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**Datasheet for the decision  
of 26 October 2006**

**Case Number:** T 0800/04 - 3.3.06

**Application Number:** 96201662.2

**Publication Number:** 0752496

**IPC:** D21H 23/04

**Language of the proceedings:** EN

**Title of invention:**

A process for the production of paper

**Patentee:**

Eka Chemicals AB

**Opponent:**

Ondeo Nalco Company

**Headword:**

Paper making/EKA

**Relevant legal provisions:**

EPC Art. 54, 56

**Keyword:**

"Novelty - (yes)"  
"Inventive step (yes)"

**Decisions cited:**

G 0004/92

**Catchword:**

-



Case Number: T 0800/04 - 3.3.06

**DECISION**  
of the Technical Board of Appeal 3.3.06  
of 26 October 2006

**Appellant:** Ondeo Nalco Company  
(Opponent) Ondeo Nalco Center  
Naperville, Illinois 60563-1198 (US)

**Representative:** Chalk Anthony John  
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**Respondent:** Eka Chemicals AB  
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**Representative:** Van Deursen, Petrus Hubertus  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 8 March 2004  
rejecting the opposition filed against European  
patent No. 0752496 pursuant to Article 102(2)  
EPC.

**Composition of the Board:**

**Chairman:** P.-P. Bracke  
**Members:** G. Dischinger-Höppler  
J. Van Moer

## Summary of Facts and Submissions

I. This appeal is from the decision of the Opposition Division to reject the opposition and to maintain European patent No. 0 752 496 on the basis of 14 Claims as granted, independent Claims 1 and 11 reading:

"1. A process for the production of paper from a suspension of cellulose containing fibres, and optional fillers, wherein a low molecular weight cationic organic polymer, a high molecular weight cationic or amphoteric polymer and anionic inorganic particles are added to the suspension and the suspension is formed and drained on a wire, characterised in that the low molecular weight polymer has a molecular weight below 700,000, the high molecular weight polymer has a molecular weight above 1,000,000 and that said polymers are simultaneously added to the suspension with substantially no time difference and essentially at the same position.

11. A polymer mixture in the form of an aqueous dispersion, characterised in that it comprises at least one high molecular weight cationic or amphoteric acrylamide-based polymer having a molecular weight above 1,000,000, at least one low molecular weight cationic organic polymer having a molecular weight below 700,000 and at least one water-soluble inorganic salt, wherein the weight ratio of said high molecular weight polymer to said low molecular weight polymer is within the range of from 9:1 to 1:2 and the dispersion comprises particles of high molecular weight cationic or amphoteric acrylamide-based polymer."

Dependent Claims 2 to 10 and 12 to 14 relate to preferred embodiments of the subject-matter of Claims 1 and 11.

II. The notice of opposition was based on the ground of lack of novelty and inventive step (Article 100(a), 54 and 56 EPC) and cited inter alia the following documents:

(1) US-A-4 929 655,

(2) US-A-5 274 055 and

(5) EP-A-0 308 752.

The notice of opposition was further based on tests carried out in view of document (1).

During opposition proceedings, the Opponent filed, amongst others, the following further documents

(8) GB-A-1 561 727 and

(10) a report and associated analysis of the commercial product Chupamid VP 131.

III. In its decision, the Opposition Division found that the subject-matter of the claims as granted was novel and inventive in view of the cited prior art.

IV. This decision was appealed by the Opponent (hereinafter Appellant) who filed under cover of a letter dated 16 July 2004, inter alia, the following further documents:

(c) Essentials of Pulping and Papermaking;  
Ch. J. Biermann; Academic Press, 1993, pages 200  
to 202 and 399 to 402; and

(e) A declaration by Dr. C. C. Johnson.

During the appeal proceedings, the Respondent (Patent-Proprietor) filed amended sets of claims in five auxiliary requests under cover of a letter dated 19 October 2006.

V. Oral proceedings before the Board of Appeal were held on 26 October 2006 in the absence of the Appellant (Opponent) as notified to the Board by letter dated 25 October 2006.

VI. The Appellant, in writing, submitted in essence the following arguments:

- Document (1) anticipated the subject-matter of Claim 1. For example, it was argued that it was apparent from documents (c) and (e) and from the test analyses presented with the notice of opposition under cover of the letter dated 26 July 2002 (see II above) that the water-soluble cationic polyacrylamide produced in example 1 of document (1) had a high molecular weight (HMW) as required in Claim 1. Moreover, the dispersant used corresponded to the low molecular weight (LMW) polymer of Claim 1.
  
- Document (1) also included the presence of the HMW polymer and LMW polymer in the required weight

ratio of 9:1, thus, anticipating the subject-matter of Claim 11.

- The subject-matter of Claim 1 was further not novel in view of document (2) since the skilled person would reasonably expect that the molecular weight of the polysaccharide would not be greater than 700,000.
- The subject-matter of Claim 1 was not inventive in view of document (5) alone or in combination with either document (8) or document (10), both suggesting the addition of the polymers as admixture.
- In the light of document (1), the subject-matter of Claim 11 was merely the result of an obvious adjustment of the weight ratio of the polymers for obtaining the most cost-effective result irrespective of any possible loss of nitrogen gas protection.

VII. The Respondent, orally and in writing, rejected the Appellant's arguments.

VIII. The Appellant requests in writing that the decision under appeal be set aside and that the patent be revoked.

The Respondent requests that the appeal be dismissed or alternatively that the decision under appeal be set aside and the patent be maintained on the basis of the claims according to any one of the first to fifth

auxiliary requests filed with letter dated 19 October 2006.

## **Reasons for the Decision**

### 1. *Novelty*

The Appellant contested the novelty of the subject-matter of Claims 1 and 11 in view of document (1). The novelty of the subject-matter of Claim 1 was further challenge on the basis of document (2).

In particular, the Appellant contested the finding of the Opposition Division that document (1) would not disclose the combination of an HMW polymer and an LMW polymer of the required molecular weights and document (2) would not disclose an LMW polymer.

- 1.1 Document (1) relates to a process for the production of a dispersion of a water-soluble cationic polymer by polymerising water-soluble monomers, in particular acrylamide monomers, in an aqueous multivalent anionic salt solution and in the presence of a cationic organic HMW dispersant (column 2, lines 43 to 56, Example 1). It is stated that the dispersion is used inter alia in papermaking processes (column 1, lines 10 to 16).

The Appellant argued that the HMW dispersant in document (1) corresponded to the LMW polymer within the meaning of Claim 11 since the operatively convenient molecular weight range was stated to be between 10,000 and 100,000 (column 4, lines 1 to 6) and since the water soluble cationic polyacrylamides disclosed in

document (1) had molecular weights above 1,000,000. The latter was apparent from document (c) teaching that HMW polymers used in papermaking were known to have molecular weights greater than 1,000,000 (page 202) and showing that according to the typical distribution curve (page 400) polymers of average molecular weight of e.g. 1,000,000 would include polymer molecules having a molecular weight of below 700,000. Further, it was evident from the viscosity value that the polymer produced in example 1 of document (1) must have a molecular weight of at least 1,000,000 as was declared in document (e). Finally, the tests filed with the notice of opposition (see II above) showed that following the process conditions given in example 1 of document (1) would give molecular weights in the order of 10,000,000. Example 1 of document (1) disclosed, therefore, the presence or, respectively, the addition during papermaking of the HMW and LMW polymers mentioned in Claims 1 and 11.

The Board is not convinced by these arguments since the only molecular weight explicitly disclosed in document (1) is that of the dispersant which may generally range between 10,000 and 10,000,000 (column 3, lines 66 to column 4, line 1).

Whilst being true that the "operatively convenient" dispersant of a molecular weight between 10,000 and 100,000 corresponds to the claimed LMW polymer, document (1) nevertheless teaches that the performance of the dispersant is not greatly affected by the molecular weight (column 3, lines 66 to 67).



In contrast, molecular weights for the polyacrylamides to be obtained are not explicitly disclosed in document (1). Thus, only the examples of document (1) may serve as a source for an implicit disclosure of molecular weights actually obtained be it by the description of the process conditions used in the examples, or be it by the properties of the products, e.g. by the viscosities obtained in the examples.

The references cited by the Appellant do not appear to contain the evidence necessary for concluding that the polyacrylamide product of example 1 of document (1) actually does have a molecular weight above 1,000,000.

Page 202 of document (c), which was referred to by the Appellant, rather shows that polyacrylamide of molecular weight well below 1,000,000, namely 500,000 is suitable as retention aid (left-hand column, lines 6 to 8). Further, the distribution curve shown on page 400 of document (c) is held to be irrelevant. In this respect, the Board agrees with the Respondent that the molecular weights normally indicate average values.

The declaration made by C.C. Johnson in document (e) in relation to the viscosity of the polyacrylamide product of Example 1 of document (1) reads:

"For similar polymers prepared under similar conditions the salt viscosities can be qualitatively correlated with molecular weight. It is generally understood that the salt viscosity of 22.0 cp as reported in Example 1 of 01" [viz. document (1)] "correlates with a solution containing cationic polyacrylamide having a molecular weight well in excess of 1,000,000".

The Board observes that example 1 does not indicate the conditions for measuring the viscosity and the statement does not reveal the basis for the alleged correlation. The above statement is, therefore not supported by evidence.

Concerning the tests filed with the notice of opposition, the Board shares the opinion of the Respondent that they are irrelevant due to the fact that they were most likely carried out in the presence of sodium sulphate.

Apart from the above, the Board notes that none of the examples in document (1) indicates the molecular weight of the dispersant used. Thus, even if it was assumed that the product obtained in example 1 would have a molecular weight corresponding to the HMW polymer of Claim 11, there is no direct and unambiguous disclosure that the molecular weight of the dispersant used would be below 700,000.

If only for that reason, the Board concludes, therefore, that document (1) does not anticipate the subject-matter of Claims 1 and 11.

- 1.2 Document (2) discloses a papermaking process employing polymeric microbeads either alone or in combination with an HMW organic polymer and/or polysaccharides (column 3, lines 15 to 30). It is stated that the molecular weight of the HMW polymer ranges from 100,000, preferably 250,000, to 25,000,000 (column 8, lines 25 to 28 and column 9, line 10 to column 10, line 16). The

molecular weight of the polymeric material of the microbeads and of the polysaccharide is not indicated.

The Appellant argued that given the molecular weight of the HMW polymer, the skilled person would expect the polysaccharide disclosed therein to have a low molecular weight of not greater than 700,000.

The Appellant has not provided reasons for this allegation. Moreover, the Board observes that this argument is in contradiction to the patent in suit teaching that starches may be used both as HMW polymer, i.e. as polymer having a molecular weight of above 1,000,000 (page 2, lines 56 to 57) and as LMW polymer if accordingly modified by degrading (page 3, lines 10 to 11), i.e. to a molecular weight of below 700,000.

Due to the fact that the molecular weight of the microbead material and of the polysaccharide is not indicated, the Board thus concludes that document (2) does not directly and unambiguously disclose a papermaking process using both an HMW polymer and an LMW polymer of the molecular weights required in Claim 1.

1.3 The Board thus concludes that the subject-matter claimed in the main request is novel and hence complies with the requirements of Articles 52(1) and 54 EPC.

2. *Inventive step*

2.1 Claim 1 of the main request

2.1.1 The Board agrees with the parties that document (5) is a suitable starting point for the assessment of inventive step since it is concerned with the object of providing a papermaking process wherein the dewatering of the paper is improved (page 2, lines 5 to 6) which is closely related to the object of the patent in suit to improve in a papermaking process drainage and retention (page 2, lines 3 to 5 and 29 to 32)

2.1.2 According to document (5) the improved dewatering is obtained by adding to the pulp a cationic LMW polymer of a molecular weight of at least 2,000 followed by a charged (anionic or cationic) HMW polymer having a molecular weight of at least 500,000, preferably greater than 1,000,000 and silica (page 2, lines 21 to 32 and 42 to 48).

A polymer combination falling within the definition of Claim 1 is disclosed only in Example 1 where an LMW cationic polymer is used in combination with an HMW cationic polymer, namely polymer 120. In all other examples the HMW polymer is anionic. However, according to this example, the LMW polymer, HMW polymer and the silica are added to the paper stock one after the other, i.e. sequentially.

In contrast, according to Claim 1, the polymers are "simultaneously added to the suspension with substantially no time difference and essentially at the same position".

2.1.3 The Board agrees with the Appellant that the terms "substantially no time difference" and "essentially at the same position" are vague.

The Appellant referred in this respect to example 2 of document (5) where 5 second intervals of addition are mentioned. However, this reference is as irrelevant as is the Respondent's reference to example 3 where points of addition are indicated since in both cases the HMW polymer is anionic and not cationic or amphoteric as in the process of Claim 1.

In example 1 of document (5), the time difference and the points of addition are not indicated.

However, in the absence of any qualifying or quantifying statement concerning the time difference in example 1 of document (5), the Board finds no basis for identifying the sequential addition in example 1 as being or not being simultaneous with substantially no time difference. The Board, thus, has no reason to put sequential and simultaneous addition on the same level of meaning.

The Board, therefore, agrees with the Respondent that the subject-matter of Claim 1 differs from the teaching in document (5), in particular example 1, in that the polymers are added simultaneously.

- 2.1.4 In the examples of the patent in suit, it is shown that simultaneous addition of the polymers as solution (M2), mixture (M3) or in separate form (S1) considerably improves retention as compared with the sequential addition of the polymers with 120 seconds or 30 seconds time difference (Examples 3 to 6 and Tables 3 to 6).

The Board is, therefore, satisfied that the technical problem credibly solved by the subject-matter of Claim 1 in view of document (5) consists in the improvement of retention in a papermaking process.

2.1.5 It remains to be assessed whether, in view of the available prior art documents, it was obvious for someone skilled in the art to solve this technical problem by adding the polymers simultaneously.

2.1.6 The emphasis of document (5) is sequential addition of the polymers (Claim 1, page 2, lines 21 to 23 and 42 to 48). Simultaneous addition is not mentioned anywhere. If anything, Example 2 may indicate separate addition of the polymers at substantially no time difference, if the 5 second interval is interpreted correspondingly, without, however, hinting at a possible improvement of the retention. Moreover, this example concerns addition of differently charged polymers (anionic and cationic) which is not comparable with the claimed addition of two cationic polymers or of one cationic and one amphoteric polymer.

Document (5) is, therefore, not suitable to propose the claimed solution of the existing technical problem.

2.1.7 The Appellant argued that document (8) would suggest to the skilled person that simultaneous addition to the paper stock of an HMW and LMW polymer could improve retention.

Document (8) relates to mixtures comprising a water-soluble non-ionic or cationic polymer of acrylamide and a water-soluble resinous amine condensation product

suitable e.g. as retention aid (page 1, lines 5 to 6, and page 4, line 64 to page 5, line 2).

The Appellant specifically referred to the following statement in document (8) "... dilute aqueous solutions of the mixtures ... exhibit a greater efficiency when used as ... retention aids, than do the individual polymeric products in the mixture, or than do combinations of aqueous solutions of said polymers" (page 2, lines 12 to 15).

However, as pointed out by the Respondent, document (8) relates to a different system with no anionic inorganic particles and does not disclose the required combination of HMW and LMW polymers. Apart from that, the above statement does not directly contain the information that simultaneous addition of the polymers would be better for retention than sequential addition since the term "combinations of aqueous solutions of said polymers" implies simultaneous addition of the separate polymer solutions. Moreover, sequential addition of the polymers is nowhere mentioned in document (8).

The Board, therefore, concludes that document (8) does not indicate that simultaneous addition of the polymers would improve retention in the process of document (5).

2.1.8 The Appellant, further, relied on document (10) as indicating the claimed solution of the above stated technical problem.

Document (10) was filed late under cover of a letter dated 5 December 2003 with no further comments in

relation to its contents during opposition proceedings either orally or in writing (see letter dated 5 December 2003 and minutes of the oral proceedings before the Opposition Division), except those submitted also during appeal proceedings (see below).

In the appeal proceedings, the Appellant merely provided the following statement:

"Furthermore, the practice of adding the LMW and HMW polymers, as a mixture was, by July 1995 (the priority date of the patent in suit) widespread. As an example, the Chupamid VP131, a commercial product available in the early 1990s, contained such a mixture (see opponent's letter dated December 5, 2003 and documents submitted therewith)".

Document (10) consists of five pages relating to a product referred to as "Chupamid VP 131" containing inter-office memos (pages 1 and 2) and product data (pages 3 to 5). The Appellant neither contended nor provided any evidence that the document itself was available to the public before the priority date of the patent in suit.

Also the allegation that the product was available in the early 1990's was never supported by any evidence. The Appellant's statement contains not even a clear indication that the product was on the market as a retention aid for papermaking processes.

Therefore, the Board has no reason to conclude that, before the priority date of the patent in suit, either document (10) or the product Chupamid VP 131 could have



proposed to a skilled person that retention might be improved if in the process of document (5) the polymers were added simultaneously.

- 2.1.9 The other prior art on file also does not contain any hint towards the claimed solution of the existing technical problem.

The Board, therefore, concludes that starting from document (5) as the closest prior art, a skilled person had no reason to expect improved retention by simultaneous addition of the polymers as claimed in Claim 1.

- 2.2 Claim 11 of the main request

- 2.2.1 The parties selected document (1) as the closest prior art. The Board agrees since document (1) discloses an aqueous dispersion of a water-soluble cationic polyacrylamide in the presence of a multivalent anionic salt solution and of a cationic organic polymeric dispersant (column 2, line 43 to column 3, line 61 and example 1).

- 2.2.2 Document (1) does not disclose the claimed combination of two polymers having a molecular weight of above 1,000,000 (HMW polymer) and below 700,000 (LMW polymer) (see also point 1.1 above).

In addition, contrary to the Appellant's opinion (point VI above), document (1) does not disclose the claimed weight ratio of HMW:LMW polymer of 9:1 to 1:2 since the amount of dispersant of 1 to 10% by weight based on the total weight of the monomers indicated in the

description (column 4, lines 6 to 8) is not disclosed in relation with an LMW polymer and, in particular, not in relation with a remainder HMW polymer of 90 to 99% by weight. In the examples the weight ratio of polyacrylamide:dispersant is 10:1 or higher. In example 1, the ratio is 20:1. Thus, irrespective of whether the dispersant is considered as LMW polymer and the polyacrylamide as HMW polymer or vice versa, the weight ratios in the examples are always outside the claimed range, namely at least 10:1 or at most 1:10.

- 2.2.3 The Board agrees with the parties that no evidence is on file showing a particular effect for the claimed dispersion as compared with the dispersion known from document (1).

The technical problem actually solved by the subject-matter of Claim 11 in view of document (1) consists, therefore, in providing a further polymer mixture suitable for application in the production of paper.

- 2.2.4 The Appellant essentially argued that a skilled person should know how to adjust the amount of LMW and HMW polymer to whatever economically meaningful ratio, in spite of any drop in the effectiveness of the nitrogen sparge. The skilled person would, therefore try different weight ratios, including those specified in Claim 11.

- 2.2.5 The Board observes that the upper limitation of the amount of dispersant to 10% by weight in document (1), which corresponds exactly to a weight ratio of 9:1 of polyacrylamide:dispersant expressed in monomers, is stated to be due to the fact that higher values are

economically meaningless but liable to lead to shortage of the nitrogen aeration due to an increase in the viscosity of the solution (column 4, lines 6 to 13).

Thus, a skilled person could have selected this recommended upper value of 10% by weight of dispersant, e.g. in example 1 instead of the lower value actually used therein at the weight ratio of polyacrylamide:dispersant of 20:1, in order to provide a further polymer mixture.

However, the Appellant overlooks that document (1) does not disclose either in the general description or in the examples the claimed combination of HMW and LMW polymer (point 1.1 above). In particular, in the examples no molecular weights are given, either for the dispersant or the produced polyacrylate.

Even if it was assumed, in spite of a corresponding explicit disclosure (point 1.1 above), that the molecular weight of the polyacrylate produced in example 1 would correspond to the HMW polymer of Claim 11, it would still be necessary, in order to arrive at the claimed subject-matter, not only to change the weight ratio of dispersant and monomers to be polymerised but also to select the molecular weight of the dispersant to be less than 700,000.

Thus, a two-fold selection is necessary to arrive at the subject-matter of Claim 11 for which a skilled person had no reason since he would expect that the technical problem to be solved, i.e. the provision of a further polymer mixture, was obtained already by either

changing the weight ratio or selecting the molecular weight of the dispersant.

The Board has verified that the other documents on file are not suitable to contribute to the claimed solution of the above stated technical problem. Consequently, it has to be concluded that the subject-matter of Claim 11 is not obvious in the light of document (1).

- 2.3 Therefore, the Board is satisfied that the subject-matter of Claims 1 and 11 involve an inventive step, thus, meeting the requirements of Articles 52(1) and 56 EPC.
3. Dependent Claims 2 to 10 and 12 to 14 refer to specific embodiments of Claims 1 and 11 and derive their patentability therefrom.
4. Since the claims of the main request comply with the requirements of the EPC, there is no need to consider the Respondent's auxiliary requests.
5. *Right to be heard*

The present decision against the Appellant has been given in its absence as notified to the Board only one day before the oral proceedings (point V above). Since the decision is based only on facts and evidence already submitted during the written proceedings, the Appellant's right to be heard under Article 113(1) EPC within the meaning of opinion G 4/92 (OJ EPO 1994, 149) has been respected by delivering this decision in its notified absence.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

G. Rauh

P.-P. Bracke