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**Datasheet for the decision  
of 18 September 2014**

**Case Number:** T 1697/12 - 3.3.09

**Application Number:** 96943288.9

**Publication Number:** 0812873

**IPC:** C08J3/24, B29B9/00, C08J3/12

**Language of the proceedings:** EN

**Title of invention:**  
WATER ABSORBENT AND PROCESS AND EQUIPMENT FOR THE PRODUCTION  
THEREOF

**Patent Proprietor:**  
NIPPON SHOKUBAI CO., LTD.

**Opponents:**  
Evonik Degussa GmbH  
BASF SE

**Headword:**

**Relevant legal provisions:**  
RPBA Art. 12(4), 13(1), 13(3)  
EPC Art. 123(2), 84, 83, 52(1), 54(3), 56, 99(1)

**Keyword:**

Admissibility of request -  
request withdrawn before the opposition division  
Amendments - added subject-matter - clarity  
Sufficiency of disclosure  
Patentable invention  
Novelty  
Inventive step  
Late-filed document

**Decisions cited:**

G 0007/93, T 0435/91, T 0390/07, T 0624/08, T 2213/08,  
T 0593/09, T 2020/09, T 0495/10, T 1525/10, T 0553/11,  
T 0937/11

**Catchword:**

Sufficiency of claims with open-ended parameter ranges (point  
5.5 of the Reasons)



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Case Number: T 1697/12 - 3.3.09

**D E C I S I O N  
of Technical Board of Appeal 3.3.09  
of 18 September 2014**

**Appellant:**  
(Patent Proprietor)

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**Decision under appeal:**

**Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
25 May 2012 concerning maintenance of the  
European Patent No. 0812873 in amended form.**

**Composition of the Board:**

<b>Chairman</b>	W. Sieber
<b>Members:</b>	M. O. Müller
	K. Garnett
	J. Jardón Álvarez
	F. Blumer

## Summary of Facts and Submissions

- I. This decision concerns the appeals filed by all parties, namely opponent 01 (Stockhausen GmbH, later re-named to Evonik Stockhausen GmbH and subsequently merged into Evonik Degussa GmbH), opponent 02 (BASF Aktiengesellschaft, later re-named to BASF SE) and the patent proprietor (Nippon Shokubai Co., Ltd.), against the decision of the opposition division that European patent No. 0 812 873 as amended met the requirements of the EPC.
- II. The opponents had requested revocation of the patent in its entirety on the grounds that the claimed subject-matter did not constitute an invention as defined in Article 52(1) EPC and was neither novel nor inventive (Article 100(a) EPC), that the patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 100(b) EPC) and that the patent contained subject-matter which extended beyond the content of the application as filed (Article 100(c) EPC).

The documents submitted during the opposition proceedings included:

- D4: EP 0 450 923 A2;
- D7: WO 97/19116 A1;
- D19: EP 0 703 265 A1;
- D20: US 4,390,285; and
- D32c: US 6,414,214 B1.

III. In its decision, which was announced orally on 21 March 2012 and issued in writing on 25 May 2012, the opposition division did not admit D20 into the proceedings since it was considered not to be *prima facie* relevant. The main request was refused since the disclaimer in claim 1 was not clear and the subject-matter of claim 1 did not fulfill the requirements of Article 123(2) EPC.

Claims 1 and 2 of auxiliary request A, which was found allowable by the opposition division, read as follows:

"1. A water absorbing agent obtained by mixing and reacting hydrogel-forming water absorbing resin particles (a) containing a carboxyl group with a cross-linking agent (b) that reacts with said carboxyl group, wherein said resin particles (a) are obtained by polymerizing and cross-linking a hydrophilic monomer composed mainly of acrylic acid and/or salt of acrylic acid, characterized in that

$X \geq 25$  g/g and  
 $Y/X \geq 0.90$ ,

where X and Y respectively represent absorbency of said water absorbing agent under a pressure of 50 g/cm<sup>2</sup> before and after applying an impact force (B) to said water absorbing agent by giving predetermined vibration of 750 c.p.m for thirty minutes at 100 V/60 Hz to 30.0 g water absorbing agent and 10.0 g glass beads of 6 mm diameter put in a container, wherein the impact force (B) is applied as specified in paragraphs [0041] to [0046] of the published patent."

"2. A method of manufacturing a water absorbing agent, characterized in that it comprises the sequential steps of:

- (1) supplying a water absorbing resin containing a carboxyl group to a first area of an agitation type mixer of a continuous extruding method including at least one kind of agitating member, disposed around a rotational shaft inside a fixed cylinder, for applying a thrusting force to said water absorbing resin;
  - (2) dispersing said water absorbing resin in said first area;
  - (3) extruding said water absorbing resin to a second area in which said thrusting force is weaker than in said first area;
  - (4) mixing said water absorbing resin and an aqueous liquid in said second area;
- wherein said aqueous liquid contains a crosslinking agent that can react with said carboxyl group."

According to the opposition division, auxiliary request A met the requirements of Articles 123(2), 123(3), and 84 EPC. No objections were raised by the opponents under Article 83 EPC and the opposition division considered the requirements of this article to be met. The subject-matter of claim 1 was novel over D7 as there was no evidence that the water absorbing agent in example 6 of D7 had a ratio Y/X as required by claim 1. Finally, auxiliary request A was inventive. D19 constituted the closest prior art with regard to product claim 1. The problem solved in view of D19 was the provision of a water absorbing polymer showing a higher water absorption under load and maintaining this high absorption under load after application of an impact force. As there was no incentive in D19 to manufacture the water absorbing agent using a specific mixer as used in example 1 of the patent, D19 did not

render the claimed product obvious. As there was furthermore no incentive in D4 to use a mixer with different thrusting forces in the first and second area, D4 did not render the claimed product obvious either. As regards the claimed method, D4 was the closest prior art. The claimed method differed from D4 in that the thrusting force in the second area was weaker than in the first area. The objective problem was the provision of an alternative and there was no incentive in D4 to modify the mixer as disclosed in this document so as to provide different thrusting forces in a first and second area of the mixer. Therefore, the claimed method was inventive in view of this document. Finally the requirements of Article 52(1) EPC were met.

IV. On 23 July 2012, opponent 02 filed an appeal and, on the same day, paid the prescribed fee. The statement setting out the grounds of appeal was filed on 4 October 2012 together with:

D38: Affidavit of A. Schlecker, signed on 28 September 2012; and

D39: Experimental report of T. Pfeiffer, signed on 28 September 2012.

V. On 24 July 2012, the proprietor filed an appeal and, on the same day, paid the prescribed fee. The statement setting out the grounds of appeal was filed on 2 October 2012 together with a main request and auxiliary requests 1 to 6, figures I and II as well as:

D36a: Paint Shaker Instruction Manual, Toyo Seiki Seisaku-sho, Ltd, first edition, 1996, 16 pages; and



D37a: "Modern Superabsorbent Polymer Technology",  
F. L. Buchholz, A. T. Graham (ed.), New  
York, Chichester, Weinheim, Brisbane,  
Singapore, Toronto, 1998, 7 pages.

VI. On 25 July 2012, opponent 01 filed an appeal and, on the same day, paid the prescribed fee. The statement setting out the grounds of appeal, which was filed on 4 October 2012, included D38 and D39 (joint experiments with opponent 02) and:

D40: EP 0 471 463 A2.

VII. As the proprietor and the opponents are respectively appellants and respondents in the present proceedings, the board will for simplicity continue to refer to them as "the proprietor", "opponent 01" and "opponent 02" respectively.

VIII. A response was filed by the proprietor with its letter of 4 April 2013 together with auxiliary requests 7 to 11.

IX. Opponent 01 filed its response with letter of 19 April 2013 and opponent 02 with letter of 22 April 2013.

X. In reply thereto, the proprietor filed auxiliary requests 4a, 4b, 5a and 5b with letter of 30 August 2013.

XI. In its communication dated 14 April 2014, the board *inter alia* observed that claims 7 to 10 of the main request appeared to be based on claims 8 to 11 in conjunction with claim 6, all of the application as filed. As regards sufficiency of disclosure, the board

*inter alia* took the preliminary view that the opponents' objections as regards the humidity content and the definition of the impact force (B) were not convincing. The board furthermore commented on novelty, inventive step and the requirements of Article 52(1) EPC.

- XII. With letters dated 16 and 18 July 2014, opponents 02 and 01 filed their respective replies.
- XIII. With its letter of 8 August 2014, the proprietor filed new auxiliary requests 1 to 4, 4a, 4b, 5, 5a, 5b, and 6 to 8.
- XIV. On 18 September 2014, oral proceedings were held before the board. The opponents maintained all their requests. The proprietor maintained the main request and the auxiliary requests 1 to 4, 4a, 4b, 5, 5a, 5b, and 6 to 10, all filed during the written proceedings, and filed new auxiliary requests 11 and 12.

Claims 1 and 2 of the main request are identical to those of auxiliary request 1 (see below) except for the features defined in the main request as follows:  $P \geq 20$  g/g (claim 1) and  $X \geq 20$  g/g (claim 2).

Claims 1 to 3 of auxiliary request 1 read as follows:

"1. A water absorbing agent obtained by mixing and reacting hydrogel-forming water absorbing resin particles (a) containing a carboxyl group with a cross-linking agent (b) that reacts with said carboxyl group, wherein said resin particles (a) are obtained by polymerizing and cross-linking a hydrophilic monomer composed mainly of acrylic acid and/or salt of acrylic

acid, the water absorbing agent being characterized in that

$P \geq 25$  g/g and  
 $Q/P \geq 0.85$ ,

where P and Q respectively represent absorbency of said water absorbing agent under pressure of  $50 \text{ g/cm}^2$  before and after applying an impact force (A) to 5 g of said water absorbing agent sealed in a bag (35) by putting a predetermined load on said water absorbing agent by reciprocally moving a roller (36) of 4 kg in weight, wherein the impact force (A) is applied as specified in paragraph [0040] of the published patent."

"2. A water absorbing agent obtained by mixing and reacting hydrogel-forming water absorbing resin particles (a) containing a carboxyl group with a cross-linking agent (b) that reacts with said carboxyl group, wherein said resin particles (a) are obtained by polymerizing and cross-linking a hydrophilic monomer composed mainly of acrylic acid and/or salt of acrylic acid, the water absorbing agent being characterized in that

$X \geq 25$  g/g and  
 $Y/X \geq 0.90$ ,

where X and Y respectively represent absorbency of said water absorbing agent under pressure of  $50 \text{ g/cm}^2$  before and after applying an impact force (B) to said water absorbing agent by giving predetermined vibration of 750 c.p.m at 100 V/60 Hz to 30.0 g water absorbing agent and 10.0 g glass beads of 6 mm diameter put in a container, wherein the impact force (B) is applied as

specified in paragraphs [0041] to [0046] of the published patent."

"3. A method of manufacturing a water absorbing agent, being characterized in that it comprises the sequential steps of:

- (1) supplying a water absorbing resin containing a carboxyl group to a first area of an agitation type mixer of a continuous extruding method including at least one kind of agitating member, disposed around a rotational shaft inside a fixed cylinder, for applying a thrusting force to said water absorbing resin;
  - (2) dispersing said water absorbing resin in said first area;
  - (3) extruding said water absorbing resin to a second area in which said thrusting force is weaker than in said first area;
  - (4) mixing said water absorbing resin and an aqueous liquid in said second area;
- wherein said aqueous liquid contains a crosslinking agent that can react with said carboxyl group."

Each of auxiliary requests 2 to 4, 4a, 4b, 5, 5a, 5b, and 6 to 10 contained a claim which required the absorbency characteristics X and Y/X to be within the same limits as defined in auxiliary request 1, namely 25g/g and  $\geq 0.90$ , respectively.

Claim 1 of auxiliary request 11 corresponds to claim 2 of auxiliary request 1 except that the following is added at the end of the claim:

"wherein the water absorbing agent is obtainable by a manufacturing method comprising the sequential steps of:

- (1) supplying resin particles (a) to a first area of an agitation type mixer of a continuous extruding method including at least one kind of agitating member, disposed around a rotational shaft inside a fixed cylinder, for applying a thrusting force the resin particles (a);
- (2) dispersing the resin particles (a) in said first area;
- (3) extruding the resin particles (a) to a second area in which said thrusting force is weaker than in said first area;
- (4) mixing the resin particles (a) and an aqueous liquid containing the cross-linking agent (b) in said second area."

Claim 2 of auxiliary request 11 corresponds to claim 3 of auxiliary request 1.

Claims 1 and 2 of auxiliary request 12 correspond to claims 1 and 2 of auxiliary request 11 except that in claim 1, the crosslinking agent (b) has been specified to be selected from the group consisting of specific polyhydric alcohol compounds, epoxy compounds and polyfunctional amine compounds and salts thereof.

XV. As far as relevant to the present decision, the opponents' arguments can be summarised as follows:

- Main request

- The main request should not be admitted into the proceedings since a request containing the same claims 1 and 2 as the main request had been withdrawn before the opposition division so that a decision on these claims had been avoided.

- Auxiliary request 1
  - The combination of the requirement of claim 3 that a crosslinking agent was present in the aqueous liquid with the features of, in particular, claim 7 did not meet the requirements of Article 123(2) EPC. More specifically, the presence of a cross-linking agent in the aqueous liquid was disclosed in the application as filed only for large particles, while for small particles, as referred to in claim 7, water without any crosslinking agent was disclosed. This was confirmed by page 33, line 42 of the published application, where deionized water without any crosslinking agent was used for small particles.
  - Furthermore the combination of a lower limit of 25 g/g for the P and X value with a lower limit of 0.85 for the Q/P value (claim 1) and 0.90 for the Y/X value (claim 2) was not clearly and unambiguously derivable from the application as filed. The claimed combination was one out of nine possible combinations derivable from the application as filed and the P and X values were technically interrelated with the Q/P and Y/X ratios such that the P and X values could not be altered without changing the Q/P and Y/X ratios.
  - The invention defined in auxiliary request 1 was insufficiently disclosed. Firstly, the humidity content and the impact force (B) had not been properly defined in the patent. Secondly, the patent did not provide sufficient guidance to obtain a water absorbing agent with an absorbency under pressure P and X of 30 g/g,

which was the preferred value in the patent. More specifically, none of the examples led to a value P and X of 30 g/g and several examples even resulted in values below the lower limit of claims 1 and 2. There were numerous mixing parameters that were not specified in the patent. The skilled person thus had to carry out a research program to find suitable mixers in order to prepare a water absorbing agent with a P and X value of 30 g/g. Thirdly, the absorbency parameters P and X were defined in claims 1 and 2 by open-ended ranges which covered, e.g., values as high as 40 g/g and it was not possible to obtain such high values with the process disclosed in the opposed patent. The monopoly conferred by the claims was therefore not commensurate with the contribution the patent provided over the prior art.

- Auxiliary request 11
  - Auxiliary request 11 did not meet the requirements of Article 84 EPC. It was not clear whether the product obtained by a method different from the one specified in product-by-process claim 1 was covered by the claim. It was furthermore ambiguous as to what type of mixer had to be used according to product-by-process claim 1 to obtain the claimed product.
  - The invention as defined in auxiliary request 11 was not sufficiently disclosed since the skilled person did not know what mixer to use in the process referred to in product-by-process claim 1.

- Auxiliary request 11 did not meet the requirements of Article 52(1) EPC. Since a problem was defined in the patent without providing a solution in the claims, there was no invention in the sense of Article 52(1) EPC.
  
- The subject-matter of claim 1 of auxiliary request 11 lacked novelty over example 6 of D7. This example had been reworked in D38 and absorbency values X and Y/X within the claimed ranges were obtained. The proprietor's argument as regards the lack of information concerning the type of mixing in D7 was not convincing. This argument applied to the continuous process of the patent but not the batch process of example 6 of D7. This was not changed by the fact that the AUL63 value after the ball mill test measured in D38 differed from that reported in example 6 of D7 by more than 10%. More specifically, this difference was due to the difference in ball milling, rather than a difference between the products obtained by the process of D38 and that of example 6 of D7. In fact, for the three absorbency characteristics of the directly obtained product that were measured in D38, the deviation from the values reported in D7 was within the experimental error margin.
  
- The proprietor's argument that the opponent did not apply the test specified in claim 1 of auxiliary request 11 when determining the Y value of the product obtained in D38, should not be admitted into the proceedings.



- Auxiliary request 12
  - The invention as defined in auxiliary request 12 lacked sufficiency of disclosure. The opposed patent did not contain any example in which the claimed absorbency characteristics X and Y/X were obtained with a polyamine surface crosslinking agent as referred to in claim 1. It was therefore not credible that the required absorbency characteristics could be obtained with this surface crosslinking agent.
  - Auxiliary request 12 lacked novelty over example 6 of D7 in conjunction with claim 9. This claim disclosed polyamines as surface crosslinking agent and using this agent instead of the ethylene carbonate in example 6 of D7 would lead to the claimed subject-matter.
  - Finally, auxiliary request 12 lacked inventive step. D19, the closest prior art for the product of claim 1, did not disclose the claimed absorbency parameters X and Y/X. It could however be deduced from D19 that a higher absorbency under pressure and a better maintenance thereof was desirable. It was thus obvious on the basis of D19 to increase the X and Y/X values. Furthermore, all that was needed according to the patent to achieve the claimed X and Y/X values was homogeneous mixing and it was known already from D4 that homogeneous mixing had to be applied in order to achieve high absorbency under pressure. The claimed product thus was not inventive in view of D19 or D19 in combination with D4. The process of claims 2 to 9 differed from D4 as the closest prior art

in that the thrusting force applied in the second area of the mixer was lower than in the first area. The skilled person would however only have to change the mixer design in D4 to arrive at the claimed process such that this was not inventive in view of D4. Furthermore, the claimed process lacked inventive step in view of D4 in combination with D20, since D20 taught the skilled person to apply a weaker thrusting force in the second area of the mixer. Finally, an inventive step was also absent in view of D4 when considered in the light of D40. More specifically, the same turbulizer as applied in the process of example 1 of D4 was disclosed in the examples of D40, and by exchanging or reorienting some paddles of the turbulizer disclosed in D40 the skilled person would arrive at the claimed mixer. Since D20 and D40 were thus *prima facie* relevant, they should be admitted into the proceedings.

XVI. As far as relevant to the present decision, the proprietor's arguments can be summarised as follows:

- Main request
  - There had not been any intention to avoid a decision of the opposition division on the claims of the main request. Furthermore, the practice of boards of appeal of not admitting requests in appeal proceedings on the ground that they had been withdrawn before the department of first instance was a recent development which had emerged only in the last two years. The proprietor had therefore not been aware of this development when withdrawing the

"Modified Main Request" before the opposition division. Finally, according to T 937/11, it was permissible to have claim requests which had been withdrawn at first instance considered in appeal proceedings.

- Auxiliary request 1
  - Auxiliary request 1 met the requirements of Article 123(2) EPC. The presence of a crosslinking agent in the aqueous liquid was disclosed in claim 6 and page 69, lines 16 to 17 of the application as filed in general terms without any restriction as regards the particle size. The combination of this feature with small particles as referred to in claim 7 therefore did not violate the requirements of Article 123(2) EPC. Furthermore, also the combination of the P and X values with the Q/P and Y/X ratios in claims 1 and 2 was based on the application as filed. To arrive at the combinations as required by claims 1 and 2, the lower limit of P and X in claims 1 and 2 as filed, respectively, had simply to be increased to a value of 25 g/g and this higher value was highlighted in the application as filed.
  - The invention defined in auxiliary request 1 was sufficiently disclosed. The opponents' arguments as regards the humidity content were not relevant to sufficiency of disclosure. Furthermore, the patent contained sufficient instructions about how to apply impact force (B). Also the opponents' argument that the patent did not provide a teaching of how to obtain water absorbing agents with a P and X

value of 30 g/g was not convincing. The patent taught the skilled person to design the mixer such that the change in thrusting force between the first and second area was as great as possible in order to obtain high P, X, Q/P and Y/X values. The skilled person thus would have obtained a P and X value of 30 g/g by further increasing the change in thrusting force over that in examples 1 and 2. As regards even higher values, such as 40 g/g, it was true that P and X values of 40 g/g could not be obtained without difficulty by the skilled person. In the event that a water absorbing agent with a P value of 40 were invented in the future, this would be covered by claim 1. It would be perverse to include an upper limit for P and X in claims 1 and 2 since it was clear that P and X would increase in the future. Furthermore the focus of the patent was not on high P and X values but high ratios Q/P and Y/X.

- Auxiliary request 11

- The wording "a product obtainable by a method" also covered products obtained by a different method as long as these products had the same properties as the one obtained by the method specified in the claim. There was thus no ambiguity in this regard. There was also no ambiguity as regards the type of mixer. The mixer was defined in claim 1 by having a first and second area and by being designed such that the thrusting force in the second area was weaker than in the first area. Furthermore, the mixer had to be such that the claimed absorbency parameters were obtained.

- The invention defined in auxiliary request 11 was sufficiently disclosed. Due to the definition of the water absorbing agent of claim 1 by way of the process by which it was obtainable, the open-ended range for the parameter X in claim 1 was restricted in practice to those values obtainable with this process. By way of this process definition, the scope of claim 1 had become commensurate with the contribution the invention made over the prior art.
  
- Auxiliary request 11 was novel over example 6 of D7 since D38 could not prove that the absorbency characteristics X and Y/X of the product obtained in example 6 of D7 were as required by claim 1. According to the opposed patent, the type of mixing during surface crosslinking was decisive for the absorbency characteristics X and Y/X. Nevertheless, the example of D7 only disclosed thorough mixing without giving any details. Therefore, one could not be sure that the way the surface crosslinking agent was mixed with the water absorbent resin when reworking the example in D38 was identical to that in example 6 of D7 and consequently whether the absorbency characteristics as measured in D38 were those of the product obtained in example 6 of D7. Furthermore, the difference of more than 10% between the AUL63 value after the ball mill test obtained in D38 and that reported in example 6 of D7 rather proved that the absorbency characteristics of the product obtained in D38 were different from those in example 6 of D7. Moreover, example 6 of D7 as

well as the data provided by the opponents referred only to the absorbency characteristics of a certain particle size fraction obtained after sieving rather than the absorbency characteristics of the entire product. Finally, when determining the Y value of the product obtained in D38, the opponents did not apply the test specified in claim 1 of auxiliary request 11 since instead of moving the container backward and forward as specified in the claim, the mixer design applied by the opponents only allowed a rocking motion of the container. Consequently, it was not certain whether the absorbency ratio measured by the opponents corresponded to the Y/X ratio in claim 1.

- Auxiliary request 12
  - The invention as defined in auxiliary request 12 was sufficiently disclosed. Examples 1 and 2 of the patent showed that water absorbing agents with the claimed absorbency characteristics could be obtained with epoxy compounds as surface crosslinking agents. Since the absorbency characteristics did not depend on the chemical nature of the crosslinks, there was no reason to believe that the absorbency characteristics obtained in examples 1 and 2 with an epoxy compound as surface crosslinking agent could not be obtained with polyfunctional amine surface crosslinkers.
  - Auxiliary request 12 was also novel since there was no teaching in D7 to replace the specific surface crosslinking agent used in example 6 of D7 by polyamines.

- Auxiliary request 12 was also inventive. The problem underlying the subject-matter of claim 1 in the light of D19 was the provision of water absorbent agents showing a higher water absorption under pressure and a better maintenance thereof after application of an impact force. It was the process as defined in product-by-process claim 1 of the patent that provided for the first time the technical means to achieve what was disclosed as desirable in D19. D19 did not disclose the claimed process and did not suggest that by way of this process the claimed absorbency characteristics could be obtained. The product of claim 1 was therefore inventive in view of D19. The same applied with regard to the combination of D19 and D4, since D4 did not disclose the process as defined in claim 1 either. Finally, the claimed process was inventive over D4. There was no indication in D4 to change the design of the mixer such that the thrusting force in the second area was weaker than in the first area. The opponents' inventive step attack on the basis of D4 in combination with D20 was not convincing since D20 lay in a technical area completely unrelated to that of the opposed patent. Therefore, the opposition division was correct in not admitting D20. Finally, the opponents' arguments concerning D40 were not correct since the turbulizers used in D4 and D40 were not necessarily the same. Since D40 thus lacked any *prima facie* relevance, it should not be admitted into the proceedings.

XVII. The proprietor requested that the decision under appeal be set aside and the patent be maintained on the basis of

- the main request filed with letter of 2 October 2012; or any of
- auxiliary requests 1 to 4, 4a, 4b, 5, 5a, 5b, or 6 to 8, filed with letter of 8 August 2014; or any of
- auxiliary requests 9 or 10, filed with letter of 4 April 2013; or any of
- auxiliary requests 11 or 12 as filed on 18 September 2014 during the oral proceedings before the board.

XVIII. The opponents requested that the decision under appeal be set aside and the patent be revoked.

### **Reasons for the Decision**

1. The appeals are admissible.

Main request

2. Admissibility

2.1 The opponents requested that the main request be not admitted into the proceedings.

2.2 Claims 1 and 2 of the main request refer to a water absorbing agent being *inter alia* characterized in that the absorbency parameters P and X are at least 20 g/g.



These two claims with this lower limit of 20 g/g were also contained in the "Modified Main Request" filed before the opposition division. After the chairman of the opposition division had announced during the oral proceedings that claims 1 and 2 of this "Modified Main Request" lacked novelty, the proprietor withdrew this request and filed a "New Main Request" (page 9 of the minutes of the oral proceedings before the opposition division). In this "New Main Request", the lower limits for the parameters P and X in claims 1 and 2 were increased to 25 g/g.

- 2.3 According to Article 12(4) RPBA, the board has the discretion to hold inadmissible requests that could have been presented in the first instance proceedings.
- 2.4 In the present case, the proprietor could have filed in opposition proceedings, and in fact did file, a request with a lower limit of 20 g/g, namely in the form of the "Modified Main Request". By withdrawing this request, and by replacing it with a "New Main Request" with a lower limit of 25 g/g, the proprietor avoided a decision of the opposition division on claims with a lower limit of 20 g/g, as now present in the main request before the board.
- 2.5 During the oral proceedings before the board, the proprietor argued that it had tried to be cooperative with the opposition division and that it had had no intention to avoid a decision of the opposition division on claims with a lower limit of 20 g/g.

However, even though it may not have been the proprietor's intention to avoid a decision by the opposition division, the inevitable result of the withdrawal of the "Modified Main Request" was that a

decision thereon was avoided since it was not thereby the subject of the reasoned decision of the opposition division. Admitting the main request into the appeal proceedings would therefore mean that the board would have to decide on a request for which no reasoned decision had been given by the opposition division. The main purpose of appeal proceedings is, however, to review what has been decided at first instance and not to review what has not been decided (T 390/07, headnote 1 and points 1 to 3 of the Reasons; T 495/10, point 2.1.7 of the Reasons; and T 1525/10, point 2.3 of the Reasons).

- 2.6 The proprietor furthermore argued that the practice of not admitting requests on the ground that they had been withdrawn before the first instance was a new development. The proprietor had therefore not been aware of this development when withdrawing the "Modified Main Request" before the opposition division.

However, in T 390/07 of 20 November 2008 (headnote 1 and points 1 to 3 of the Reasons), *i.e.* more than three years before the proprietor withdrew its "Modified Main Request", a claim request had not been admitted by a board on the ground that it had been previously withdrawn in proceedings before the opposition division. Therefore, for this reason alone, the proprietor's argument is not convincing.

- 2.7 The proprietor finally argued that according to decision T 937/11, it is permissible to have claim requests which have been withdrawn at first instance considered on appeal.

It is true that in T 937/11 an auxiliary request, which had been withdrawn before the opposition division, was

re-filed and admitted in appeal. The case underlying T 937/11 is, however, different from the present one. The auxiliary request in that case contained the same critical issue as the main request before the opposition division. As set out in that decision (point 2.1 of the Reasons), the withdrawal of the auxiliary request did not therefore have the effect of avoiding a decision of the opposition division on this issue, since it was decided when issuing a reasoned decision on the main request.

- 2.8 The board therefore used its discretionary power according to Article 12(4) RPBA not to admit the main request into the appeal proceedings.

Auxiliary request 1

### 3. Admissibility

The claims of auxiliary request 1 differ from those of the main request in that the lower limits of the P and Q values in claims 1 and 2 have been increased to 25 g/g (see point XIV above). These lower limits are now identical to those present in the claims decided by the opposition division. The admissibility problem present as regards the main request thus no longer exists. Since, furthermore, none of the opponents raised any objection against the admissibility of auxiliary request 1, the board decided to admit this auxiliary request into the proceedings.

4. Allowability of amendments - Article 123(2) EPC

4.1 Claim 7

4.1.1 Claim 7 refers to a "method of manufacturing a water absorbing agent as defined in claim 3, being characterized in that said water absorbing resin has an average particle diameter of 10  $\mu\text{m}$  to 150  $\mu\text{m}$ ". Claim 3, on which claim 7 depends, contains the feature that an aqueous liquid applied in one of the steps of the claimed method contains a crosslinking agent that can react with the carboxyl group of the water absorbing resin ("wherein said aqueous liquid contains a crosslinking agent that can react with said carboxyl group"). This feature was added by way of amendment at the end of claim 3 as granted.

4.1.2 The opponents did not attack any of claims 3 or 7 as such under Article 123(2) EPC. What they argued, however, was that the combination of the amended feature of claim 3 that the aqueous liquid contains a crosslinking agent with the feature of claim 7 of a small particle size of 10 to 150  $\mu\text{m}$ , was not clearly and unambiguously derivable from the application as filed. More specifically, the presence of a crosslinking agent in the aqueous liquid as required by claim 3 was disclosed in the application as filed only for embodiments wherein the particles had an average particle diameter of 200 to 800  $\mu\text{m}$ , while for small particles, ie having an average particle diameter of 10 to 150  $\mu\text{m}$  as referred to in claim 7, water without any crosslinking agent was disclosed as the aqueous liquid. This was confirmed by page 33, line 42 of the published application, corresponding to page 143, lines 6 to 7 of the application as filed, where deionized water without any crosslinking agent was used for small particles. An

analogous objection was raised against claims 8 to 10 without, however, giving detailed arguments.

4.1.3 As not disputed by the opponents, the features of claims 7 to 10 are disclosed in claims 8 to 11 of the application as filed. The presence of a crosslinking agent in the aqueous liquid is disclosed in claim 6 as filed, which contains the feature that "said aqueous liquid contains a crosslinking agent that can react with said carboxyl group" and page 69, lines 16 to 17 of the application as filed, where it is stated that "Preferred as the aqueous liquid among them are pure water or water containing a small amount of crosslinking agent". These passages of the application as filed thus disclose the presence of a crosslinking agent in general terms without any restriction as regards the particle size. This is not altered by the passage referred to by the opponents (page 33, line 42 of the published application, see point 4.1.2 above), since this belongs to an example (example 13) of the application as filed and therefore does not imply that a crosslinking agent must be present in the aqueous liquid in the event that small particles are used.

4.1.4 For these reasons, the board considers the combination of the presence of a crosslinking agent as required by claim 3 with the feature of claim 7 of small particles (average particle diameter of 10 to 150  $\mu\text{m}$ ) to be based on the application as filed. For the same reason, and in the absence of any specific arguments from the opponents' side, the board considers the combination of claim 3 with claims 8 to 10 to be based on the application as filed.

4.2 Claims 1 and 2

4.2.1 The opponents' only further objection under Article 123(2) EPC was directed to claims 1 and 2. They argued that the combination of a lower limit of 25 g/g for the P and X value with a lower limit of 0.85 for the Q/P value (claim 1) and 0.90 for the Y/X value (claim 2) was not clearly and unambiguously derivable from the application as filed. The claimed combination was one out of nine possible combinations derivable from the application as filed and the P and, as evident from table 2, X values were technically interrelated with the Q/P and Y/X ratios such that the P and X values could not be altered without changing the Q/P and Y/X ratios.

4.2.2 Claims 1 and 2 as filed contain a combination of firstly P and X being at least 20 g/g with secondly Q/P being at least 0.85 (claim 1 as filed) and Y/X being at least 0.90 (claim 2 as filed). To arrive at the combinations as required by claims 1 and 2 of auxiliary request 1, the lower limits of P and X in claims 1 and 2 as filed, respectively, have to be increased to a value of 25 g/g. This higher value is disclosed as a preferred embodiment on page 25, lines 2 to 3 of the application as filed (this passage refers to P only, but P and X are identical; see the definition of P and X in claims 1 and 2, respectively). A pointer to high P and X values, ie high absorbency under pressure, is furthermore contained in page 11, last line to page 12, line 4 of the application as filed ("In view of the problems, objects of the present invention is [sic] to offer a water absorbing agent ... being capable of exhibiting high absorbency under pressure..."). These passages of the application as filed disclose the (desirability of) higher P and Q values in general

terms without any restriction as regards the Q/P and Y/P ratios.

The opponents' argument that table 2 of the application as filed proves that the P value cannot be varied independently from the Q/P ratio is not convincing since this table is only part of the example section of the application as filed. This table therefore does not constitute any teaching that a P value of at least 25 g/gram can only be obtained with a certain Q/P value.

4.2.3 The board therefore considers the combination of the requirement in claims 1 and 2 that P and X are at least 25 g/g with the requirement that Q/P and Y/X are at least 0.85 and 0.90, respectively, to be based on the application as filed.

4.3 Auxiliary request 1 thus meets the requirements of Article 123(2) EPC.

5. Sufficiency of disclosure

5.1 As set out above, claims 1 and 2 refer to a water absorbing agent being *inter alia* characterized in that the absorbency values P and X are at least 25 g/g and the absorbency ratios Q/P and Y/X are at least 0.85 and 0.90, respectively.

5.2 Opponent 02's first argument, which was only put forward in writing, was that the Q/P and Y/X ratios were strongly influenced by the humidity content of the water absorbing agent. Opponent 02 in this respect referred to the statement of the proprietor in the second paragraph of page 13 of its letter of 28 April 2005 as well as D32c.

However the statement of the proprietor refers to crush proofness and D32c to mechanical stability, such as frangibility. It is therefore at least doubtful whether the proprietor's statement or D32c establish that the Q/P and Y/X ratios indeed depend on the water absorbent agents' humidity. Furthermore, even if such a dependence was present and, as a result thereof, the Q/P and Y/X ratios were ambiguous, the opponents have not shown that this leads to any insufficiency of disclosure. It is noted in this respect that an ambiguity itself is not enough reason to deny sufficiency of disclosure (T 593/09; catchword).

- 5.3 Opponent 02's second argument, which was equally only put forward in writing, was that the opposed patent did not clearly define how the impact force (B) had to be applied to measure the Y/X value of claim 2. It was in particular unclear around which tilting axis the container had to be shaken during this measurement.

However, firstly, paragraph [0041] of the patent, which is referred to in claim 2, provides sufficient teaching to the skilled person on how the impact force (B) has to be determined. Secondly, no evidence has been provided that even if there is some degree of freedom in applying the impact force (B), it follows that the method of measuring the absorbency ratio is so unclear that insufficiency arises.

- 5.4 The opponents' third argument was that the patent did not provide sufficient guidance to obtain a water absorbing agent with an absorbency under pressure P and X of 30 g/g, which was the preferred value in the patent. More specifically, none of the examples led to a value P and X of 30 g/g and several examples even resulted in values below the lower limit of claims 1



and 2. There were numerous mixing parameters, e.g. the dimensions of the mixer, the mixing speed, the contact angle of the surface of the mixer, the deformation temperature and the throughput of the mixer that were not specified in the patent. The skilled person thus had to carry out a research program to find suitable mixers in order to prepare a water absorbing agent with a P and X value of 30 g/g.

- 5.4.1 The board acknowledges that not all examples of the patent (e.g. examples 4 and 5) lead to absorbency characteristics as claimed and that the P and X values obtained in examples 1 and 2, namely 26 g/g and 27 g/g (table 1), are lower than the value of 30 g/g referred to by the opponents.

The board does not however agree with the opponents that a research program would be necessary to achieve a P and X value of 30 g/g. The patent teaches the skilled person that mixing needs to be carried out so that the thrusting force changes as greatly as possible between the first and second areas of the mixer in order to obtain high P, Q/P, X and Y/X values (paragraphs [0126] and [0274]). The skilled person learns furthermore from the patent that the change in the thrusting force in examples 1 and 2, where the first mixing embodiment is applied, is greater than in examples 4 and 5, where the third mixing embodiment is used (paragraph [0273]). The skilled person would thus know from the patent that the higher X, P, Q/P and Y/X values obtained in examples 1 and 2, compared to those of examples 4 and 5, are due to the fact that the mixer of the first mixing embodiment with a higher change in thrusting force is used. The skilled person is thus taught by the patent to design the mixer such that the change in thrusting force between the first and second area is as great as

possible in order to obtain high P, X, Q/P and Y/X values. Therefore, the opponents' argument that a research program is needed to achieve an X and P value of 30 g/g is not accepted.

- 5.5 The opponent's fourth argument was that the absorbency under pressure parameters P and X were defined in claims 1 and 2 by open-ended ranges which covered, e.g., values as high as 40 g/g and that it was impossible to obtain such high values with the process disclosed in the opposed patent.
- 5.5.1 During the oral proceedings, the proprietor did not dispute that claims 1 and 2 covered water absorbing agents with values P and X that cannot be obtained with the process disclosed in the patent. The proprietor explained that no upper limit had been included in the claim since it was clear that water absorbent agents with increased absorbency under pressure would be invented in the future. Due to the absence of an upper limit, a water absorbing agent with a P value of, e.g., 40 g/g, if invented in the future, would be covered by claim 1.
- 5.5.2 In view of the proprietor's statements, there can be no doubt that claims 1 and 2 of auxiliary request 1 cover embodiments with an absorbency under pressure P and X which is not obtainable with the process disclosed in the patent, but which might be obtainable with different methods still to be invented in the future.
- 5.5.3 As set out in T 435/91 (OJ EPO 1995, 188, point 2.2.1 of the Reasons), it is a general legal principle that the protection covered by a patent should correspond to the technical contribution to the art made by the disclosure of the invention described therein. This

means that the patent monopoly should not be extended to subject-matter which, after reading the patent specification, will still not be at the disposal of the skilled person. The same principle was applied by the German Supreme Court (BGH) in a case where a claim defined a physical property by way of an open-ended range:

*"Eine ausführbare Offenbarung der Erfindung kann zu verneinen sein, wenn der geschützte Gegenstand im Patentanspruch durch offene Bereichsangaben für physikalische Eigenschaften über die dem Fachmann in der Gesamtheit der Unterlagen an die Hand gegebene Lösung hinaus so weit verallgemeinert wird, dass der Patentschutz über den Beitrag der Erfindung zum Stand der Technik hinausgeht."* See Xa ZR 100/05 of 25 February 2010, GRUR 2010, 414, headnote a).

(Translation by the board: sufficiency of disclosure can be denied if the subject-matter covered by a claim is generalised by open ranges for physical properties to such an extent over the solution made available to the skilled person on the basis of the specification as a whole that the patent protection extends over the contribution the invention makes over the prior art.)

- 5.5.4 Since, in the present case the claims cover embodiments that cannot be obtained with the process disclosed in the patent, but which might be obtainable with different methods still to be invented in the future, the monopoly claimed extends to subject-matter which, after reading the patent, would still not be at the disposal of the skilled person. The board therefore considers the invention as defined in claims 1 and 2 of auxiliary request 1 to be insufficiently disclosed.

5.5.5 The present board is aware that numerous decisions of the boards of appeal have acknowledged sufficiency of disclosure for claims with an open-ended range. The acknowledgement of sufficiency in these cases was however based on the ground that the open-ended ranges were implicitly limited by way of further features in the claim. For instance, in T 624/08 (point 3.2.2 of the Reasons) and T 2213/08 (points 6.3 to 6.5 of the Reasons), sufficiency was acknowledged for a claim in which an absorbency under load was defined by an open-ended range since this range was considered to be limited in practice by way of process features present in the claim. Similarly, sufficiency of disclosure was acknowledged in T 553/11 (point 4.6 of the Reasons) for a claim in which a water absorption capacity was defined by an open-ended range since this range was implicitly limited by the bulk density required by this claim.

The present case is different from these cases in that it was not argued by the proprietor that, and the board does not see any reason why, the P and X values in claims 1 and 2 are limited in practice by way of any of the further features present in these claims. The rationale applied by the boards in the above cases therefore does not apply in the present case.

Auxiliary requests 2 to 4, 4a, 4b, 5, 5a, 5b, and 6 to 10

## 6. Sufficiency of disclosure

Each of auxiliary requests 2 to 4, 4a, 4b, 5, 5a, 5b, and 6 to 10 contains the open-ended definition present in claim 2 of auxiliary request 1, namely that X is at least 25 g/g. For the same reasons as given above with regard to auxiliary request 1 (point 5.5 above), the

invention as defined in these auxiliary requests is insufficiently disclosed.

Auxiliary request 11

7. Admissibility

In the absence of any objections from the opponents, and for the same reasons as given above for auxiliary request 1 (point 3), the board admitted this request into the proceedings.

8. Clarity of amendments - Article 84 EPC

8.1 Claim 1 of auxiliary request 11 corresponds to claim 2 of auxiliary request 1 with the claimed water absorbing agent now being additionally defined as being obtainable by the manufacturing method as defined in claim 3 of auxiliary request 1 (see point XIV above).

8.2 The opponents argued that it was not clear whether the product obtained by a method different from the one specified in product-by-process claim 1 was covered by the claim.

The board does not find this argument persuasive. It is generally accepted practice at the European Patent Office that the wording "a product obtainable by a method" also covers products obtained by a different method as long as these products have the same properties as the one obtained by the method specified in the claim. There is thus no ambiguity in this regard.

8.3 The opponents furthermore argued that it was ambiguous as to what type of mixer had to be applied according to

product-by-process claim 1 to obtain the claimed product.

First of all, however, the type of mixer is defined in claim 1 by having a first and second area and by being designed such that the thrusting force in the second area is weaker than in the first area. Secondly, by way of the product-by-process formulation of this claim, it is clear that the type of mixer must be chosen such that the absorbency parameters X and Y/X of this claim are obtained in the product. There is therefore no ambiguity as regards the type of mixer.

8.4 Auxiliary request 11 therefore meets the requirements of Article 84 EPC.

9. Allowability of amendments - Article 123(2) EPC

Apart from the objections discussed above with regard to auxiliary request 1, the opponents had no further objections and the board is satisfied that the requirements of Article 123(2) EPC are met.

10. Sufficiency of disclosure

10.1 Due to the definition of the water absorbing agent of claim 1 of auxiliary request 11 by way of the process by which it is obtainable, the open-ended range for the parameter X in claim 1 is restricted in practice to those values obtainable with this process. By way of this process definition, the scope of claim 1 has become commensurate with the contribution the invention defined in this claim makes over the prior art. More specifically, the claim is now restricted to water absorbing agents obtainable by the key teaching of the patent, namely by a mixing process with a mixer having

a first and second area with the thrusting force in the second area being weaker than in the first area. Therefore, the lack of sufficiency of disclosure present with regard to auxiliary requests 1 to 10 is no longer present in auxiliary request 11.

This is in line with the above-discussed decisions of the boards of appeal T 624/08 and T 2213/08 as well as the above-discussed decision of the German Supreme Court (BGH) Xa ZR 100/05 of 25 February 2010, where sufficiency of disclosure was acknowledged after the claimed product had been further specified by the process by which it could be obtained (headnote b)).

10.2 The invention as defined in auxiliary request 11 is therefore considered to be sufficiently disclosed.

11. Article 52(1) EPC

11.1 Opponent 01 argued that since a problem was defined in the patent without providing a solution in the claims, there was no invention in the sense of Article 52(1) EPC.

Article 52(1) requires that "European patents shall be granted for any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application". Article 52(1) EPC nowhere requires that the invention as defined in the claims provides a solution to the problem addressed in the patent. The opponent's attack must therefore fail.

12. Novelty

12.1 The only novelty attack of the opponents was based on example 6 of D7. This example is also contained in the first priority document of D7 and therefore is prior art under Article 54(3) EPC.

12.2 In example 6 of D7 (pages 26 and 27 and table 1 on page 32), particles of a water absorbing resin obtained by polymerising and crosslinking acrylic acid, ethoxylated trimethylolpropanetriacrylate (TMPTA-3EO), an ester of acrylic acid with ethoxylated allyl alcohol (AA-10EO-A) and ethoxylated methoxypolyethylene glycol methacrylate (MPEG1000 MA) (corresponding to the water absorbing resin particles (a) of claim 1) are mixed with ethylene carbonate (corresponding to the crosslinking agent (b) of claim 1).

Example 6 of D7 does not disclose the X and Y/X values of the product obtained in this example. The opponents therefore reworked this example in D38 and measured the X and Y/X values. They obtained an X value of 25.7 g/g (first table on page 3 of D38) and an Y value of 25.4 g/g (second table on page 3 of D38), corresponding to an Y/X ratio of 0.99. Both, the X value and the Y/X ratio are within the ranges as defined in claim 1.

12.3 It was a matter of dispute between the parties whether in view of D38, the product of example 6 of D7 could be considered to show absorbency characteristics X and Y/X as required by claim 1.

12.3.1 The proprietor's first argument, which was put forward only in writing, was that example 6 of D7 as well as the data provided by the opponents in D38 referred only to the absorbency characteristics of a certain particle



size fraction obtained after sieving rather than the absorbency characteristics of the entire product.

The board does not find this argument persuasive since claim 1 does not contain any requirement that the absorbency characteristics cited therein refer to a product prior to any sieving operation having been performed.

12.3.2 The proprietor's second argument was that according to the opposed patent, the type of mixing during surface crosslinking was decisive for the absorbency characteristics X and Y/X. Nevertheless, the example of D7 only disclosed thorough mixing ("*unter kräftigem Durchmischen*", see the last line of page 26) without giving any details. Therefore, one could not be sure that the way the surface crosslinking agent was mixed with the water absorbent resin when reworking the example in D38 was identical to that in example 6 of D7 and consequently whether the absorbency characteristics as measured in D38 were those of the product obtained in example 6 of D7.

The board acknowledges that according to the opposed patent, mixing has to be carried out with a specific mixer. However, the patent refers to a continuous process (see "continuous extruding method" in claim 1 of auxiliary request 11) while, as not disputed by the proprietor, example 6 of D7 applies a batch process on a laboratory scale. Unlike a continuous process, which offers indeed a number of mixing variables, mixing in a batch process forms part of standard laboratory procedures with a very limited number of choices. It cannot be seriously argued that a person skilled in the art does not know how to carry out such batchwise

mixing in a laboratory. The proprietor's argument thus cannot be applied to the process in D7/D38.

- 12.3.3 The proprietor's third argument was that the difference of more than 10% between the AUL63 value after the ball mill test obtained in D38 (21.4 g/g) and that reported in example 6 of D7 (24 g/g) proved that the absorbency characteristics of the product obtained in D38 were different from those in example 6 of D7.

The board acknowledges that there is indeed a difference of more than 10% between the AUL63 value after the ball mill test in D38 and that reported in example 6 of D7. However, this value does not refer to the characteristics of the product directly obtained with the processes of D38 and of example 6 of D7 but refers to a characteristic of the products obtained after the products have been subjected to ball milling. Consequently, the differences between the two values could equally be due to the difference in ball milling, rather than a difference between the products obtained by the process of D38 and that of example 6 of D7. In fact, for the three absorbency characteristics of the directly obtained product that were measured in D38, the deviations from the values reported in D7 are less than 10%, *i.e.* within the experimental error margin (see "*Retention des Vorproduktes*", "*Retention des nachvernetzten Produktes*" and "*AUL 63-Wert vor dem Ball Mill Test*" in the first table on page 3 of D38).

- 12.3.4 In view of the above, the board considers it more likely than not that the absorbency characteristics X and Y/X measured in D38 are those of the product of example 6 of D7. This implies in turn that the product obtained in example 6 of D7 has absorbency characteristics X and Y/X as required by claim 1 and

thus is novelty-destroying for the subject-matter of claim 1 of auxiliary request 11.

- 12.4 During the oral proceedings, the proprietor advanced for the first time the argument that when determining the Y value of the product obtained in D38, the opponent did not apply the test specified in claim 1 of auxiliary request 11 since instead of moving the container backward and forward as specified in the claim (by reference to paragraph [0041]), the mixer design applied by the opponent only allowed a rocking motion of the container.

The opponents requested that this objection be not admitted into the proceedings.

As not disputed by the proprietor, this objection was raised for the first time during the oral proceedings before the board. This objection raised complex new issues as regards the way the container could be moved in the test design applied by the opponents, which the opponents and the board could not be expected to deal with during the oral proceedings. The board therefore decided not to admit this objection into the proceedings (Articles 13(1) and (3) RPBA).

Auxiliary request 12

### 13. Admissibility

In the absence of any objections from the opponents, and for the same reasons as given above with regard to auxiliary request 1, the board admitted this request into the proceedings.

14. Allowability of amendments - Articles 84 and 123(2) EPC

14.1 Apart from the objections discussed above with regard to auxiliary requests 1 and 11, the opponents had no further objections and the board is satisfied that the requirements of Articles 84 and 123(2) EPC are met.

15. Sufficiency of disclosure

15.1 Claim 1 of auxiliary request 12 differs from claim 1 of auxiliary request 11 in that the crosslinking agent (b) has been specified to be selected from the group consisting of specific polyhydric alcohol compounds, epoxy compounds and polyfunctional amine compounds and salts thereof.

15.2 The opponents argued that the opposed patent did not contain any example in which the claimed absorbency characteristics X and Y/X were obtained with a polyamine surface crosslinking agent. It was therefore not credible that the required absorbency characteristics could be obtained with this surface crosslinking agent.

The board does not find this argument persuasive. Examples 1 and 2 of the patent show that water absorbing agents with the claimed absorbency characteristics can be obtained with epoxy compounds as surface crosslinking agents (ethylene glycol diglycidylether). The absorbency characteristics are, e.g., determined by the amount of fine particles (see for instance paragraph [0007] of the opposed patent), the surface area of the particles (see for instance paragraph [0010] of the opposed patent) and the amount of agglomerates or gel (paragraph [0022] of the opposed patent). These variables are all related to the

macroscopic properties of the water absorbing agents rather than the chemical nature of the surface crosslinks. There is therefore no reason to believe that the absorbency characteristics obtained in examples 1 and 2 with an epoxy compound as surface crosslinking agent cannot be obtained with polyfunctional amine surface crosslinkers.

15.3 The invention as defined in auxiliary request 12 is thus sufficiently disclosed.

16. Article 52(1) EPC

For the same reason as given above with regard to auxiliary request 11, the board considers the requirements of Article 52(1) EPC to be met.

17. Novelty

17.1 The surface crosslinking agent used in example 6 of D7 is ethylene carbonate. This is different from the surface crosslinking agents now required in claim 1. The opponents argued that claim 9 of D7 disclosed polyamines as surface crosslinking agents, corresponding to one of the claimed surface crosslinking agents. The subject-matter of claim 1 thus lacked novelty in view of example 6 in conjunction with claim 9 of D7.

17.2 The board does not agree. Example 6 of D7 explicitly discloses ethylene carbonate as the surface crosslinking agent. There is no teaching in D7, either in example 6 itself or in the remaining part of this document, to replace this specific surface crosslinking agent of this example by polyamines. The subject-matter of claim 1 is therefore novel over D7.

17.3 As not disputed by the opponents, D7 does not disclose the method as defined in claims 2 to 9. The subject-matter of these claims is thus novel over D7 as well.

18. Inventive step

18.1 The invention as referred to in claim 1 concerns water absorbing agents with high absorbency under pressure with this high water absorption performance being maintained even after the agents have, for example, been transported in a manufacturing plant or have been processed into end products by the user or have been used in any manner in end products (page 4, lines 23 to 27 of the opposed patent).

18.2 Inventive step of the product of claim 1

18.2.1 The only inventive step objection made by the opponents against the product of claim 1 was based on D19 as the closest prior art.

As not disputed by the proprietor, the absorbency characteristics X and Y/X of claim 1 of auxiliary request 12 are not disclosed in the priority document of the opposed patent. Claim 1 of auxiliary request 12 does therefore not enjoy the priority of the opposed patent. The relevant date of claim 1 is thus the filing date of the opposed patent, namely 25 December 1996, which is after the publication date of D19. D19 thus is prior art under Article 54(2) EPC for claim 1.

D19 refers to water absorbing agents that show high absorption of aqueous liquids and that are abrasion resistant (page 3, lines 1 to 4). As is apparent from the examples of D19, abrasion resistance means the

maintenance of the absorption under load after an abrasion test. Therefore, in line with the arguments made by all parties, D19 can be considered to represent the closest prior art.

D19 discloses hydrogel particles which are made preferably from acrylic acid and methacrylic acid, which are surface crosslinked by, e.g., polyamines and which are coated with a water insoluble polymer film (page 3, lines 2 to 4, page 4, lines 27 to 31, and page 5, line 18 and lines 48 to 53).

D19 does not disclose the absorbency parameters X and Y/X of claim 1. D19 does not disclose either any process that is similar, let alone identical to that of claim 1. It cannot therefore be assumed in the opponents' favour that the products obtained in D19 have X and Y/X parameters within the claimed ranges. The product of claim 1 must therefore be assumed to differ from those of D19 in that it has a higher absorbency under pressure (higher X value) and a better maintenance of this high absorption under pressure after application of an impact force (higher Y/X ratio).

18.2.2 The problem underlying the subject-matter of claim 1 in the light of D19 can thus be seen in the provision of water absorbent agents having a higher water absorption under pressure and a better maintenance thereof after application of an impact force.

18.2.3 As a solution to this problem, the patent proposes a water absorbing agent according to claim 1 characterized in that it has an X value of at least 25 g/g and an Y/X ratio of at least 0.90 and in that it is obtainable by means of a mixer with a first and

second area, in which the thrusting force in the second area is weaker than in the first one.

18.2.4 It is explained in paragraphs [0091] and [0092] of the opposed patent that in a conventional mixer, a thrusting force of only one strength is applied and that this leads to products that do not maintain their water absorbing characteristics whereas in the process according to the invention (and as defined in claim 1), a mixer is used creating two different thrusting forces in a first and second area. It is confirmed by examples 1 and 2 of the patent that with a mixer according to figure 1 of the opposed patent, which exerts a lower thrusting force in the second area, water absorbing agents with X and Y/X values within the claimed ranges are obtained (X is 27 g/g and 26 g/g (table 1), respectively and Y/X is 0.96 and 1.00, respectively (table 3)).

It is thus credible that the above problem has been solved by using the mixing process as defined in product-by-process claim 1

18.2.5 It remains to be examined whether the claimed solution is obvious in view of the cited prior art.

The opponents argued that it could be deduced from D19 that a higher absorbency under pressure and a better maintenance thereof was desirable. It was thus obvious on the basis of D19 to increase the X and Y/X values.

This argument is however not persuasive. It is the process as defined in product-by-process claim 1 of the patent that provides the technical means to achieve what is disclosed as desirable in D19. D19 does not disclose this process, let alone suggest that by way of



this process the claimed absorbency characteristics can be obtained. In fact, D19 rather suggests coating the water absorbing resin particles with a non-reactive water insoluble polymer (page 3, lines 2 to 4), which is entirely different from the process of claim 1. The skilled person starting from D19 and trying to improve the absorbency characteristics X and Y/X would thus have had no reason to apply the claimed process and thus would not have obtained water absorbing resins with the claimed absorbency characteristics. The product of claim 1 is therefore inventive in view of D19.

- 18.2.6 The opponents furthermore argued that all that was needed according to the patent to achieve the claimed X and Y/X values was homogeneous mixing. It was already known from D4 that homogeneous mixing had to be applied in order to achieve high absorbency under pressure.

The board does not consider this argument to be persuasive. As can be deduced from figure 1 of D4, the mixing in D4 is effected by a mixer in which the distribution of agitating members is uniform over the entire rotational shaft of the mixer, implying the application of one single thrusting force. As acknowledged by the opponents, the claimed process differs from that disclosed in D4 in that the thrusting force applied in the second area of the mixer is lower than in the first area. As furthermore set out above (point 18.2.4), the application of one single thrusting force leads to inferior absorbency characteristics X and Y/X. Hence, even if the skilled person had applied the process of D4 in D19, he would not have arrived at the claimed product. Therefore, the product of claim 1 is not rendered obvious by a combination of D19 in combination with D4.

18.3 The method of claims 2 to 9

18.3.1 Apart from using D4 as a secondary document in their inventive step attack against the product claim, the opponents used D4 as the closest prior art in their inventive step attack against the process of claim 2 to 9.

In the same way as the process of claims 2 to 9, D4 relates to a method of treating the surface of an absorbent resin (page 2, line 1). Therefore in line with the opponents' argument, D4 can be considered to represent the closest prior art with regard to the claimed process.

As set out above (point 18.2.6), the claimed process differs from that disclosed in D4 in that contrary to D4, the thrusting force applied in the second area of the mixer is lower than in the first area.

18.3.2 As equally set out above (point 18.2.4), by way of this process difference, increased X and Y/X values are obtained, such that the objective technical problem is the provision of water absorbent agents showing a higher water absorption under pressure (X) and a better maintenance thereof after application of an impact force (Y/X).

18.3.3 There is no indication in D4 to change the design of the mixer such that the thrusting force in the second area is weaker than in a first area, let alone is it suggested that by means of this measure, the absorbency characteristics X and Y/X can be increased. Therefore the subject-matter of claims 2 to 9 is inventive in view of D4.

18.4 Admissibility of D20 and D40

18.4.1 The opponents argued that the process of claim 2 lacks inventive step in view of D4 in combination with D20. The opponents requested in this respect that the decision of the opposition division not to admit D20 be set aside since, contrary to the opposition division's judgement, this document is *prima facie* relevant.

18.4.2 As set out in G 7/93 (OJ EPO 1994, 775, point 2.6 of the Reasons), a board of appeal should only overrule the way in which a first instance department has exercised its discretion if it comes to the conclusion either that the first instance department in its decision has not exercised its discretion in accordance with the right principles, or that it has exercised its discretion in an unreasonable way, and has thus exceeded the proper limits of its discretion.

18.4.3 D20 is in a technical area that is completely unrelated to that of the opposed patent. More specifically, D20 refers to a method of gluing woodchips (title and column 1, lines 4 to 10) while the opposed patent deals with the preparation of water absorbing agents. The skilled person starting from D4 and being confronted with the problem of increasing the absorbency parameters X and Y/X of the water absorbing agent of D4 would therefore not have turned to D20. Therefore, in not admitting D20 for lack of *prima facie* relevance, the opposition division exercised its discretion in accordance with the right principles in a reasonable way. The board therefore maintained the opposition division's decision not to admit D20 into the proceedings.

18.4.4 D40 was used by the opponents to attack inventive step of process claim 2 in view of D4. More specifically, the opponents argued that the same turbulizer as applied in the process of example 1 of D4 was disclosed in the examples of D40, and that by exchanging or reorienting some paddles of the turbulizer disclosed in D40, the skilled person would arrive at the claimed mixer. The claimed mixing process was thus obvious in view of D4 in the light of D40.

The proprietor requested that D40 be not admitted.

D40 was submitted by opponent 01 with its grounds of appeal (letter of 4 October 2012), *i.e.* after the nine-month time limit under Article 99(1) EPC. D40 thus was filed late. As set out in T 2020/09 (point 6.2. of the Reasons), it is therefore at the board's discretion not to admit this document if it lacks *prima facie* relevance.

In example 1 of D4, a "Turbulizer 1" produced by Hosokawa Micron K.K. is used. In the examples of D40, "Turbulizer intensive mixer Model TCJS-8" is applied. There is no evidence that the two turbulizers are identical. The opponents' arguments which start from the assumption that the two turbulizers used in D4 and D40 are identical must thus fail, such that D40 lacks any *prima facie* relevance. The board therefore decided not to admit D40 into the proceedings.

18.5 The subject-matter of the claims of auxiliary request 12 is thus inventive.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent on the basis of claims 1 to 9, according to auxiliary request 12 as filed during the oral proceedings of 18 September 2014, and after any necessary consequential adaptation of the description and the drawings.

The Registrar:

The Chairman:



M. Cañueto Carbajo

W. Sieber

Decision electronically authenticated