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**Datasheet for the decision  
of 22 October 2013**

**Case Number:** T 1367/10 - 3.3.03

**Application Number:** 02741509.0

**Publication Number:** 1390412

**IPC:** C08B31/00

**Language of the proceedings:** EN

**Title of invention:**

CROSS-LINKING OF STARCH

**Patent Proprietor:**

Coöperatie AVEBE U.A.

**Opponent:**

CARGILL, INCORPORATED

**Headword:**

**Relevant legal provisions:**

EPC Art. 54, 56

RPBA Art. 12(4)

**Keyword:**

Novelty - main request (yes)

Inventive step - main request (yes)

Late submitted material - document admitted (no)

**Decisions cited:**

G 0009/92, G 0004/93

**Catchword:**



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Case Number: T 1367/10 - 3.3.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.03**  
**of 22 October 2013**

**Appellant:**  
(Patent Proprietor)

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**Decision under appeal:**

**Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
13 April 2010 concerning maintenance of the  
European Patent No. 1390412 in amended form.**

**Composition of the Board:**

**Chairwoman:** B. ter Laan  
**Members:** O. Dury  
C. Brandt

## Summary of Facts and Submissions

I. The appeal by the patent proprietor lies against the decision of the opposition division posted on 13 April 2010 to maintain European patent N°. EP 1 390 412, based on application N°. 02 741 509.0 and corresponding to the international application published as WO 2002/088188, in amended form.

II. The granted patent was based on 15 claims, of which claims 1 and 5, the only claims relevant for the present decision, read as follows:

"1. Method for preparing a cross-linked starch, comprising reacting a starch material with a cross-linking agent, wherein the reaction takes place at a temperature between 5-75°C under semi-dry conditions, and wherein the moisture content during the cross-linking reaction is 1-25 wt.%, based upon the dry weight of the starch, above the equilibrium moisture content of the starch."

"5. Method according to any of the preceding claims, wherein the cross-linking agent comprises one or more compounds chosen from the group formed by trimetaphosphate (TMF), polymetaphosphates, epichlorohydrine, POCl<sub>3</sub>, N,N,-dimethylol-imidzolidon-2 (DMEU), adipic acid/acetic acid and cyanuric chloride."

III. A notice of opposition against the patent was filed on 13 March 2007, in which the revocation of the patent in its entirety was requested on the grounds of Art. 100 (a) EPC (lack of novelty as well as lack of an inventive step) and Art. 100 (b) EPC. During the opposition procedure the following documents were *inter alia* cited:

- D3: GB 787 026  
D7: US 2 801 242  
D10: EP-A-0 396 226  
D11: Kearsley M.W. and Dziedzic S.Z., Handbook of Starch Hydrolysis Products and their Derivatives, 1995, pages 6-11  
D12: Reynolds J.E.F., MARTINDALE The Extra Pharmacopoeia, 28. Edition, The Pharmaceutical Press, 1982, page 503  
D13: Food Ingredient Catalog, ADM Milling, 2009-2010, page 33  
D14: Product Datasheet, Whetstar®-4.

IV. The decision of the opposition division was based on an amended sets of claims as the main and two auxiliary requests. In its decision, the opposition division held *inter alia* that the main request was not novel over example 1 of D3 since all the claimed process steps were disclosed. The sodium metaphosphate used as the cross-linking agent was a trimetaphosphate, as could be concluded from page 2, lines 34-45 and the scheme below that passage. Example 1 of D10 also disclosed the claimed process since the described heating step fell within the claimed range and inevitably led to cross-linking.

The subject-matter of auxiliary request 1 lacked clarity (Art. 84 EPC).

Auxiliary request 2 complied with the requirements of Art. 123(2), Art. 54 and Art. 56 EPC and the patent was maintained on that basis.

The issue of sufficiency of disclosure (Art. 100(b) and 83 EPC) was not addressed.

- V. The opponent lodged an appeal against the above decision on 7 June 2010, which was however withdrawn by letter dated 15 November 2010.
- VI. On 14 June 2010, the patent proprietor (appellant) lodged an appeal against the above decision. The prescribed fee was paid on the same day. In its statement of grounds of appeal filed on 22 July 2010 the appellant requested that the decision of the opposition division be set aside and the patent in suit be maintained in amended form according to either the main request or any of auxiliary requests 1-3 filed therewith. A corrected version of auxiliary request 3 was filed by letter of 2 August 2013. Additional arguments were submitted with a letter dated 17 December 2010.

The main request was based on 13 claims of which claim 1 read as follows (amendments as compared to granted claim 1 are indicated in **bold** by the Board):

"1. Method for preparing a cross-linked starch, comprising reacting a starch material with a cross-linking agent, wherein the reaction takes place at a temperature between 5-75°C under semi-dry conditions, wherein the moisture content during the cross-linking reaction is 1-25 wt.%, based upon the dry weight of the starch, above the equilibrium moisture content of the starch, **and wherein the cross-linking agent is trimetaphosphate (TMF).**"

Claims 2-13 were dependent on claim 1.

- VII. In the communication issued on 18 March 2013 accompanying the summons to oral proceedings, the Board

set out its preliminary view of the case, referring *inter alia* to

D17: experimental report filed by the appellant with letter of 23 October 2007.

VIII. The oral proceedings took place on 22 October 2013 in the absence of the respondent, as announced by letter of 27 March 2013.

IX. The appellant's arguments relevant for the present decision may be summarised as follows:

*Main request*

Novelty

- a) Operative claim 1 was to be read as follows:
  - i) the wording of claim 1 imposed that the temperature of the reaction mixture should be 5-75°C throughout the process. This reading was confirmed by example 5 of the patent in suit;
  - ii) the "semi-dry conditions" were defined on the basis of the effective moisture content, knowing the equilibrium moisture content of the starch. The latter was well known in the art and further indicated in paragraph [0051] of the patent in suit. Example 3 showed how that determination could be done in practice;
  - iii) the term "trimetaphosphate (TMF)" had a generic meaning and was not limited to

sodium trimetaphosphate.

- b) The cross-linking agent used in example 1 of D3 was sodium metaphosphate, which was not a trimetaphosphate according to operative claim 1. Considering that D3 explicitly cited and illustrated sodium metaphosphate and sodium trimetaphosphate as two different compounds (page 2, lines 31 and 44-45), the argument of the opposition division and of the respondent that example 1 of D3 was carried out using a trimetaphosphate was not correct.

In example 1 of D3, a maize starch was dried to a moisture content of 12 wt.%, which was below the equilibrium moisture content of maize starch. Besides, it could not be excluded that the starch slurry reached a temperature higher than 75°C.

The finding of the opposition division that cross-linking took place in example 1 of D3 when the starch was dried to a moisture content of 12 wt.% was not supported by any evidence. On the contrary, D3 taught that the reaction with sodium metaphosphate led to a monostarch ester, not a cross-linked ester (reaction scheme on page 2, line 33). There was also no indication in D3 that cross-linking would take place prior to the second heat treatment performed at 120°C.

- c) D10 failed to disclose the equilibrium moisture content of the commercial product Whetstar-4 used in example 1. In that respect, D11-D13 disclosed moisture contents varying between 10 and 14 wt.%. The information on Whetstar-4 given in D13 and D14 could not concern the same product as used in D10



since those documents were published about 20 years after the publication of D10. Therefore, it could not be concluded that example 1 of D10 disclosed a starch having a moisture content as defined in operative claim 1.

D10 further failed to disclose directly and unambiguously that the working conditions of example 1 were as defined in claim 1 of the main request for the following reasons:

(i) it could not be recognized whether a composition having a moisture content according to operative claim 1 and comprising starch and a trimetaphosphate was present in said first zone;

(ii) it could not be excluded that the reaction mixture inside the extruder reached temperatures higher than 75°C. In that respect, the process of D10 was not limited to cross-linking but also led to plasticisation of starch and to the preparation of a glass-like starch. Furthermore, the cross-linking reaction was exothermic.

d) For those reasons, neither example 1 of D3 nor example 1 of D10 disclosed directly and unambiguously a method according to operative claim 1. Therefore, the main request met the requirements of Art. 54 EPC.

Inventive step

- e) D7, which dealt with a slurry process for preparing cross-linked starch using sodium trimetaphosphate at temperatures of 40-50°C, was the closest prior art.
- f) The problem to be solved as specified in the patent in suit was to provide a more economical process for cross-linking starch, i.e. a process that used less energy, less water, lower amounts of reagents and was faster than a slurry process.
- g) The solution of that problem resided in the method according to claim 1.
- h) The examples of the patent in suit and those of D17, which all illustrated the subject-matter of claim 1, showed that the problem was effectively solved. In that respect,
  - the drying step indicated on page 4, line 57 of the patent in suit took place at room temperature;
  - the moisture content used was derivable from the comparison of the moisture content specified in each example with the equilibrium moisture content of the corresponding starch given in paragraph [0051] of the patent in suit.
- i) D7 was primarily directed to a slurry process. Only example 9 of D7 disclosed a process carried out, in part, under semi-dry conditions but involving a drying step at 120-130°C. Therefore, D7 taught that cross-linking of starch by a trimetaphosphate could either be done under wet conditions or under semi-dry conditions but in the

latter case using high temperatures.

- j) The processes of D7 and D10 were so different that the skilled person would not have contemplated their combination.
- k) None of the cited documents indicated that it would be possible to cross-link starch by a trimetaphosphate under semi-dry conditions at a temperature between 5 and 75°C.
- l) Therefore, the main request satisfied the requirements of Art. 56 EPC.

X. With its statement of the grounds of the appeal submitted on 17 August 2010, the respondent argued a lack of novelty and inventive step only regarding the claims as maintained by the opposition division. After the withdrawal of its appeal, no further arguments were submitted, in particular not regarding the present main request. The arguments given in relation to the claims as maintained by the opposition division can, in so far as they are relevant to the present main request, be summarized as follows:

#### Novelty

- a) The sole novelty objection raised concerned the novelty over example 1 of D3. In that respect, the passage on page 2, lines 34-45 of D3 in combination with the reaction scheme shown below it, made clear that the term "metaphosphate" used in D3 meant "trimetaphosphate". Furthermore, the feature relating to the semi-dry conditions was non-limiting and did not exclude that said conditions were achieved by first adding water to

the dry starch followed by removing some of the added water to give a starch having the desired moisture content.

- b) Hence, the claimed subject-matter did not satisfy the requirements of Art. 54 EPC.

Inventive step

- c) Starting from D3, the problem to be solved was to increase the level of cross-linking in the starch. Since D3 taught that cross-linking could be improved by using metaphosphate at higher pH values, it was obvious to the skilled person to do so, in particular since D7 described the cross-linking of starch using trimetaphosphate in alkaline conditions. Therefore, the claimed subject-matter was not inventive.
- d) A further objection was made in respect of D3 in combination with two other documents filed with the respondent's statement of grounds of the appeal (now withdrawn), which are however not relevant for the present decision.

XI. The appellant agreed that auxiliary request 3 was superfluous since it corresponded to the version allowed by the opposition division. The appellant (patent proprietor) requested that the decision under appeal be set aside and the patent be maintained in amended form according to the main request or any of the auxiliary requests 1 and 2, all filed with the statement of grounds of appeal.

In its statement of grounds for the appeal, the respondent had requested the revocation of the patent.

After the withdrawal of its appeal no further requests were submitted.

XII. The Board announced its decision at the end of the oral proceedings.

### **Reasons for the Decision**

1. The appeal is admissible.

#### *Main request*

2. Novelty

2.1 The present main request is identical to the main request on which the contested decision is based. The subject-matter of claim 1 was held to be anticipated by example 1 of D3 and example 1 of D10.

2.2 D3 discloses a process for making a stable starch phosphate ester product containing mono-starch phosphate and or di-starch phosphate groups which comprises heating a starch product containing 5 to 20 per cent of moisture in contact with an inorganic phosphate at a pH of between 4 and 11.5 and at a temperature and for a time sufficient to effect the desired degree of esterification, said phosphate being selected from the group consisting of metaphosphates, polymetaphosphates, pyrophosphates, tripolyphosphates and mixtures thereof, said heating being carried out while permitting the evaporation of moisture (claim 1).

The process comprises four main steps, namely:

- preparation of a starch orthophosphate by reaction of starch with phosphate salts, of which reaction three types may be involved (page 1, line 62 to page 2, line 48): the first two reactions lead to mono-starch phosphate (reaction schemes at the top of page 2), while the third one leads to a di-starch phosphate i.e. a compound in which the phosphate group establishes a cross-link between two starch molecules (D3: page 2, lines 40 -48). The latter reaction is exemplified in the middle of page 2 of D3 using sodium trimetaphosphate as a cross-linking agent;
- drying under such conditions that the temperature of the starch phosphate does not exceed 60-70°C "until the moisture content has been reduced to 20 per cent" (page 3, lines 14-49);
- cross-linking at a temperature of 100-160 °C (page 3, lines 50-84). D3 further teaches that if cross-linking is desired, the degree of cross-linking primarily depends on the combination of type of phosphate reagent and pH range used, but also to a lesser extent on time, temperature and amount of phosphate reagent (page 3, lines 66-72);
- post-treatment (page 3, line 85ff).

2.2.1 Example 1 of D3 is carried out using "sodium metaphosphate" as cross-linking agent (D3: page 5, lines 55-58). D3 explicitly discloses on page 2, lines 28-33 that sodium metaphosphate is the chemical compound  $\text{NaPO}_3$ , which is not a trimetaphosphate (i.e. a cyclic compound of three phosphate units) according to operative claim 1.

Both the opposition division and the respondent considered that D3 referred to trimetaphosphate when

using the term metaphosphate. However, as explained in the paragraph above, D3 makes a clear distinction between sodium metaphosphate and sodium trimetaphosphate. The statement made in example 1 of D3 that 9 grams of sodium metaphosphate represented 0.09 moles (page 5, lines 66-67) confirms that the cross-linking agent used had a weight of about 100 g/mol and was therefore sodium metaphosphate (102 g/mol), not sodium trimetaphosphate (240 g/mol). Therefore, the argument that example 1 of D3 was carried out using sodium trimetaphosphate cannot be followed. Hence, already for that reason Example 1 of D3 cannot destroy the novelty of present claim 1.

2.2.2 Moreover, other features of the process now being claimed are also not clearly and unambiguously disclosed in example 1 of D3, which describes a process comprising the stages of preparation of the phosphate starch, drying and cross-linking (page 5: lines 57-62, 63-69 and 70-78, respectively).

Moisture content:

- (a) The moisture content during the first two stages of the process of example 1 of D3 (col. 5, lines 57-69), as calculated from the amounts of water (500 ml) and starch used (180 g of 10 per cent moisture content), does not correspond to "semi-dry conditions" as defined in operative claim 1, because the amount of water of more than 300 wt.% of the starch is far higher than the required 1-25 wt.% above the equilibrium moisture content.
- (b) D3 further fails to disclose the equilibrium moisture content of the corn starch used in example 1. Considering that said starch is dried

to a moisture content of 12 wt.% (D3: page 5, line 65) and that corn starch typically has an equilibrium moisture content of 13 wt.% (D11, Table 1.3), it can not be ascertained if in the process of example 1 of D3 the moisture content during the cross-linking reaction is as high as 1-25 wt.% above the equilibrium moisture content of the starch, as required by operative claim 1.

- (c) Therefore, example 1 of D3 does not disclose a process performed under semi-dry conditions according to operative claim 1.

#### Temperature

- (d) In the first steps of the process of example 1 of D3, the corn starch is air-dried to a water content of 12 wt.%. D3 does not indicate under which conditions said drying takes place. According to page 3, lines 24-27 of D3, temperatures of 49-124 °C (120-255°F) may suitably be used. Under these circumstances, it can not be ascertained whether or not in example 1 of D3 the reaction takes place at a temperature of 5-75°C, as required by operative claim 1. In that respect, the requirement specified on page 3, lines 36-45 of D3, according to which the temperature of the starch should not exceed 70 °C, is limited to a moisture content higher than 20 per cent i.e. no limitation is set to the temperature of the starch at lower moisture contents, including a moisture content as low as the 12 wt.% achieved in example 1.
- (e) Although in D3 it is indicated that the second drying step of example 1 is carried out at 120°C



(page 5, lines 70-71), no indication is provided regarding the temperature of the reaction mixture.

Therefore, it cannot be concluded that in example 1 of D3 the cross-linking reaction takes place at a temperature of 5-75°C as specified in operative claim 1.

- (f) The third stage comprises heating at 120°C, which is outside the temperature range of between 5-75°C according to present claim 1.

#### Cross-linking

- (g) Considering that D3 teaches that cross-linking does not mandatorily occur at temperatures below 100 °C (page 3, lines 55-58), in the absence of any evidence in that regard, it can also not be concluded that in example 1 of D3 any cross-linking of the starch effectively takes place prior to the heating step at 120°C.

2.2.3 Example 1 of D3, thus, does not directly and unambiguously disclose the subject-matter of claim 1.

2.3 D10 discloses a method comprising the step of treating a surface with particulates, wherein the particulates are glass-like polysaccharide particulates (claim 1). Example 1 of D10 discloses a method for preparing a cross-linked glass-like starch comprising extruding a mixture comprising starch, water, sodium trimetaphosphate and calcium carbonate in an extruder comprising three zones (Z1, Z2, Z3). The screw speed is 100 rpm and the zones are heated at temperatures of 10-15°C, 50°C and 80°C, respectively.

2.3.1 According to page 7, lines 23-24, Z1 is a feed zone adapted to receive both dry and liquid feeds. In the absence of any indication in D10 when, where and in which form (liquid or solid) the various components were added to the extruder, it can neither be concluded that a cross-linking reaction of starch effectively takes place in that zone, nor can it be determined if and where semi-dry conditions according to claim 1 are effectively achieved in zone Z1.

2.3.2 Furthermore, the method of operative claim 1 requires that the reaction takes place at a temperature between 5-75°C. Although the second zone Z2 of the extruder of D10 is held at 50°C, there is no information regarding the temperature of the starch mixture in the extruder.

In that respect, it should be considered that the cross-linking reaction is exothermic as indicated in paragraph [0027] of the patent in suit and as derivable from the difference in temperature between Zone 3 of the extruder - 80°C - and the extruded product - 103°C- reported in example 1 of D10. Also, the process of D10 is not limited to a mere cross-linking reaction in a batch reactor but takes place in an extruder, under conditions of shear force.

In addition, the process of D10 eventually leads to the preparation of a starch having a specific glass-like structure. There is no evidence on file regarding the effect of the reaction conditions necessary for that result on the effective temperature of the starch mixture in the extruder.

Under these circumstances, example 1 of D10 does not directly and unambiguously disclose that in the mixing

zone Z2 the reaction takes place at a temperature between 5-75°C.

2.3.3 Since in example 1 of D10 the extruded starch had a temperature of 103°C (page 7, line 38) the reaction temperature in the third zone Z3 of the extruder must have exceeded a temperature of 5-75°C as specified in operative claim 1.

2.3.4 Therefore, example 1 of D10 does not directly and unambiguously disclose the subject-matter of claim 1.

2.4 For these reasons, the main request fulfils the requirements of Art. 54 EPC.

3. Inventive step

3.1 Closest prior art

3.1.1 The patent in suit relates to a method for the cross-linking of starch (paragraph [0001]). Such methods are known from D7, which the appellant as well as the opposition division considered to be the closest prior art document.

3.1.2 D7 discloses a process for making di-starch (i.e. cross-linked; col. 1, lines 15 to 25) phosphate which comprises treating unswollen granule starch in aqueous slurry with a water soluble salt from the group consisting of metaphosphates and polymetaphosphates at a temperature sufficiently low to maintain the starch in the unswollen granule state for a time to effect the desired degree of esterification, the amount of said salt being at least about 0.01 percent, based on the dry weight of the starch (claim 1). The water soluble salt is preferably sodium trimetaphosphate (claim 2;

col. 3, lines 17-20). Temperatures between 40 and 50 °C are generally used (col. 3, lines 2-3).

Examples 1-8 and 10-11 disclose processes carried out using trimetaphosphate as cross-linking agent in a slurry of starch in water, i.e. processes carried out under wet conditions.

Example 9 of D7 discloses a process comprising two steps:

- the first step is carried out under semi-dry conditions using sodium tripolyphosphate (i.e. not a trimetaphosphate according to claim 1 of the main request) to prepare a phosphate starch (col. 9, lines 17-48). There is no evidence on file that cross-linking takes place when the phosphate starch is prepared. The process used in example 9 is very similar to that disclosed in D3 (in particular the first reaction scheme illustrated for tripolyphosphate on page 1, line 64 to page 2, line 27 and example 4 of D3), which was not shown to disclose unambiguously the formation of cross-linked starch using tripolyphosphate at temperatures of up to 75°C. Furthermore, the semi-dry conditions used in example 9 of D7 include a drying step of corn starch to a moisture content of 12 wt.%, which does not satisfy the requirement of present claim 1 (see last paragraph of section 2.2.2.b above);
- in a second step, the starch-phosphate prepared of the first step is cross-linked in a slurry, i.e. under wet conditions, using sodium trimetaphosphate (D7: col. 9, lines 49-56).

3.1.3 D7 represents, thus, a suitable starting point for the assessment of the inventive step.

3.1.4 D3, which was considered as the closest prior art by the respondent in respect of auxiliary request 2 on which the contested decision was based, is less relevant than D7, in particular because it provides less information regarding the process and because none of the examples of D3 was specifically performed using trimetaphosphate as a cross-linking agent. Therefore, D3 does not constitute a more appropriate closest prior art document.

### 3.2 Problem to be solved

According to paragraphs [0010] and [0014] and example 7 of the patent in suit the problem to be solved is to provide a more economical process for preparing cross-linked starch. In that respect, it is specifically indicated in paragraph [0014] that the economic advantages include low energy consumption (low temperature and water content), short processing time and low consumption of raw materials (water, reagents).

### 3.3 Solution

The solution to the problem identified above resides in the method defined in operative claim 1, the subject-matter of which differs from the process of D7 in that it is completely performed under semi-dry conditions as defined in claim 1 and in that it uses specifically a trimetaphosphate.

3.4 Success of the solution - Problem effectively solved

3.4.1 Taking into account that the appellant confirmed that the drying step specified in paragraph [0044] of the patent in suit took place at room temperature, all the examples of the patent in suit effectively illustrate the subject-matter of operative claim 1. In that respect, from the water content indicated in the examples and the equilibrium moisture contents specified in paragraph [0051] of the patent in suit it may be concluded that the processes were all carried out under semi-dry conditions according to operative claim 1.

While examples 1-6 of the patent in suit show that the processes effectively led to the preparation of cross-linked starch, example 7 demonstrates that a process as claimed is more economical than a slurry process in terms of consumption of energy, water and reagents (paragraphs [0058]-[0060]).

3.4.2 D17 concerns the comparison of a semi-dry process with a slurry process for the cross-linking of a potato starch using sodium trimetaphosphate, the latter reflecting the process of D7. Table 1 (page 2) of D17 shows that cross-linking effectively took place in both cases but that the semi-dry process was much faster. The results given in Table 2 of D17 further confirm that the semi-dry process allows to reduce the consumption of reagents.

3.4.3 During the oral proceedings before the Board the appellant confirmed that the term trimetaphosphate specified in claim 1 was to be read as a generic term (see section IX a), third paragraph). Although all the examples on file were performed using a single type of

trimetaphosphate as cross-linking agent, namely sodium trimetaphosphate, there is, in the absence of any evidence to the contrary, no reason to consider that the problem is not solved over the whole scope of the claims.

3.4.4 In view of the above, the technical problem identified in section 3.2 above can be considered as being effectively solved.

### 3.5 Obviousness

3.5.1 D7 deals with a process for cross-linking starch with a phosphate salt (col. 1, lines 43-53; claim 1) but did not recognise the possibility of using a trimetaphosphate and semi-dry conditions throughout the whole process as proposed by the patent in suit. The latter appears in particular from the fact that although example 9 of D7 comprises a process first performed under semi-dry conditions, an additional step carried out under wet conditions was held to be necessary in order effectively to cross-link the starch.

3.5.2 The processes of D7 and D10 are of a completely different nature, the process of D7 being a batch process and that of D10 an extrusion. Besides, D10 leads to the degradation of the starch as demonstrated by the colouration of the extruded product (D10: page 7, lines 39-40). Such degradation is, however, to be avoided for most applications (see paragraphs [0012] and [0013] of the patent in suit). Therefore, the teachings of D7 and D10 cannot be combined, in particular not in order to solve the technical problem addressed in the patent in suit.

3.5.3 None of the other documents cited in the proceedings indicates that it was known at the priority/filing date of the patent in suit that starch could be cross-linked with trimetaphosphate under semi-dry conditions at a temperature between 5 and 75°C as defined in claim 1. Hence, none of those documents can lead to the solution provided in operative claim 1.

3.5.4 For these reasons, the subject-matter of operative claim 1 is not obvious in the light of the prior art cited.

3.6 Therefore, the main request fulfils the requirements of Art. 56 EPC.

3.7 Article 83 EPC

In respect of the present main request, the respondent has not submitted any argument in support of its objection of lack of sufficiency, neither in the opposition, nor in the appeal proceedings. The contested decision also did not address sufficiency of disclosure in respect of any of the then pending requests.

Since the patent proprietor is now the sole appellant, the principle of no *reformatio in peius* applies and the issue of sufficiency of disclosure cannot be addressed (G 9/92 and G 4/93, both OJ 1994, 875).

4. Late filed documents

4.1 The respondent had filed two further documents during the appeal proceedings in respect of an objection of lack of inventive step of the claims as upheld by the opposition division. Arguments pertaining to their



relevance for the present main request have not been submitted. Since they are not prima facie more relevant for the present main request than the documents on file, they are not admitted into the proceedings (Art. 12(4) RPBA).

5. The main request of the appellant/patent proprietor being allowable, there is no need to consider the auxiliary requests.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to maintain the patent on the basis of the main request filed with the statement of grounds of appeal and after any necessary consequential amendment of the description.

The Registrar:

The Chairman:



E. Goergmaier

B. ter Laan

Decision electronically authenticated