in a proportion of 1-30 weight % of the total weight of binder.

Document D17 teaches the use of a recording layer containing a quaternary ammonium salt type polymeric electrolyte for imparting water resistance (see page 3, lines 21 to 25). There is, however, no indication as to whether or not the coated paper could be expected to satisfy the various criteria specified in claim 1 of the main request.

Document D18 is generally concerned with an ink jet recording medium combining a high gloss with high ink absorption. This is achieved by the use of a pigment

comprising fine silica particles and dry casting of the recording layer by heat pressing on a heated mirror surface. At page 7, lines 14 to 18, it is stated that "cationic resins, cationic surfactants and cation-modified inorganic particles can also be added as a water resistance-imparting agent". Of the Examples, only Example 3 includes a cationic polymer in the coating composition.

Document D19 discloses, in particular in Example 1, an ink jet recording sheet having a coating including a cationic resin. However, as indicated by the experiments carried out by the respondent, and described in the respondent's submission of 2 December 2003 (page 1), the gloss of this recording sheet is unsatisfactory.

The teaching of the prior art as discussed above thus does not lead the person skilled in the art to modify the coating composition of Example 1 of document D12 so that the binder includes a cationic polymer electrolyte in a proportion of 1-30 weight % of the total weight of binder.

4. Claims 2 to 8 are directly or indirectly appendant to claim 1. They relate to preferred embodiments of the subject-matter of claim 1 and thus similarly involve an inventive step.
5. The patent in suit can accordingly be maintained in the form as maintained by the Opposition Division in accordance with the main request of the respondent, and it is not necessary to consider the auxiliary request of the respondent.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

N. Maslin

W. Moser