

**Internal distribution code:**

- (A) [ - ] Publication in OJ  
(B) [ - ] To Chairmen and Members  
(C) [ - ] To Chairmen  
(D) [ X ] No distribution

**Datasheet for the decision  
of 27 May 2014**

**Case Number:** T 0842/10 - 3.3.03

**Application Number:** 98302876.2

**Publication Number:** 0872491

**IPC:** C08F8/00, A61L15/00

**Language of the proceedings:** EN

**Title of invention:**

Pressure-resistant absorbent resin, disposable diaper using the resin and absorbent resin, and method for production thereof

**Patent Proprietor:**

NIPPON SHOKUBAI CO., LTD.

**Opponents:**

BASF SE  
Evonik Degussa GmbH

**Relevant legal provisions:**

EPC Art. 100(c), 123(2)

**Keyword:**

Amendments - added subject-matter (yes) (All requests)



**Beschwerdekammern  
Boards of Appeal  
Chambres de recours**

European Patent Office  
D-80298 MUNICH  
GERMANY  
Tel. +49 (0) 89 2399-0  
Fax +49 (0) 89 2399-4465

Case Number: T 0842/10 - 3.3.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.03**  
**of 27 May 2014**

**Appellant:** NIPPON SHOKUBAI CO., LTD.  
(Patent Proprietor) 1-1, Koraibashi 4-chome  
Chuo-ku  
Osaka-shi, Osaka-fu 541 (JP)

**Representative:** Bassil, Nicholas Charles  
Kilburn & Strode LLP  
20 Red Lion Street  
London WC1R 4PJ (GB)

**Respondent:** BASF SE  
(Opponent 1) Patentabteilung - C6  
Carl-Bosch-Strasse 38  
67056 Ludwigshafen (DE)

**Respondent:** Evonik Degussa GmbH  
(Opponent 2) Rellinghauserstrasse 1-11  
45128 Essen (DE)

**Representative:** Herzog, Martin  
Herzog Fiesser & Partner Patentanwälte PartG mbB  
Immermannstraße 40  
40210 Düsseldorf (DE)

**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 25 February  
2010 revoking European patent No. 0872491  
pursuant to Article 101(3)(b) EPC.**

**Composition of the Board:**

**Chairman** B. ter Laan  
**Members:** D. Marquis  
C. Vallet

## Summary of Facts and Submissions

I. The appeal by the patent proprietor lies from the decision of the opposition division posted on 25 February 2010 revoking European patent N° 0 872 491 based on application number 98 302 876.2.

II. The application as originally filed contained nine claims of which claims 6 and 8 read as follows:

"6. A pressure-resistant absorbent resin manifesting a ratio of water absorption capacity under pressure of 30 g/g or more to artificial urine under a load of 50 g/cm<sup>2</sup>, and a pressure-resistant absorption ratio of 0.6 or more, wherein said pressure-resistant absorption ratio is defined as the ratio of said ratio of water absorption capacity under high pressure to artificial urine under a load of 100 g/cm<sup>2</sup> to a ratio of water absorption capacity under pressure to artificial urine under a load of 50 g/cm<sup>2</sup>."

"8. A method for the production of an absorbent resin, characterized by adding a compound having plural of functional groups capable of reacting with a group represented by formula -COOR in which each R is independently hydrogen atoms, metal atoms or ammonium to an absorbent cross-linked polymer having a -COOR group of 12 mmol/g or more and a molecular ratio of -COOH/-COOR of not more than 0.5 and heating the resultant mixture."

Claims 1, 2 and 3 were independent claims directed to an absorbent resin. Claims 4 and 5 were directed to preferred embodiments of claim 3. Claim 7 was directed to a disposable diaper. Claim 9 was directed to a

preferred embodiment of claim 8.

III. The patent was granted with a set of fourteen claims of which claims 1 and 12 read as follows:

"1. A pressure-resistant absorbent resin obtained by mixing 100 wt. parts of an absorbent cross-linked polymer obtained by polymerisation of a monomer having a carboxyl group, and having an average particle diameter in the range of 100-600  $\mu\text{m}$  and containing fine powder of a particle diameter of 150  $\mu\text{m}$  or less in a concentration of 5 wt % or less and 0.001 to 10 wt. parts of a compound having a plurality of functional groups capable of reacting with a group represented by formula  $-\text{COOR}$  in which each R is independently hydrogen atoms, metal atoms, or ammonium, and heating the mixture, characterised in that the pressure-resistant absorbent resin manifests

- 1) a ratio of water absorption capacity of 35 g/g or more to artificial urine under no load at 60 minutes,
- 2) a content of water-soluble component at 16 hours in a concentration of not more than 25wt%,
- 3) a ratio of water absorption capacity under pressure of 30 g/g or more to artificial urine under a load of 50  $\text{g}/\text{cm}^2$  (about 4.9 kPa) 60 minutes after the start of the absorption, and
- 4) a pressure-resistant absorption ratio defined by the following numerical formula of 0.6 or more, where the pressure-resistant absorption ratio is defined as being the ratio of water absorption capacity under high pressure to artificial urine under a load of 100  $\text{g}/\text{cm}^2$  (about 9.8 kPa) 60 minutes after the start of the absorption/the ratio of water absorption capacity under

pressure to artificial urine under a load of 50 g/cm<sup>2</sup> (about 4.9 kPa) 60 minutes after the start of the absorption,

wherein said artificial urine is prepared by dissolving 2.0 g of potassium chloride, 2.0 g of sodium sulfate, 0.8 g of ammonium dihydrogenphosphate, 0.15 g of diammonium hydrogenphosphate, 0.19 g of calcium chloride, 0.23 g of magnesium chloride in 1 litre of deionized water."

"12. A method for the production of a pressure-resistant absorbent resin, characterized by adding a compound having a plurality of functional groups capable of reacting with a group represented by formula -COOR in which each R is independently hydrogen atoms, metal atoms or ammonium to an absorbent cross-linked polymer having a -COOR group of 12 mmol/g or more and a molecular ratio of -COOH/-COOR of not more than 0.5 and heating the resultant mixture."

Claims 2 to 11 were directed to preferred embodiments of claim 1. Claim 13 was directed to a preferred embodiment of claim 12. Claim 14 was directed to a disposable diaper.

- IV. Two notices of opposition against the patent were filed. The opponents requested the revocation of the patent in its entirety based on grounds according to Article 100(a) EPC (novelty and inventive step) and Article 100(b) EPC. Opponent 02 also invoked the ground according to Article 100(c) EPC.
- V. The appealed decision was based on a main request (submitted on 1 October 2007) and two auxiliary requests (submitted on 13 November 2009). Claim 1 of each of the main and the first requests was identical

to claim 1 as granted. Claim 1 of the second auxiliary request was amended defining one additional property of the pressure-resistant absorbent resin. According to the opposition division, claim 1 of none of the requests met the requirements of Article 123(2) EPC. According to the decision, it was not permissible to delete the feature "having a -COOR group of 12 mmol/g or more" from claim 1 as originally filed because this feature was presented as an essential feature of the absorbent cross-linked polymer throughout the description. Also, all claims 1 presented a combination of features that had not been disclosed in combination in the originally filed documents.

- VI. On 23 April 2010, the patent proprietor lodged an appeal against the decision and paid the prescribed appeal fee on the same day. The statement setting out the grounds of appeal was filed on 22 June 2010. With it, two additional sets of claims were submitted - indicated as third and fourth auxiliary requests -, as well as a further document.
- VII. The respondents replied to the appeal with letters dated 10 November 2010 and 4 January 2011, resp.
- VIII. On 6 September 2013, the Board issued summons to attend oral proceedings on 27 Mai 2014.
- IX. On 12 March 2014, the Board issued a preliminary opinion to which the appellant replied by letter of 8 April 2014, requesting that the decision under appeal be set aside and that the patent be maintained on the basis of the main request or any one of the two auxiliary requests decided upon by the opposition division or on the basis of the third or fourth

auxiliary requests filed with the statement setting out the grounds of the appeal.

- X. The claims of the main request are identical to the claims of the patent as granted apart from claim 12 which adds, compared to claim 12 as granted:

**"[...], wherein the mixture is heated at a temperature in the range of 80-220°C for 3 to 60 minutes."**

Claim 1 of the first auxiliary request is identical to claim 1 as granted. Claim 12 of the first auxiliary request adds, compared to claim 12 as granted:

**"[...], wherein the mixture is heated at a temperature in the range of 80-220°C for 3 to 60 minutes and wherein said compound is a covalent bond-forming cross-linking agent and said covalent bond-forming cross-linking agent serves the purpose of lowering the ratio of water absorption capacity of said absorbent cross-linked polymer under no load to 0.9-0.3 times the level which existed prior to cross-linking."**

Claim 1 of the second auxiliary request read:

"1. A pressure-resistant absorbent resin obtained by mixing 100 wt. parts of an absorbent cross-linked polymer obtained by polymerisation of a monomer having a carboxyl group, and having an average particle diameter in the range of 100-600  $\mu\text{m}$  and containing fine powder of a particle diameter of 150  $\mu\text{m}$  or less in a concentration of 5 wt % or less and 0.001 to 10 wt. parts of a compound having a plurality of functional groups capable of reacting with a group represented by formula  $-\text{COOR}$  in which each R is independently hydrogen atoms, metal atoms, or ammonium, and heating the

mixture,  
characterised in that the pressure-resistant absorbent resin manifests

- 1) a ratio of water absorption capacity of 35 g/g or more to artificial urine under no load at 60 minutes,
- 2) a content of water-soluble component at 16 hours in a concentration of not more than 25wt%,
- 3) a ratio of water absorption capacity under pressure of 30 g/g or more to artificial urine under a load of 50 g/cm<sup>2</sup> (about 4.9 kPa) 60 minutes after the start of the absorption, and
- 4) a ratio of water absorption capacity under high pressure to artificial urine under a load of 100 g/cm<sup>2</sup> (about 9.8 kPa) 60 minutes after the start of the absorption of 22 g/g or more**
- 5) a pressure-resistant absorption ratio defined by the following numerical formula of 0.6 or more, where the pressure-resistant absorption ratio is defined as being the ratio of water absorption capacity under high pressure to artificial urine under a load of 100 g/cm<sup>2</sup> (about 9.8 kPa) 60 minutes after the start of the absorption/the ratio of water absorption capacity under pressure to artificial urine under a load of 50 g/cm<sup>2</sup> (about 4.9 kPa) 60 minutes after the start of the absorption, wherein said artificial urine is prepared by dissolving 2.0 g of potassium chloride, 2.0 g of sodium sulfate, 0.8 g of ammonium dihydrogenphosphate, 0.15 g of diammonium hydrogenphosphate, 0.19 g of calcium chloride, 0.23 g of magnesium chloride in 1 litre of deionized water."

Claim 12 of the second auxiliary request adds, compared to claim 12 as granted:

**"[...], wherein the mixture is heated at a temperature**



**in the range of 80-220°C for 3 to 60 minutes and wherein said compound is a covalent bond-forming cross-linking agent and said covalent bond-forming cross-linking agent serves the purpose of lowering the ratio of water absorption capacity of said absorbent cross-linked polymer under no load to 0.9-0.3 times the level which existed prior to cross-linking."**

Claim 1 of the third auxiliary request adds, compared to claim 1 as granted:

**"[...] in which the disposable diaper has a core concentration defined as (the absorbent resin/(fibre material + absorbent resin)) of 30-100%."**

Claim 12 of the third auxiliary request adds, compared to claim 12 as granted:

**"[...], wherein the mixture is heated at a temperature in the range of 80-220°C for 3 to 60 minutes."**

Claim 1 of the fourth auxiliary request adds, compared to claim 12 as granted:

**"[...], wherein the mixture is heated at a temperature in the range of 80-220°C for 3 to 60 minutes."**

XI. Oral proceedings were held on 27 Mai 2014.

XII. The arguments of the appellant may be summarised as follows:

Claim 6 of the application as originally filed was the basis for claim 1 of the main request. The feature "having a -COOR group of 12 mmol/g or more and a molecular ratio of -COOH/-COOR of not more than 0.5"

was not essential for the invention, as appeared from claim 6 and description pages 8 and 26 as originally filed, so that it could be omitted in the claims of the main request. Furthermore, an absorbent cross-linked polymer was disclosed on original page 11, lines 13 to 16, without the requirement of having "a -COOR group of 12 mmol/g or more". Even if a passage further down on that page disclosed an absorbent cross-linked polymer having "a -COOR group of 12 mmol/g or more", the description also disclosed an absorbent cross-linked polymer for which that feature was not essential. On original page 35 the pressure-resistant absorbent resin was also disclosed without the requirement regarding the -COOR groups. The process steps disclosed in claim 1 of auxiliary request 4 resulted in a pressure-resistant absorbent resin possessing the properties listed in original claim 6. The claims 1 of the main and auxiliary requests 1 to 4 were therefore supported by the original description and did therefore not contravene the requirements of Article 123(2) EPC.

XIII. The respondents' arguments may be summarised as follows:

The original application contained four inventions that had now been combined, for which there was no basis. The absorbent cross-linked polymer was defined on page 5 and in the passage bridging pages 7 and 8 of the description as filed, from which it was clear that the features "having a -COOR group of 12 mmol/g or more" and "having a molecular ratio of -COOH/-COOR of not more than 0.5" were not merely optional for the polymer.

The absorbent resin (III) was described on original page 25. Absorbent resin (III) was nowhere disclosed in

the absence of the requirement regarding the -COOR groups. The the pressure-resistant resin (IV) was only disclosed on original page 36. Since the embodiments (III) and (IV) differed from one another, it was not permissible to combine the features and properties of of embodiment (III) with those of embodiment (IV).

Therefore, the claimed subject-matter of all requests contravened the requirements of Article 123(2) EPC.

- XIV. The appellant (patent proprietor) requested that the decision under appeal be set aside and to remit the case to the opposition division on the basis of the main request as filed on 1 October 2007 or one of the auxiliary requests 1 and 2 filed on 13 November 2009 or on the basis of auxiliary requests 3 and 4 filed with the statement of grounds of appeal.
- XV. The respondents (opponents 1 and 2) requested that the appeal be dismissed.

## **Reasons for the Decision**

1. The appeal is admissible.

Main request

2. Article 123(2) EPC
- 2.1 The pressure-resistant absorbent resin of claim 1 is defined as being obtained by mixing an absorbent cross-linked polymer and a compound having functional groups capable of reacting with -COOR groups, the absorbent cross-linked polymer being *"obtained by polymerisation*

*of a monomer having a carboxyl group, and having an average particle diameter in the range of 100-600  $\mu\text{m}$  and containing fine powder of a particle diameter of 150  $\mu\text{m}$  or less in a concentration of 5 wt % or less".* The absorbent cross-linked polymer is not required to bear any -COOR groups wherein R is independently hydrogen atoms, metal atoms or ammonium.

- 2.2 The application as originally filed however consistently describes the absorbent cross-linked polymer used to produce the pressure-resistant absorbent resin as a polymer "*of improved -COOR density*" having -COOR groups of 12 mmol/g or more and a molecular ratio of -COOH/-COOR of not more than 0.5.

The absorbent cross-linked polymer is described in the passages of the original description on page 9, lines 1 to 9 and lines 19 to 22, on page 11, lines 13 to 16, page 11, line 28 to page 12, line 10, on page 21, lines 11 to 15 and on page 23, lines 17 to 21. All those passages refer to the absorbent cross-linked polymer as containing -COOR groups of 12 mmol/g or more and a molecular ratio of -COOH/-COOR of not more than 0.5.

On page 13, line 5 to page 14, line 17, four methods for the preparation of the absorbent cross-linked polymer are described as the polymerization of a -COOR group-containing monomer in such a way that the resulting polymer contains -COOR groups of 12 mmol/g or more and a molecular ratio of -COOH/-COOR of not more than 0.5.

On page 15, line 19 to page 16, line 15, the -COOR group-containing monomer used to produce the absorbent cross-linked polymer is disclosed. It may be used with other monomers capable of copolymerizing therewith "So

*long as these monomers allow production of an absorbent cross-linked polymer containing -COOR groups in a concentration of 12 mmol/g or more and having a molecular ratio of -COOH/-COOR of not more than 0.5[...]" (page 15, lines 25 to 28).*

2.3 The application as originally filed does not provide any disclosure of an absorbent cross-linked polymer not containing the requirements regarding the -COOR groups and it does not reveal or suggest any other means to obtain the pressure-resistant absorbent resin of original claim 6 than by means of the absorbent cross-linked polymer containing -COOR groups in a concentration of 12 mmol/g or more and having a molecular ratio of -COOH/-COOR of not more than 0.5.

2.4 The passages cited by the appellant do not provide a basis for the modifications present in claim 1 of the main request. Original claim 6 and the passage on page 8, lines 9 to 16, which discloses the pressure-resistant absorbent resin in the wording of original claim 6, concern the pressure-resistant absorbent resin as such and are completely silent about the absorbent cross-linked polymer. As pointed out above (point 2.2), the passage on page 11, lines 13 to 16 explicitly refers to the presence of -COOR groups on the absorbent cross-linked polymer "*An absorbent cross-linked polymer used in the present invention has a group represented by formula -COOR in which each R is independently hydrogen atoms, metal atoms or ammonium and a ratio of -COOH/-COOR of not more than 0.5.*" and the concentration of these groups is mentioned in lines 28 and 29 of the same page "*This invention has established by the absorbent cross-linked polymer having -COOR group of 12 mmol/g or more for governing factor for the ratio of water absorption capacity and the speed of*

*absorption under pressure.*". Finally, the passage on page 26, lines 23 to 25 merely refers to the compound having a plurality of functional groups capable of reacting with a -COOR group (III-a). If this passage does not refer to the presence of -COOR groups on the absorbent cross-linked polymer, it is because it does not concern the absorbent cross-linked polymer.

- 2.5 Therefore, the application as originally filed does not provide a basis for the amendments of claim 1 of the main request. The main request contravenes the requirements of Article 123(2) EPC.

Auxiliary requests 1 to 3

3. Article 123(2) EPC

- 3.1 Claim 1 of the auxiliary requests 1 to 3 all involve an absorbent cross-linked polymer that is not required to bear any -COOR groups at all. The reasoning under point 2 above therefore equally applies to claim 1 of those requests. Auxiliary requests 1 to 3 contravene the requirements of Article 123(2) EPC.

Auxiliary request 4

4. Article 123(2) EPC

- 4.1 Claim 1 of the fourth auxiliary request describes a method for the production of a pressure-resistant absorbent resin. A method for the production of an absorbent resin was disclosed in claim 8 as originally filed. However, that method did not refer to a pressure-resistant absorbent resin. The requirements for a pressure-resistant absorbent resin are described on original page page 35 line 31 to page 36 line 8.

However, the method of claim 1 does not require the pressure-resistant absorbent resin to fulfil any of the requirements set out in that passage, in particular the requirements concerning the ratio of water absorption capacity under pressure with and without load, the ratio of water absorption after 5 minutes and the speed of absorption.

4.2 The application as originally filed does not explicitly disclose a method for the production of a pressure-resistant absorbent resin as disclosed in claim 1. The passage on page 8, lines 26 to 32, relates to the production of the absorbent resin defined on pages 25 and 26 (III) and not to the pressure-resistant absorbent resin defined on pages 35 and 36 (IV). According to the teaching of the application as filed on page 26 lines 7 to 18, the pressure-resistant absorbent resin of the invention having the requirements set out on pages 35 and 36 is obtained by adjusting "*suitably the kind and amount of a cross-linking agent and the temperature and duration of heating so that the ratio of water absorption capacity under no load may fall in the range of 0.9 - 0.3 times, [...] the level which existed before the surface cross-linking.*". None of those process steps is present in claim 1 of the fourth auxiliary so that the argument of the appellant that the claimed process would necessarily result in the pressure-resistant absorbent resin according to the description as filed, fails to convince.

4.3 The application as originally filed does therefore not support the amendment present in claim 1 of the fourth auxiliary request, which for that reason contravenes the requirements of Article 123 (2) EPC.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:



E. Goergmaier

B. ter Laan

Decision electronically authenticated