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Datasheet for the decision
of 11 March 2008

Case Number:	T 0142/06 - 3.3.03
Application Number:	97909613.8
Publication Number:	0982325
IPC:	C08F 14/08
Language of the proceedings:	EN

Title of invention:
Polyvinylidene chloride latex and process for the preparation thereof

Patentee:
Asahi Kasei Kabushiki Kaisha

Opponent:
Solvay (Société Anonyme)

Headword:
-

Relevant legal provisions:
EPC Art. 54, 83, 56

Relevant legal provisions (EPC 1973):
-

Keyword:
"Sufficiency of disclosure (yes)"
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:
T 0119/82, T 0219/83, T 0226/85, T 0409/91, T 0435/91, T 0939/92, T 0793/93, T 0990/96, T 0190/99, T 0100/00, T 0803/01

Catchword:
see Reasons points 3.28, 3.29

Case Number: T 0142/06 **-** 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 11 March 2008

Appellant: (Opponent)	Solvay (Société Anonyme) Rue du Prince Albert, 33 B-1050 Bruxelles (BE)
Representative:	Jacques, Philippe Solvay S.A. Départment de la Propriété Industrielle Rue de Ransbeek, 310 B-1120 Bruxelles (BE)
Respondent: (Patent Proprietor)	Asahi Kasei Kabushiki Kaisha 2-6, Dojimahama 1-chome Kita-ku Osaka-shi Osaka 530-8205 (JP)
Representative:	Strehl Schübel-Hopf & Partner Maximilianstrasse 54 D-80538 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted dated 9 November 2005 and posted 30 November 2005 concerning maintenance of European patent No. 0982325 in amended form.**

Composition of the Board:

Chairman: R. Young
Members: C. Idez
H. Preglau

Summary of Facts and Submissions

I. The grant of European patent No. 0 982 325 in the name of Asahi Kasei Kabushiki Kaisha in respect of European patent application No. 97 909 613.8 filed on 23 October 1997 and claiming priority of the Japanese patent application JP 12146797 filed on 25 April 1997 was announced on 16 April 2003 (Bulletin 2003/16) on the basis of 17 claims.

Independent Claims 1 and 5 read as follows:

"1. A vinylidene chloride-based latex which has a chlorine ion content not higher than 500 ppm based on the total concentration of all solid matter in the latex by weight.

5. A process for producing a vinylidene chloride-based latex, which comprises dialyzing a vinylidene chloride-based latex to thereby reduce the chlorine ion content in the latex to or below 500 ppm of all solid matter in the latex by weight."

Claims 2 to 4, and 6 to 17 were dependent claims.

II. On 16 January 2004, a Notice of Opposition against the patent was filed by Solvay S.A.
The Opponent requested revocation of the patent in its entirety on the grounds of lack of novelty and lack of inventive step (Art. 100(a) EPC) as well as on the ground of insufficiency of disclosure (Art. 100(b) EPC).

The opposition was supported *inter alia* by the following documents:

D1 : Sakai H. et al; Kotingu Jiho, 1993, No. 195, pages 9-15 in Japanese and English translation thereof; and

D2 : JP 48-10941 and English translation thereof.

III. In an interlocutory decision announced orally on 9 November 2005 and issued in writing on 30 November 2005 the Opposition Division held that the grounds of opposition did not prejudice the maintenance of the patent in amended form. The decision of the Opposition Division was based on Claims 1 to 17 as granted as main request and on Claims 1 to 13 submitted as first auxiliary request during the oral proceedings of 9 November 2005.

Claims 1 to 4 of the first auxiliary request corresponded to 1 to 4 of the main request. Independent Claim 5 thereof read as follows:

"A process for producing a vinylidene chloride-based latex, which comprises dialyzing a vinylidene chloride-based latex to thereby reduce the chlorine ion content in the latex to or below 500 ppm of all solid matter in the latex by weight, wherein at least one hollow fiber membrane module is used for the dialysis, and is for use as an artificial kidney, and wherein in the dialysis with at least one hollow-fiber membrane module for use as an artificial kidney, the latex side pressure PL and the dialyzing fluid side pressure PW are kept so that $PL \leq PW$, and wherein in the dialysis with at least one hollow-fiber membrane module for use as an artificial kidney, the dialyzing fluid is passed through the module on the inner side of the hollow-fiber membranes and the latex is passed through the module on the outer side of the hollow-fiber membranes."

Dependent Claims 6, and 7 to 13 were based on granted Claims 9, and 11 to 17.

According to the decision of the Opposition Division, the main request met the requirements of Article 83 EPC and of Article 54 EPC but Claim 5 lacked inventive step in view of document D1.
According to the decision, the Opponent had no objections as to the formal admissibility of the auxiliary request and did not raise any novelty or inventive step objection against the subject-matter of that request.
Consequently, the patent could be maintained on the basis of this auxiliary request

IV. Notice of Appeal was filed on 30 January 2006 by the Appellant (Opponent) with simultaneous payment of the prescribed fee.

With the Statement of Grounds of Appeal filed on 6 April 2006, the Appellant submitted ***inter alia*** the following new documents:

Dl’: Enlarged version of Fig. 2 of Dl;

D5: Repetition of dialysis tests;

D6: US-A-4 535 120;

D7: Repetition of Example 1 of D6;

D8: T. Kodani et al.; "Effect of Storage on Film-Formation Property of Vinylidene Chloride-Acrylonitrile-Methyl Acrylate Terpolymer Latex."; Journal of Applied Polymer Science, Vol. 69, 1998; pages 573-579; and

D9: H. Sakai et al.; "Film-Formation Property of Vinylidene Chloride-Acrylonitrile-Methyl Acrylate Copolymer Latex. I. Effect of Emulsion-Polymerization Process."; Journal of Polymer Science Part B Polymer Physics, Vol. 40, 2002; pages 939-947.

The Appellant also argued essentially as follows:

(i) Concerning insufficiency of description:

(i.1) Claim 1 of the request accepted by the Opposition Division was directed to latexes with a chlorine content equal to or lower than 500 ppm based on solid matter and encompassed latexes with a chlorine content of zero or close to zero.

(i.2) In the examples of the patent in suit the lowest value achieved was 75 ppm. There was no teaching in the patent in suit how to obtain lower chlorine content in particular close to zero.

(i.3) Document D5 showed that it was not possible to obtain values below 50 ppm.

(i.4) Reference was also made to the decisions T 409/91 (OJ EPO 1994, 653) and T 435/91 (OJ EPO 1995, 188).

(ii) Concerning novelty:

(ii.1) Document D6 (Example 1) disclosed a latex of a copolymer of vinylidene chloride which exhibited a conductivity of $2,5.10^{-3}\ \Omega^{-1}\ cm^{-1}$.

(ii.2) A repetition of Example 1 of D6 (cf. D7) showed that this latex had a chlorine ion content of 193 ppm.

(ii.3) Thus, the subject-matter of Claims 1 to 3 was not novel over D6.

(ii.4) Document D1 (cf. D1') disclosed latexes having a chlorine content of less than 500 ppm.

(ii.5) The skilled person would have understood that these values were based on the solid matter of the latex (cf. also documents D8 and D9 whose author was the same as the one of D1).

(ii.6) In that respect the declaration made by the author of D1 (cf. document D4: Declaration of Mr H. Sakai dated September 7, 2005) was not relevant since it was the interpretation of the skilled person when reading D1 at the date of the patent in suit which was pertinent.

(ii.7) Thus, D1 was novelty destroying for the subject-matter of Claim 1.

(ii.8) Document D2 disclosed the dialysis of polyvinylidene chloride latexes. In Examples 1 and 2 the amount of salts decreased from 5000 to 1000 ppm after respectively 12 and 15 hours dialysis in running water.

(ii.9) As shown by document D5 after 12 and 15 hours dialysis in running water, the chlorine ion content would inevitably be lower than 500 ppm based on solid matter.

(ii.10) The chlorine ion content of the latex represented a purity feature of the claimed latexes.

(ii.11) Conventional dialysis methods enabled to reach this level of purity i.e. less than 500 ppm as shown by D5 and D7.

(ii.12) Thus, taking into account the considerations made in the decision T 803/01 of 9 September 2003 (not published in OJ EPO), the subject-matter of Claim 1 was not novel over D6 and D2.

(iii) Concerning inventive step:

(iii.1) The claimed technical effect was not obtained over the whole range claimed.

(iii.2) Thus, inventive step could not be acknowledged for the subject-matter of Claim 1. Reference was made to the decision T 939/92 (OJ EPO 1996, 309).

V. With its letter dated 24 October 2006, the Respondent submitted 5 auxiliary requests as well as a new document:

D11: Textbook "Kagaku Binran Kisohen", 3rd
edition edited by the Chemical Society of Japan,
page II-452, Table 12—2.

It also argued essentially as follows:

(i) Concerning sufficiency of disclosure:

(i.1) It was not a question under Art. 83 EPC whether Claim 1 was sufficiently clear and complete, but whether the patent as a whole provided sufficiently clear and complete information.

(i.2) It was clear that the description contained very specific instructions how to perform the present invention (cf. Examples).

(i.3) The Examples illustrated most of the claimed range, i.e. from 75 ppm to 500 ppm chlorine ion content (see Table 3).

(i.4) The key feature of the invention was the upper boundary of 500 ppm chlorine ion content.

(i.5) As the effect thereof was shown in a range of 75 ppm to 500 ppm as demonstrated by the examples, it could be reasonably assumed that the effect could also be obtained at concentrations lower than 75 ppm.

(ii) Concerning novelty:

(ii.1) D7 was not an exact repetition of Example 1 of D6.

(ii.2) Thus, the experiments of D7 could not be regarded as representative for D6.

(ii.3) In D1 the content of chlorine ion related to the concentration in the latex (cf. also D4).

(ii.4) Documents D8 and D9 were published after the filing date of the patent in suit. Furthermore they could not be considered as representing general technical knowledge.

(ii.5) Thus novelty was given over D1.

(ii.6) In D2 the amount of chlorine ion was unknown.

(ii.7) Even if one would assume that there was 5000 ppm of chlorine ion after completion of the reaction in the Examples of D2, one would come, in view of D5, to a concentration of 1000 ppm after dialysis.

(ii.8) The reference to the decision T 803/01 was not pertinent, since Claim 1 referred to a composition and not to a compound. The chlorine ion content defined the composition and not the degree of purity.

(iii) Concerning inventive step:

(iii.1) The Appellant had stated that it would have been within the competence of a skilled person to obtain a latex having a chloride concentration within the claimed range.

(iii.2) Dl being considered as the closest prior art, the question was however whether there was motivation in Dl or in any of the other documents to reduce the chloride ion concentration to 500 ppm or less in order to improve the gas barrier properties and the boil blushing properties.

(iii.3) D1 rather taught that the chloride concentration had no influence on the gas barrier properties. There was further no hint in that respect in the other documents.

VI. In its letter dated 18 January 2008, the Appellant essentially maintained its arguments presented in view of D1, D2, D6 and decision T 803/01 concerning the issue of novelty.

VII. Oral proceedings were held before the Board on 11 March 2008.

At the oral proceedings the discussion focussed (i) on the question of sufficiency of disclosure of the main request, (ii) on the question of novelty of the subject-matter of Claim 1 of the main request and (iii) on the question of inventive step of the subject-matter of Claims 1 and 5 of the main request.

Concerning point (i), the Parties, while essentially relying on their arguments presented during the written phase of the appeal made additional submissions which may be summarized as follows:

(i.1) By the Appellant:

(i.1.1) Claim 1 encompassed latexes with a chlorine ion content between 0 and 500 ppm. Document D5 illustrated that it was not possible to achieve very low content of residual chlorine ion, either by increasing the volume of water or the time for dialysis.

(i.1.2) The Patent Proprietor would get a protection for products which could not be produced.

(i.1.3) Even if one would admit that a value 0 ppm zero would be practically excluded, it remained that the lowest value of chlorine ion would vary with time if new purification techniques were developed.

(i.1.4) The same considerations of lack of sufficient disclosure would apply to the subject matter of Claim 5.

(i.2) By the Respondent:

(i.2.1) The skilled person would understand that the value of 0 for the chlorine ion content was not technically achievable.

(i.2.2) The patent in suit illustrated how to obtain chlorine value between 495 and 75 ppm. This represented about 80 % of the chlorine content range according to Claim 1.

(i.2.3) A preferred value of chlorine concentration was, according to the patent in suit, 200 ppm (cf. paragraphs [0011] and [0035]).

(i.2.4) The patent in suit provided appropriate teaching in order to obtain such low values.

(i.2.5) Concerning Claim 5, the same considerations as for Claim 1 would apply.

Concerning point (ii), the Appellant indicated that it did not maintain its objection of lack of novelty in view of document D2. The arguments presented by the Parties in respect of documents D1 and D6 and in view of the considerations made in decision T 803/01 may be summarized as follows:

(ii.1) By the Appellant:

(ii.1.1) The skilled person reading D1 would understand that the chlorine ion content was calculated on the total solid basis, because this was the usual in the art. Only this way of calculating allowed a comparison between latexes.

(ii.1.2) As shown by documents D8 and D9, which had the same author as D1, there was no need to indicate the basis for the calculation of the chlorine content.

(ii.1.3) It was to be noted that the method disclosed in D9 for determining the chlorine content (page 941, left-hand column, fourth paragraph) was the same as the one used in the patent in suit where the chlorine ion content was expressed on the total solid content.

(ii.1.4) From D1' which reproduced Fig.2 of D1 in a bigger scale it was clear that D1 disclosed a polyvinylidene chloride latex having a chlorine ion content of 500 ppm.

(ii.1.5) The minor changes made in the repetition of Example 1 of D6 (i.e. change of the concentration of the sodium persulfate solution, difference in surface tension; no use of steam for maintaining the temperature at 60°C) could not have affected the result (i.e. 193 ppm of chlorine ion) in a significant manner. The same was true for the fact the concentration of the latex was not indicated in D6. Thus, it could be considered that the chlorine ion content of the latex of Example 1 was well below 500 ppm.

(ii.1.6) The change of scale of the reactor (40 litres instead of 200 litres) would have no significant influence.

(ii.1.7) The arguments of the Respondent in view of the change of conductivity with respect to the temperature (cf. D11) were not pertinent, since D11 referred to the conductivity of water which was well below that of the aqueous phase of the latex.

(ii.1.8) The reference to the oxygen permeability of the film obtained from the latex of Example 1 of D6 (cf. second table on columns 7 and 8 of D6) was not pertinent to show that the latex of Example 1 had a high chlorine ion content because the change in oxygen permeability after boiling was also dependent on the the composition of the polyvinylidene polymer.

(ii.1.9) Document D5 showed that by conventional dialysis methods it was possible to reduce the chlorine ion content of polyvinylidene latex well below 500 ppm. It was however conceded that it was not known whether the semi-permeable membranes used in D5 were available at the priority date. Nevertheless, they had not been purposely selected for their performance but have been taken by chance in a catalogue.

(ii.1.10) Chlorine was an impurity, and the claimed latexes according to Claim 1 only differed from those of the prior art by the degree of purity.

(ii.1.11) It was known from document D2 that the presence of inorganic salts in polyvinylidene latexes of affected the properties of films therefrom (i.e. haze, oxygen permeability). D2 hence taught to reduce or eliminate inorganic salts from the latex.

(ii.1.12) Thus the skilled person would aim to obtain latexes as pure as possible.

(ii.1.13) Thus, in view of the considerations made in T 803/01, the subject-matter of Claim 1 of the patent in suit could not be considered as novel.

(ii.2) By the Respondent:

(ii.2.1) It was clear from the wording used in D1 for describing Fig.2 thereof, that the concentration of chlorine ions referred to the whole latex.

(ii.2.2) Documents D8 and D9 were post published. It was further not possible to combine several documents for demonstrating a lack of novelty.

(ii.2.3) Document D4 made clear that the chlorine concentration had been calculated on the whole latex and not on the total solid content.

(ii.2.4) Further it was not even clear whether Figure 2 of D1 disclosed a latex with a chlorine concentration of 500 ppm. Figure 2 was not precise and the initial value could be read as being 520 ppm.

(ii.2.5) D7 was not a true repetition of Example 1 of D6. In particular the steam treatment in D6 would increase the amount of chlorine ions, since it would degrade the polyvinylidene polymer or the vinylidene chloride monomer.

(ii.2.6) The surface tension was not the same. Even if this was, as submitted by the Appellant, related to the particle size of the polymer, this would inevitably show that the polymer was not the same in Example 1 of D6 and in its alleged repetition in D7.

(ii.2.7) The temperature at which the conductivity of the latex had been determined had not been indicated in D6.

(ii.2.8) The significant change in oxygen permeability of the film obtained from the latex of Example 1 (cf. second Table on columns 7 and 8) further showed that the amount of chlorine ion in the latex would have been much greater than 500 ppm.

(ii.2.9) Decision T 803/01 referred to the question of purity of a polymeric compound for use in pharmaceutical compositions. Claim 1 of the patent in suit was however directed to a composition.

(ii.2.10) Chlorine ions could not be considered as an impurity. They were generated by decomposition of the polymeric product.

(ii.2.11) In contrast to pharmaceutical products where high degree of purity was required, there was no such requirement for polyvinylidene latexes.

(ii.1.12) D2 only disclosed that the presence of inorganic salts in polyvinylidene latexes might negatively influence the properties of films obtained therefrom.

(ii.2.13) The comparison between Reference Example 1 and Reference Example 2 in the patent in suit showed however that it was not the presence of inorganic salts but the presence of chlorine ions in the latex which was decisive for the properties of the films obtained therefrom.

(ii.2.14) Furthermore, the level of chlorine ion of below 500 ppm could not be obtained by conventional dialysis methods as those mentioned in D2. This was also shown by Comparative Example 1 of the patent in suit.

(ii.2.15) It was not clear whether the semi-permeable membranes used in D5 were average quality membranes. Furthermore, the tests of D5 had been carried out in 2006, i.e. 9 years after the priority date of the patent in suit. It was hence not clear whether the membranes used in D5 were available at the priority date.

(iii) The Board, having after deliberation informed the Parties, that the subject-matter of the main request was considered as meeting the requirements of sufficiency of disclosure and of novelty, the discussion moved to the question of inventive step. The submissions made by the Parties at the oral proceedings may be summarized as follows:

(iii.1) By the Appellant:

(iii.1.1) Document D1 would represent the closest state of the art. D1 taught that a high content of chlorine ions in the latex would lead to increased haze in films prepared therefrom (cf. Fig.2 and page 14, lines 7 to 17).

(iii.1.2) Document D2 taught that oxygen barrier properties and haze could be improved by reducing or eliminating inorganic salts in the latex. Inorganic salts would also encompass chlorine ions.

(iii.1.3) Thus, in view of D1 and D2 it would have been obvious to solve the technical problem underlying the patent in suit (cf. paragraphs [0008] and [0010]) by reducing the amount of chlorine ions in the latex.

(iii.1.4) The threshold value of 500 ppm was merely an arbitrary value. As shown by D1 and D2 there was a continuous clear relationship between organic salts content i.e. also chlorine ions content and the properties i.e. haze and oxygen barrier.

(iii.1.5) The process of comparative Example 5 would fall under the scope of process Claim 5. In that example, the chlorine ion content obtained after dialysis was above 500 ppm.

(iii.1.6) Thus, Claim 5 covered subject-matter which did not solve the technical problem. Consequently, it lacked inventive step. Reference was made to the decision T 939/92 in that respect.

(iii.2) By the Respondent:

(iii.2.1) Figure 10 of D1 showed that there was no change in the haze properties after 1.5 months storage, i.e. although the content of chlorine ions in the latex had drastically increased (cf. Fig.2).

(iii.2.2) Table 1 on page 14 of D1 showed that the oxygen permeability remained the same after 2 months storage.

(iii.2.3) There was hence no reason to consider that oxygen permeability and haze could be improved by reducing the chlorine ion content below 500 ppm.

(iii.2.4) The jump in these properties (cf. Table 3 of the patent in suit) observed between comparative Example 1 (650 ppm) and Example 1 (495 ppm chlorine ion) showed that the threshold value of 500 ppm was not arbitrary.

(iii.2.5) D2 did not recognize the influence of chlorine ions on these properties. It only referred to inorganic salts. The comparison between Ref. Example 1 and Reference Example 2 in Table 3 showed that it was the chlorine ions content and not the inorganic salts content which was decisive.

(iii.2.6) In Comparative Example 5, no artificial kidney device had been used. This was apparent from the very high permeability of the membrane used in that example. This example did not fall under the scope of Claim 5.

VIII. The Appellant requested that the decision under appeal be set aside and the patent be revoked.

The Respondent requested that the appeal be dismissed or in the alternative that the decision under appeal be set aside and the patent be maintained on the basis of one of the auxiliary requests 1 to 5 as submitted with the letter dated 24 October 2006.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. *Sufficiency of disclosure*

2.1 Claim 1 of the main request refers to a vinylidene chloride-based latex having a chlorine ion content not higher than 500 ppm based on the total concentration of all solid matter in the latex by weight.

2.2 In that context, the Appellant has submitted that Claim 1 comprises a feature (chlorine ion content) whose value is only defined by an upper limit (500 ppm) and that, since no lower limit of the chlorine ion content is specified in Claim 1, this claim would encompass vinylidene chloride based-latexes with a chlorine ion content of zero or very close to zero. According to the Appellant, the patent in suit does not disclose how such latexes can be obtained. In other words, according to the Appellant, Claim 1 is unduly broad so that the specification does not enable the full scope of the invention to be carried out by a person skilled in the art.

2.3 According to the decision T 190/99 of 6 March 2001 (not published in OJ EPO), the skilled person when considering a claim should however rule out interpretations which do not make technical sense (Reasons 2.4). In this connection, while, as argued by the Respondent and conceded by the Appellant, the achievement of a value of 0 of the chlorine ion content of the latex does not make technical sense, it is, in the Board's view, evident for a person skilled in the art that there is an inherent lower limit for the chlorine ion content of vinylidene chloride based latex which can be achieved by the specific dialysis process disclosed in the patent in suit (cf. paragraph [0020] to paragraph [0025], paragraph [0052] to paragraph [0059]) depending ***inter alia*** on the semi-permeable membrane used, and on the number of modules of artificial kidney device used.

2.4 The Board also observes that the patent in suit contains very specific examples resulting in the claimed latex (cf. Examples 1 to 18) which illustrate how to obtain vinylidene chloride based latexes having chlorine ion contents as high as 495 ppm (Table 3, Example 1) or as low as 75 ppm (cf. Table 3, Example 2).

2.5 The Board further observes that the Appellant has not questioned the results obtained in these examples.

2.6 In that context, it should hence be examined by the Board whether the absence of such lower limit (e.g. 75 ppm) of the chlorine ion content in the claim might give rise to an objection under Article 83 EPC.

2.7 As indicated in the decision T 226/85 (OJ EPO 1988, 336, Reasons point 2), "an attack on the ground of insufficiency under Article 100(b) EPC is, of course, based on Article 83 EPC which requires that the disclosure of the invention must be 'sufficiently clear and complete for it to be carried out by the person skilled in the art'. It is understood that this means that substantially any embodiment of the invention, as defined in the broadest claim, must be capable of being realised on the basis of the disclosure".

2.8 As can be deduced from the values of chlorine ion content disclosed in the examples of the patent in suit (cf. paragraph 2.4 above), the examples illustrate more than 80% of the range of the chlorine ion content which would be encompassed by the broadest interpretation of Claim 1 (i.e. from 0 to 500 ppm).

2.9 Under these circumstances, it can hence be considered, in the Board's view, that substantially any embodiment of the claimed invention according to Claim 1 is capable of being realised on the basis of the disclosure of the patent in suit. Thus, the Board comes to the conclusion that the objection of insufficient disclosure in respect of the subject-matter of Claim 1 raised by the Appellant cannot succeed.

2.10 This conclusion cannot be altered by the reference made by the Appellant to the decisions T 409/91 and T 435/91 since the circumstances of the present case totally differ from those underlying these decisions for the following reasons:

2.11 The case under consideration in decision T 409/91 dealt with distillate fuel oil in which the wax crystals should have an average particle size less than 4000 nanometres (Claim 1) or preferably of less than 1000 nm (Claim 5). According to the decision, these claims must hence be construed as to relate to fuel oil containing wax crystals smaller than 1000 nm. According to the decision the applicant (appellant) had admitted that no way of obtaining such fuel oils was disclosed or could be found in the body of relevant common general knowledge. The board in charge of the case came hence to the conclusion that the claims related to an invention which was not sufficiently disclosed as required by Article 83 EPC, since the application as filed did not contain sufficient information to allow a person skilled in the art, using his common general knowledge, to carry out the invention within the whole area that was claimed.

2.12 In the present case, while Claim 1 is directed to a vinylidene chloride based latex having a chlorine ion content not greater than 500 ppm, the description of the patent in suit (cf. paragraph [0011] indicates that the chlorine ion content is preferably not greater than

200 ppm. Thus, even if one would consider, following the considerations made in T 409/91, that Claim 1 is to be construed as relating to latexes with a chlorine ion content not greater than 200 ppm, the patent in suit, in contrast to the case under consideration in T 409/91, illustrates how to obtain such lower values, i.e. latexes with a chlorine ion content well below 200 ppm. Furthermore as shown above in paragraph 2.6, the patent in suit enables the skilled person to obtain substantially all the embodiments falling within the ambit of Claim 1 (cf. also reference made to the decision T 226/85 in paragraph 3.5 of the decision T 409/91).

2.13 The decision T 435/91 is even less relevant since it deals with the functional definition of an additive in a composition and the question as to whether the patent in suit discloses, taking into account, if necessary, the relevant common general knowledge, any technical concept fit for generalisation, which would enable the skilled person to achieve the envisaged result without undue difficulty within the whole ambit of the claim containing the "functional" definition (point 2.2.1 of the Reasons).

2.14 The Board notes that the Appellant while objecting that the subject-matter of Claim 5 was not sufficiently disclosed has merely submitted that the same arguments as those presented for Claim 1 would apply, i.e. that the process according to Claim 5 would not allow to obtain latexes having a chlorine ion content of zero or close to zero ppm.

2.15 Since the process disclosed in Claim 5 corresponds to the process used in the Examples 1 to 18 of the patent in suit, the same considerations as for the sufficiency of disclosure in respect of Claim 1 would equally apply.

2.16 Consequently, the objection of lack of sufficiency of disclosure in respect of Claim 5 raised by the Appellant must also fail.

3. *Novelty*

3.1 Lack of novelty of the subject-matter of Claim 1 has been alleged by the Appellant in view of document D1 (in particular Figure 2 thereof), of Example 1 of D6 and of the considerations made in the decision T 803/01.

3.2 Document D1 relates to the changes in physical properties of high barrier Saran latexes with time. Saran latex is a trade name for aqueous dispersions of co-polymers obtained by emulsion polymerization from monomers whose main component is vinylidene chloride.

3.3 In document D1, the change in the concentration of chloride ions in the latex with time was investigated. As shown in Figure 2 of D1,

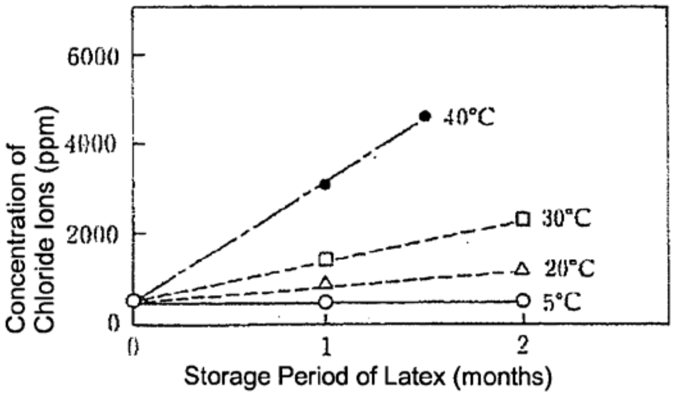


Figure 2 Changes in the Concentration of Chloride Ions in Latex with Time.

the chloride ion concentration increased linearly and also, as the storage temperature was raised, the rate of increase became faster.

3.4 While Figure 2 is the only place in D1 where the concentration in chlorine ions in the latex is indicated in D1, the Board observes that D1 does not specify on which basis the concentration of chlorine ions is expressed, i.e. on the total solid content or on the latex as the whole.

3.5 While the Parties have made contradictory submissions in that respect (cf. points VII (ii.1.1) to (ii.1.3) and VII (ii.2.1) to (ii.2.3) above), the Board observes that neither D8 nor D9 relied on by the Appellant indicates on which basis the chlorine ion content of vinylidene chloride based latex is to be calculated and that, in document D4, the author of D1 has stated that the concentration of chlorine ion in D1 was calculated on the latex as a whole.

3.6 The Board also notes that the main justification from side of the Appellant that the amount of chlorine ion in the latex is to be calculated on the solid content of the latex is based on the considerations that this way of calculating is the only one which allows valid comparison between various latexes. The Board, however, observes that D1 does not intend to make comparison between various latexes but merely to study the change of chlorine ion concentration in only one latex, so that it cannot be excluded that the author of D1, as indicated in D4, might have used a different basis (i.e. whole latex) for the calculation of the chlorine ion concentration.

3.7 Thus, under these circumstances, and since the Board is unable to establish the facts of its own motion, the patent proprietor is given the benefit of the doubt (cf. also T 219/83, OJ EPO, 1986, 211).

3.8 Furthermore, the inaccurate scale used for the chloride ion concentration in Figure 2 of D1 combined with the inaccurate indication of the initial chlorine concentration of the Saran latex in that figure (cf. circle on the concentration axis) do not allow to establish clearly and unambiguously whether the chlorine ion concentration in the Saran latex tested and reported in Figure 2 is not higher than 500 ppm. This conclusion cannot be altered, in the Board's view, by the submission of document D1' presented by the Appellant as an enlarged version of Figure 2 of D1, because the enlarging of an imprecise figure does not remedy the initial and fundamental inaccuracy of the indication of the starting concentration of the chlorine ion or the inaccuracy of the scale used for the chlorine ion concentration.

3.9 Thus, under these circumstances, the Board can only come to the conclusion that document D1 does not disclose clearly and unambiguously a vinylidene chloride based latex having a chlorine concentration not higher than 500 ppm on the total solid basis of the latex.

3.10 Document D6 relates to an aqueous dispersion of a vinylidene chloride resin which has good adhesive properties and which is capable of forming a coating having a good printability, excellent gas (especially oxygen) and water vapour barrier properties and resistance to boiling water treatment (column 1, lines 6 to 14).

3.11 In its Example 1, it discloses the manufacture of an aqueous dispersion of a vinylidene chloride polymer having a electric conductivity of below 2.5×10^{-3} $\Omega.\text{cm}^{-1}$ (D6, column 5, line 66 to column 6, line 2). The Board can however only state that D6 contains no explicit indication of chlorine ion content of the aqueous dispersion (i.e. latex) of Example 1.

3.12 According to decision T 793/93 of 27 September 1995 (not published in OJ EPO), "concerning the issue of novelty, Article 54(2) EPC defines a state of the art as comprising 'everything made available to the public by means of written or oral description, by use or in any other way'. The term 'available' clearly goes beyond literal or diagrammatical description, and implies a communication, express or implicit, of technical information by other means as well. In the case where a prior art document fails explicitly to disclose something falling within a claim, availability in the sense of Article 54 may still be established if the inevitable outcome of what is literally or explicitly disclosed falls within the ambit of that claim" (Reasons 2.1). As further stated in decision T 793/93 "in deciding what is or is not the inevitable outcome of an express literal disclosure in a particular prior art document, a standard of proof much stricter than the balance of probability, to wit 'beyond all reasonable doubt', needs to be applied. It follows that if any reasonable doubt exists as to what might or might not be the result of carrying out the literal disclosure and instructions of a prior art document, in other words if there remains a 'grey area', then the case on anticipation based on such a document must fail" (Reasons 2.1).

3.13 Since as indicated above D6 does not explicitly disclose the chlorine ion content of the latex of Example 1, the Appellant has relied on a reworking of Example 1 of D6 (cf. document D7) in order to establish that the chlorine ion content of the latex obtained in Example 1 of D6 was indeed not greater than 500 ppm.

3.14 This argument based on the reworking of Example 1 of D6 would however presuppose that this reworking is a true repetition of this example.

3.15 In that respect, the Board notes that according to column 5, lines 55 to 59 of the disclosure of Example 1 of D6, steam was blown through the aqueous dispersion at a rate of 4 percent per hour, based on the aqueous dispersion, while maintaining a reduced internal pressure of -500 to -600 millimeters of mercury to keep the aqueous dispersion at 60°C, and that this treatment removed unreacted residual monomers to such an extent that the aqueous dispersion contained not more than 10 ppm of unreacted residual vinylidene chloride monomer.

3.16 In this connection the Board observes, however, that at the same corresponding stage of the process according to D7, it is merely indicated that the temperature of the autoclave had been maintained during 5 hours under a reduced internal pressure of -500 to -600 mm of mercury. According to D7, this treatment has removed the unreacted residual monomers to such an extent that the aqueous dispersion contained not more than 10 ppm of unreacted residual vinylidene chloride monomer (cf. D7, page 2, lines 2 to 6). It is hence evident that no steam blowing treatment has been carried in D7 in contrast to Example 1 of D6.

3.17 The Board further observes that D6 is totally silent on the duration of the steam blowing treatment. Thus, in view of the differences between the heat treatment applied in Example 1 of D6 and the heat treatment in its alleged reworking in D7, it cannot be excluded that a significant difference in the amount of chlorine ions in the aqueous dispersions at the end of the respective stages of the process of Example 1 of D6 and the process of D7 due to the degradation of the vinylidene chloride polymer or the vinylidene chloride monomer and, hence, release of chlorine during the steam blowing in D6 might arise (cf. Section VII (ii.2.5, above)).

3.18 Since the steam blowing carried in Example 1 of D6 would modify the solid concentration of the aqueous dispersion during that treatment, this would also have for its consequence that the solid concentration at the end of the heat treatment of Example 1 of D6 would be lower than the solid concentration of the aqueous dispersion at the end of the heat treatment carried out in D7.

3.19 The Board also notes that D6 does not indicate either the temperature at which the electric conductivity of the obtained dispersion of Example 1 should be determined or the solid concentration of the obtained dispersion.

3.20 Since however, the electric conductivity of the aqueous dispersion is dependent on the temperature at which it is determined, and since the electric conductivity of the dispersion also depends on the chlorine ion concentration in the aqueous phase, the fact that at the end of the process of D7 the value of the conductivity at 23°C (2.24×10^{-3} $\Omega.cm^{-1}$) is close to the value indicated in D6 (2.5×10^{-3} $\Omega.cm^{-1}$) does not inevitably imply that similar aqueous dispersions have been obtained in both cases.

3.21 Furthermore, it cannot be excluded that the loss in electric conductivity due to a higher dilution in D6 might have been compensated by a higher amount of chlorine ions released during the steam treatment in D6. Since the solid concentration of the dispersion is lower in D6 than in D7, this would further contribute ***de facto*** to an increase of the chlorine ion content calculated on the total solid basis for Example 1 of D6.

3.22 Thus, in view of the lack of information in D6 concerning the temperature at which the conductivity of the aqueous dispersions should be determined, and taking further into account that the change in operative features concerning the heat treatment stage between D6 and D7 might have significant influence on the calculated value of the chlorine ion content based on the total solid content of the dispersion, it would, in the Board's view, remain a "grey zone" not only as to whether the chlorine ion content determined in D7 (i.e. 193 ppm) corresponds to the actual chlorine ion content of the aqueous dispersion prepared according to Example 1 of D6, but also as to whether the chlorine ion content of this aqueous dispersion was indeed not greater than 500 ppm.

3.23 In other words, the reworking of Example 1 of D6 by the Appellant cannot demonstrate beyond any reasonable doubt that the chlorine ion content of the vinylidene chloride based latex produced in that example was not greater than 500 ppm.

3.24 It follows from the above that neither D1 nor D6 discloses a vinylidene chloride based latex with a chlorine ion content based on the whole solid content of not greater than 500 ppm.

3.25 The further line of argument of the Appellant is essentially based on the submissions that chlorine ions should be considered as impurities in the claimed latex according to Claim 1, and that therefore the degree of purity of the claimed latex (i.e. chlorine ion content up to 500 ppm) cannot provide a new element over the vinylidene chloride based latex of the prior art (D1, D2, D6) since conventional purification methods such as dialysis were within the common general knowledge in that technical field in order to obtain that degree of purity. In that respect, it has relied on decision T 803/01.

3.26 Decision T 803/01 dealt with the novelty of a polymeric compound (polylactide) which was characterized by its degree of purity. In that respect, the Board observes (cf. T 803/01, Reasons point 4.5 to 4.6), that the considerations made in the decision T 803/01 were made in the context of the prior decision T 990/96 (OJ EPO, 1998, 489).

3.27 According to the decision T 990/96, in general, a document disclosing a low molecular chemical compound and its manufacture makes available this compound to the public in the sense of Article 54 EPC in all grades of purity as desired by a person skilled in the art since conventional methods for the purification of low molecular organic compounds are within his common general knowledge (Reasons point 7). Nevertheless, if a party alleges that this general rule would not be applicable in a particular case, then the burden of proving the existence of such an exceptional situation, e.g. of a situation where all prior attempts to achieve a particular degree of purity by conventional purification processes have failed, lies with the party who alleges the existence of such a situation (Reasons point 8).

3.28 In the Board's view, it follows firstly from the considerations made in the decision T 990/96 according to which a document disclosing a low molecular compound and its manufacture normally makes this compound allowable in all desired grades of purity, that the purity level of an organic compound is as such not an essential feature for the definition of this organic compound.

3.29 In the present case, it is however evident that the content of chlorine ion of the claimed latex is an essential feature of the claimed latex, since according to the patent in suit only the latexes having this low level of chlorine ions enable the production of films having the desired properties in terms of oxygen barrier properties and boil blushing properties. This implies that the claimed degree purity in terms of chlorine ion content cannot be considered as an arbitrary degree of purity but that it amounts to a purposive selection.

3.30 Thus, at least for this reason the considerations made in decision T 990/96 and, by way of implication, in decision T 803/01 do not apply to the present case.

3.31 Furthermore, it also follows from the considerations made in the decision T 990/96, that, before examining as to whether conventional purification processes described in the prior art would succeed or not in providing the requested degree of purity, it should, in the Board's view, firstly be checked, whether the desirability of obtaining the claimed grade of purity existed in the relevant prior art (cf. also T 100/00 of 7 March 2003; not published in OJ EPO; Reasons point 4.15).

3.32 While in the cases under consideration in T 803/01 and T 990/96, it might have been considered that, since the claimed compounds were to be used in pharmaceutical compositions, there were hence generally prevailing needs and requirements for highly pure compounds in that technical field, the Board is unable to discern the desirability of reducing the amount of chlorine ion to a very low content in the prior art documents D1 or D6.

3.33 Nor could this desirability be detected, in the Board's view, in document D2 for the following reasons:

3.33.1 While it is true as submitted by the Appellant that document D2 taught that inorganic salts should be eliminated or reduced from vinylidene chloride based latexes in order to improve the gas carrier properties of coatings made therefrom (page 6, lines 1 to 9), the Board can only state that there is no reference in D2 to the specific elimination or reduction of chlorine ion content.

3.33.2 This is also because the comparison between Reference Example 1 and Reference Example 2 in Table 3 of the patent in suit clearly shows that it is the amount of chlorine ion and not the amount of inorganic salts in the latex as such which is essential for the obtaining gas barrier properties and the haze properties, so that the desirability of reducing or eliminating inorganic salts cannot be equated to the desirability of reducing the amount of chlorine ions to very low levels.

3.34 It thus follows that there were neither prevailing needs nor requirements in the prior art documents for carrying out a purification step in order to reduce the amount of chlorine ion to such a very low level.

3.35 Consequently, in the absence of such prevailing needs or requirements, the further question as to whether conventional purification methods would have allowed or not to reach the requested purity level in terms of chlorine ion content does not even arise.

3.36 Thus, the Board can only come to the conclusion that the present inventor has really given the public something new, or, in other words, that there is a new element (i.e. chlorine ion content not greater than 500 ppm) in Claim 1 which imparts novelty over the prior art (cf. also T 801/03, Reasons point 4.3.3).

3.37 It follows from the above that the objection of lack of novelty raised by the Appellant must fail.

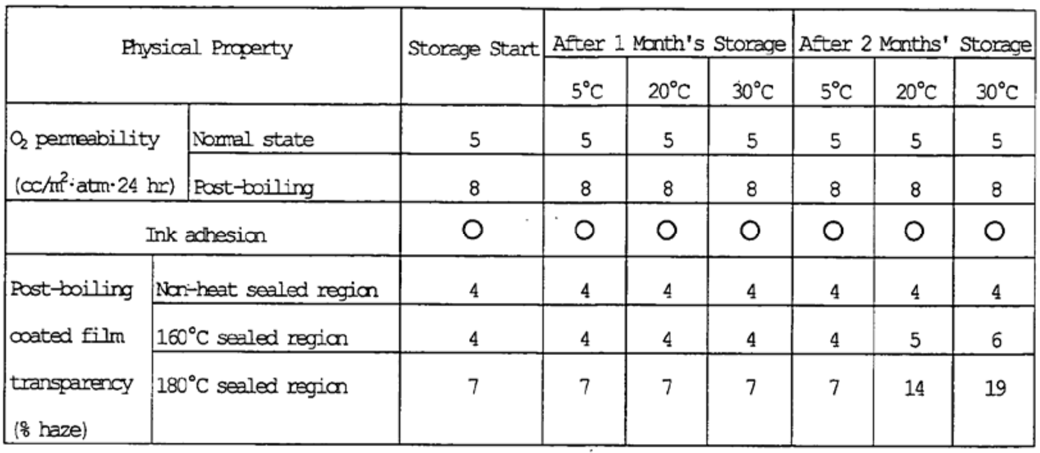
4. *Problem and solution*

4.1 The patent in suit is concerned with vinylidene based latexes which can be used in the manufacture of coatings.

4.2 Such latexes are known from document D1.

4.3 D1 in particular investigated the changes in physical properties of films coated with a vinylidene chloride based latex (Saran latex L530) after storage of the latex. According to D1, the oxygen permeability, resistance to boiling haze formation and ink adhesion were examined by varying the storage temperature and the storage time. According to D1, while no changes were observed in the physical properties, oxygen permeability or ink adhesion with storage at 5°C to 30°C for 2 months, as the storage temperature was increased, the haze value of the heat sealed region of the coated film increased with time.

4.4 The change in physical properties is shown in Table 1 of D1:



Physical Property		Storage Start	After 1 Month's Storage			After 2 Months' Storage		
			5°C	20°C	30°C	5°C	20°C	30°C
O_2 permeability (cc/m²·atm·24 hr)	Normal state	5	5	5	5	5	5	5
	Post-boiling	8	8	8	8	8	8	8
Ink adhesion		○	○	○	○	○	○	○
Post-boiling coated film transparency (% haze)	Non-heat sealed region	4	4	4	4	4	4	4
	160°C sealed region	4	4	4	4	4	5	6
	180°C sealed region	7	7	7	7	7	14	19

4.5 Document D1, as indicated above in paragraph 3.3 has also investigated the change with time in chlorine ion concentration in the latex depending on the storage temperature of the latex (cf. Fig.2).

4.6 As can be understood from the patent in suit its aim is to provide vinylidene chloride based latexes enabling the manufacture of coated films which undergo neither boil blushing (i.e. formation of haze) nor a decrease in gas barrier properties after hot water treatment (cf. patent in suit paragraph [0008]). According to the patent in suit, this aim could be achieved by reducing the amount of chlorine ions in the latex beyond a specific level.

4.7 Thus, since D1 deals with the problem of gas permeability and haze resistance of films made from vinylidene chloride based latexes and since it is the only document of the prior art which relates to the chlorine ion concentration of vinylidene chloride based latex, D1 represents in the Board's view, the most appropriate starting point for the assessment of inventive step.

4.8 Consequently, starting from D1, the technical problem might be seen in the provision of vinylidene chloride based latex enabling the manufacture of coated films having improved gas barrier properties and haze resistance properties.

4.9 According to the patent in suit, this problem is solved by the provision of vinylidene chloride based latex having a chlorine ion content of not greater than 500 ppm as defined in Claim 1.

4.10 In view of the comparison of the oxygen permeability after boiling and the boil blushing properties between a vinylidene chloride based latex having a chlorine ion content of 495 ppm (cf. patent in suit, Table 3, Example 1) and a vinylidene chloride latex having a chlorine ion content of 650 ppm (Table 3, Comparative Example 1), the Board is satisfied that the claimed measures provide an effective solution of the technical problem.

5. *Inventive step*

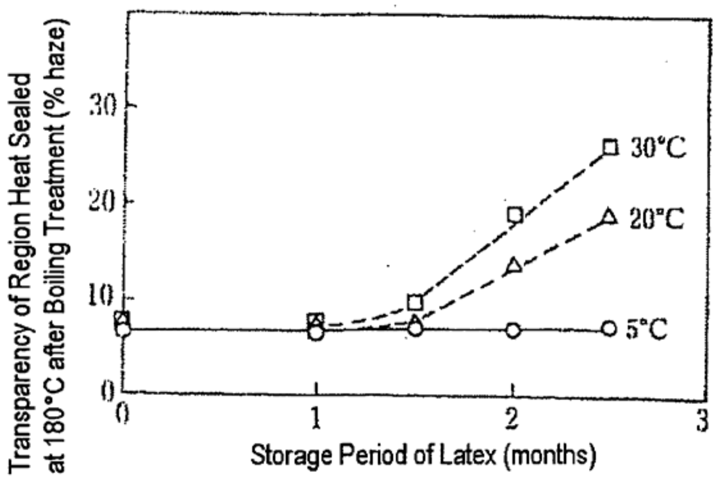
5.1 It remains to be decided whether the claimed subject-matter was obvious to a person skilled in the art in view of the prior art relied upon in that respect by the Appellant, i.e. documents D1 and D2.

5.2 As it is apparent from Table 1 of D1, no difference in the oxygen permeability can be detected between films which have been coated with the vinylidene chloride latex depending on the storage conditions (time and temperature) of the latex, i.e. the oxygen permeability of films coated with such latex remains the same during a storage of 2 months either at 5°C, 20°C, or 30°C.

5.3 However, as is also apparent from Figure 2 of D1, the chlorine ion concentration is very much higher after two months at 30°C (about 2000 ppm), than after two months at 20°C (about 1000 ppm) or 5°C (near to 500 ppm).

5.4 Thus, confronted with the information of both the Table 1 and Figure 2 of D1, the skilled person would only consider that the amount of chlorine ion in the latex had no influence on the oxygen barrier properties of the films coated therewith.

5.5 The Board also notes, in view of Fig 10 of D1,



that practically no differences exist in the haze properties of films prepared from latex stored for 1.5 months either at 5°C, 20°C or 30°C. A significant difference only become apparent after storage for 2 months at these temperatures.

5.6 Thus, the skilled person confronted with the additional information provided by Fig. 2 concerning the chlorine ion concentration of the latex after storage for 1.5 and 2 months at these temperatures, would consider that chlorine content of up to about 1000 ppm (cf Fig.2, 1.5 months storage at 30°C) of the latex have no influence on the haze properties of the films coated therewith.

5.7 This implies that there is absolutely no indication in D1 that a reduction of the chlorine ion content of the latex to 500 ppm or below would improve the gas barrier properties and the haze properties of the films made therewith.

5.8 Consequently D1 itself cannot provide any hint to the solution of the technical problem.

5.9 While D2, as indicated above in paragraph 3.33.1, teaches that a reduction of the inorganic salts in vinylidene chloride latex might improve the gas barrier properties of films coated therewith, it still remains that D2 contains absolutely no indication on the influence of the content of chlorine ion on these properties. Since it has been shown by the comparison between Reference Example 1 and Reference Example 2 that it is chlorine ion content and not the amount of inorganic salts as such which is decisive to the improvement of the gas barrier properties and the haze properties, the Board can only come to the conclusion that D2 cannot suggest the solution proposed in the patent in suit.

5.10 Thus, the subject-matter of Claim 1, and by the same token that of dependent Claims 2 to 4 must be regarded as involving an inventive step over the prior art relied on by the Appellant (Art. 56 EPC).

5.11 The Board notes that the Appellant has further raised an objection of lack of inventive against the subject-matter of Claim 5.

5.12 Claim 5 is inherently directed to a process for the manufacture of a vinylidene chloride latex in the ambit of Claim 1.

5.13 Since the latex according to Claim 1 is novel and inventive, and since the effect of a process manifests itself in the result, i.e. the product in chemical cases (cf. T 119/82, OJ EPO, 1984, 217), it thus follows that the subject-matter of Claim 5 can only be considered as novel and inventive (Art. 56 EPC).

5.14 This conclusion cannot be altered by the argument of the Appellant, in view of Comparative Example 5 of the patent in suit that Claim 5 encompasses subject-matter which does not solve the technical problem, and that hence Claim 5 lacked inventive step.

5.14.1 This essentially because Claim 5 is directed to a process for the manufacture of a latex having the required chlorine ion content.

5.14.2 Thus, if the technical features of the process described in that example do not allow to obtain a latex having the required chlorine ion content, it is evident that the process exemplified in that example does not fall under the scope of Claim 5, as further underlined by the adjective "comparative".

6. Since the main request of the Respondent is allowable, there is no need for the Board to deal with the auxiliary requests submitted with letter dated 24 October 2006.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:	The Chairman:
E. Görgmaier	R. Young