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**Datasheet for the decision  
of 24 November 2009**

**Case Number:** T 1523/07 - 3.3.10

**Application Number:** 00104063.3

**Publication Number:** 1033359

**IPC:** C07C 57/04

**Language of the proceedings:** EN

**Title of invention:**

Method for production of (meth)acrylic acid and/or  
(meth)acrylic esters

**Applicant:**

NIPPON SHOKUBAI CO., LTD.

**Opponent:**

Stockhausen GmbH et al

**Headword:**

Washing a device for the production of meth(acrylic)acid or  
esters/NIPPON SHOKUBAI

**Relevant legal provisions:**

EPC Art. 54(2), 54(3), 56, 87(1), 88

**Relevant legal provisions (EPC 1973):**

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**Keyword:**

"Novelty (yes) - no implicit disclosure"  
"No priority - document prepublished"  
"Inventive step - arbitrary threshold - routine activity -  
obvious alternative"

**Decisions cited:**

G 0002/98, T 0939/92, T 0823/96

**Catchword:**

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Case Number: T 1523/07 - 3.3.10

**DECISION**  
of the Technical Board of Appeal 3.3.10  
of 24 November 2009

**Appellant:** NIPPON SHOKUBAI CO., LTD.  
(Patent Proprietor) 1-1, Koraibashi 4-chome  
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**Representative:** Luderschmidt, Schüler & Partner  
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**Respondent:** Stockhausen GmbH et al  
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**Representative:** Herzog, Martin  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 28 June 2007  
revoking European patent No. 1033359 pursuant  
to Article 102(1) EPC 1973.

**Composition of the Board:**

**Chairman:** R. Freimuth  
**Members:** J. Mercey  
F. Blumer

## Summary of Facts and Submissions

I. The Appellant (Proprietor of the Patent) lodged an appeal on 7 September 2007 against the decision of the Opposition Division dated 28 June 2007 revoking European patent No. 1 033 359, and on 26 October 2007 filed a written statement setting out the grounds of appeal.

II. Notice of Opposition had been filed by the Respondent (Opponent II), requesting revocation of the patent in its entirety on the grounds of *inter alia* lack of novelty and inventive step (Article 100(a) EPC). *Inter alia* the following documents were submitted in opposition proceedings:

- (3) EP-A-765 854,
- (10) WO-A-99 205 95,
- (16) Affidavit of M. Olechowski and
- (21) Affidavit of A. Lunow.

III. Independent claim 2 of the patent as granted read as follows:

"A method for the production of (meth)acrylic esters, characterized by, when the production thereof is stopped,

- pre-washing the device constructed for the production thereof with water;

- washing it with an aqueous basic solution of at least one member selected from the group consisting of an oxide, hydroxide, carbonate, and hydrogen carbonate of an alkali metal and an oxide and hydroxide of an

- alkaline earth metal, wherein the concentration of said solution is in the range of 1 to 10 wt.%; and  
- thereafter rinsing it with water,  
wherein the rinsing subsequent to the washing with the aqueous basic solution is continued until the pH value of the waste water is not more than 9 at 50°C."
- IV. The Opposition Division held that the subject-matter of the granted claims and of the then pending second auxiliary request was novel over document (10). It further found that the priority of 2 March 1999 (JP 5431699) was validly claimed for the claims of the patent in suit. As such, document (10) was merely prior art under Article 54(3) EPC and could not be taken into consideration for the assessment of inventive step. The subject-matter of both requests did not, however, involve an inventive step in view of document (3) together with the common general knowledge of the skilled person.
- V. With letter dated 24 October 2007, the Appellant filed a second auxiliary request, claim 1 of which was directed to the same subject-matter as that of granted independent claim 2, together with a method for the production of (meth)acrylic acid. During oral proceedings, held on 24 November 2009, the Appellant withdrew the first auxiliary request filed with the letter dated 24 October 2007 and the third auxiliary request filed with letter dated 29 October 2009.
- VI. The Appellant submitted that the subject-matter of both requests was novel over document (10), since said document did not directly and unambiguously disclose the feature that the rinsing subsequent to the washing

with the aqueous basic solution was continued until the pH value of the waste water was not more than 9 at 50°C, rinsing with water not inevitably leading to such a pH drop.

The Appellant argued that its claims were all entitled to priority, since although the feature in the claims "when the production thereof is stopped" was not to be found *expressis verbis* in the priority document, it was apparent to the skilled person that the removal of polymer precipitates adhering to the device could take place only when the device was empty, i.e. when the production had been stopped. Thus document (10) could not be taken into consideration for the assessment of inventive step.

With regard to inventive step, the Appellant argued that if document (10) were considered to represent the closest prior art, the problem to be solved by the invention was to provide a method for the production of *inter alia* (meth)acrylic esters, comprising cleaning a device constructed for the production thereof, wherein upon restarting the production, a smaller amount of polymer and precipitate was formed inside the device allowing for continuous distillation of acrylic ester for a longer period of time, and whereby additionally, in the case where the amount of polymer and precipitate adhered to the device to be cleaned was large, avoided swelling of the polymer by the basic aqueous solution which could lead to blocking and/or damage of the device. This problem was solved, as shown by the Examples and Comparative Examples in the specification of the patent in suit, by carrying out the rinsing of the device with water subsequent to the washing with

the basic aqueous solution until the pH of the waste water was no more than 9 at 50°C, and by pre-washing with water. These features were neither suggested by document (10) itself, nor by any of the other documents cited in the proceedings, let alone for achieving the desired effects, document (33) (see section VII) being very general in its teaching and not relating to the field of (meth)acrylic acid or ester production. The subject-matter of the invention was thus inventive.

VII. The Respondent submitted that the subject-matter of the invention was not novel over the disclosure of document (10), which disclosed in claim 1 a process for cleaning plant parts deployed in the production or processing of (meth)acrylic esters comprising the steps of emptying plant parts in which production or processing of (meth)acrylic esters had been carried out, flushing the plant parts with aqueous 5 to 50 wt.% alkali metal hydroxide solution, removing the alkali hydroxide solution from the plant parts, and optionally rinsing the plant parts with water. The Respondent referred to two affidavits, (16) and (21), showing that it belonged to the training of an apprentice chemist that when washing a plant for the production of (meth)acrylic acid or esters, rinsing with water meant rinsing until the alkali hydroxide had been completely removed from the plant parts, namely until the waste water was neutral. The additional pre-washing step was also implicitly disclosed, since it belonged to the skilled person's common general knowledge that in order to avoid product contamination, plant parts must first be washed with water.

The Respondent, citing decision G 2/98 in this respect, argued that the claims were not entitled to priority, since the priority document did not disclose "the same invention" because the feature "when the production thereof is stopped" was not directly and unambiguously derivable therefrom. As such, document (10) qualified as closest prior art for the assessment of inventive step.

With regard to inventive step, the Respondent argued that in the light of document (10), rinsing with water until the pH of the waste water was no more than 9 at 50°C was obvious, since it belonged to the skilled person's common general knowledge, document (33):

(33) "How to prepare and test columns before startup",  
Chemical Engineering, Column Internals/7, 6. April  
1981

filed with letter dated 25 February 2009, being cited in this respect, that chemical wash agents should be thoroughly removed from plant parts after the wash, particularly if the washing agent had the potential to react during normal plant operation. Specifying that the pH of the waste water should be no more than 9 was merely a measure of how thoroughly the alkali had been removed. Pre-washing the device with water, was obvious in view the skilled person's common general knowledge, as also illustrated by this document (33), which taught that it was common practice during column start-up to water-wash the column to remove scale. That an additional washing step resulted in the removal of more polymer and/or scale was not surprising, since document

(33) taught that water-washing removed scale. The subject-matter of the invention was thus not inventive.

VIII. Opponent I withdrew its opposition with letter dated 12 August 2008.

IX. The Appellant requested that the decision under appeal be set aside and the patent be maintained on the basis of the claims as granted as main request or, subsidiarily, on the basis of the second auxiliary request, filed with letter dated 24 October 2007.

The Respondent requested that the appeal be dismissed.

X. At the end of the oral proceedings, the decision of the Board was announced.

### **Reasons for the Decision**

1. The appeal is admissible.

#### *Main and second auxiliary request*

2. *Novelty*

2.1 The Respondent has challenged the novelty of the claimed invention exclusively with regard to document (10), said document being comprised in the state of the art at least according to Article 54(3) EPC, since it has a filing date of 21 October 1998, the patent in suit claiming a priority of 2 March 1999.



- 2.2 Document (10) discloses in claim 1 a process for cleaning plant parts deployed in the production or processing of (meth)acrylic esters comprising the steps of emptying plant parts in which production or processing of (meth)acrylic esters has been carried out, flushing the plant parts with aqueous 5 to 50 wt.% alkali metal hydroxide solution, removing the alkali hydroxide solution from the plant parts, and optionally rinsing the plant parts with water.
- 2.3 The Respondent conceded that the feature present in the claimed method that the rinsing subsequent to the washing with the alkali metal hydroxide solution was continued until the pH value of the waste water was not more than 9 at 50°C was not explicitly disclosed in document (10). It submitted that this feature was nonetheless implicitly disclosed therein, and referred in this respect to the affidavits (16) and (21), which showed that it belonged to the training of an apprentice chemist that after washing a plant with aqueous alkali hydroxide solution, rinsing with water meant rinsing until the alkali hydroxide had been completely removed from the plant parts, namely until the waste water was neutral. Thus, the skilled person, when reading document (10), would understand that rinsing with water meant rinsing until the waste water was neutral i.e. had a pH of about 6.5 at 50°C.
- 2.4 The Board observes that it is a generally applied principle that for concluding lack of novelty, there must be a direct and unambiguous disclosure, either explicit or implicit, in the state of the art which would inevitably lead the skilled person to subject-matter falling within the scope of what is claimed. In

this context "implicit disclosure" means disclosure which any person skilled in the art would objectively consider as necessarily implied in the explicit content, e.g. in view of general scientific laws. In this respect, the term "implicit disclosure" should not be construed to mean matter that does not belong to the content of the technical information provided by a document but may be rendered obvious on the basis of that content. Whilst common general knowledge must be taken into account in deciding what is clearly and unambiguously implied by the explicit disclosure of a document, the question of what may be rendered obvious by that disclosure in the light of common general knowledge is not relevant to the assessment of what is implied by the disclosure of that document. The implicit disclosure means no more than the clear and unambiguous consequence of what is explicitly mentioned (see T 823/96, point 4.5 of the reasons, not published in OJ EPO).

2.5 In the present case, the disclosure in document (10) of rinsing with water does not implicitly mean rinsing until the pH value of the waste water is not more than 9 at 50°C, since although the skilled person may have known that it was desirable to achieve such a pH, rinsing with water does not inevitably result in the waste water having such a pH value, the pH value being simply the result of the amount of water used and the intensity of rinsing, on which document (10), however, is silent.

2.6 Since all the independent claims of the main request and the second auxiliary request contain the feature that the rinsing subsequent to the washing with the

alkali metal hydroxide solution is continued until the pH value of the waste water is not more than 9 at 50°C, document (10) not disclosing said feature, neither explicitly nor implicitly, the Board concludes that the subject-matter of the main request and of the second auxiliary request is novel within the meaning of Article 54 EPC.

3. *Inventive step*

3.1 The subject-matter of independent claim 2 of the main request is embraced by the subject-matter of independent claim 1 of the second auxiliary request. In case this embodiment according to claim 2 of the main request lacked an inventive step, then the same conclusion would apply to claim 1 of the second auxiliary request, which is also directed to this embodiment. For this reason, it is appropriate that the subject-matter of claim 2 of the main request is examined first as to inventive step.

3.2 According to the established jurisprudence of the Boards of Appeal it is necessary, in order to assess inventive step, to establish the closest state of the art, to determine in the light thereof the technical problem which the invention addresses and successfully solves, and to examine the obviousness of the claimed solution to this problem in view of the state of the art. This "problem-solution approach" ensures assessing inventive step on an objective basis and avoids an *ex post facto* analysis.

3.2.1 Of the documents in the proceedings, both parties agreed that the teaching of document (10) came closest

to the subject-matter of claim 2. However, the parties disagreed as to whether this document, published on 29 April 1999, constituted prior art according to Article 54(3) or 54(2) EPC, depending on whether the priority of 2 March 1999 of the patent in suit was valid or not.

- 3.2.2 The requirement for claiming priority of "the same invention", referred to in Article 87(1) EPC, means that priority of a previous application in respect of a claim in a European patent application in accordance with Article 88 EPC is to be acknowledged only if the skilled person can derive the subject-matter of the claim directly and unambiguously, using common general knowledge, from the previous application as a whole (see G 2/98, OJ EPO 2001, 413, Headnote).
- 3.2.3 In the present case, the Appellant conceded that the feature "when the production thereof is stopped" was not disclosed *expressis verbis* in the priority document, but that it was nonetheless implicitly disclosed therein, since it was apparent to the skilled person that in order to remove polymer and precipitate adhering to the device, said adhesion being referred to on page 3, lines 20 to 23 and page 6, lines 17 to 18 of the priority document, the device must first be emptied. According to the Appellant, emptying the device was equivalent to stopping the production of (meth)acrylic esters. The Appellant also referred to the Examples of the priority document in which in every case "the distillation was stopped".
- 3.2.4 However, emptying the device is not tantamount to stopping the production, since the device for working

up the reaction product, for example, the distillation column used in all examples in the priority document, may be emptied whilst nevertheless continuing the production of (meth)acrylic esters, for example, by redirecting the reaction product to another distillation column, as submitted by the Respondent. With regard to the Examples in the priority document, leaving aside the question of whether or not examples could be generalised in such a manner, only the distillation and not the production of (meth)acrylic acid and/or esters is stopped, thus, not providing a proper basis for the fresh feature of stopping the production. Furthermore, in the examples in the priority document, the distillation is in any case stopped after the alkali hydroxide washing step and not before, as now claimed. As such, the Examples do not even exemplify the sequence of stopping (the production) and then washing as required by the claim, but rather the reverse.

3.2.5 The Board thus concludes that there is no support in the priority document for the feature "when the production thereof is stopped". This conclusion is supported by the fact that this feature has replaced the *prima facie* opposing feature "in the case of producing (meth)acrylic acid and/or (meth)acrylic ester" in claim 1 of the priority document. The patent in suit is thus not entitled to the priority of 2 March 1999, and as a consequence, document (10) is prior art according to Article 54(2) EPC and may thus be taken into consideration for the assessment of inventive step.

3.2.6 Thus, the Board considers in agreement with the Respondent, that in the present case the cleaning

method of document (10), the relevant disclosure of which is reflected in point 2.2 above, represents the closest state of the art and, hence, takes it as the starting point when assessing inventive step.

- 3.3 In view of this state of the art the problem underlying the patent in suit, as formulated by the Appellant at the oral proceedings, was the provision of a method for the production of (meth)acrylic esters, comprising cleaning a device constructed for the production thereof, in order to remove polymer and precipitate adhered thereto, wherein (i) upon restarting the production, a smaller amount of polymer and precipitate is formed inside the device allowing for continuous distillation of (meth)acrylic ester for a longer period of time, and (ii), in the case where the amount of polymer and precipitate adhered to the device to be cleaned is large, avoids swelling of the polymer by the basic aqueous solution which could lead to blocking and/or damage of the device.
- 3.4 As the solution to these two partial problems, the Appellant submitted that the patent in suit proposes (i) carrying out the rinsing subsequent to the washing with the aqueous basic solution until the pH value of the waste water is not more than 9 at 50°C and (ii) pre-washing the device with water.
- 3.5 The Appellant and the Respondent were divided as to whether or not the evidence presented convincingly showed the successful solution of the problem defined in point 3.3 above *vis-à-vis* the closest prior art. To demonstrate that the cleaning method achieves the alleged improvements, the Appellant relied on Example 1

and Comparative Example 2 comprised in the specification of the patent in suit for part (i) of the problem, and on Examples 3 and 5 and Comparative Examples 4 and 5 for part (ii) of the problem.

3.5.1 However, with regard to the partial problem (i), Example 1 and Comparative Example 2 merely show that when the washed device is reused in a distillation process, virtually no signs of increase in pressure loss in the interior of the column and decrease in the coefficient of heat transfer of the shell-and-tube heat exchanger are observed, such that the distillation may be continued for a longer period of time. Reuse of the device is, however, not a feature of the proposed solution as defined in the claim, which therefore also covers embodiments wherein the device is not reused, with the consequence that the purported improvement cannot be achieved for these embodiments.

3.5.2 Similarly, in the case of the partial problem (ii), the purported improvement occurs only when the amount of polymer and precipitate to be removed is "large" (see specification of the patent in suit, col. 5, lines 18 to 22), the Appellant itself thereby conceding that the effect is not achieved over the whole scope of the claim, which is not restricted to the removal of a specific minimum amount of polymer and precipitate. This finding is confirmed by the teaching of the closest prior art document (10), which, although not first carrying out a pre-wash with water, does not report any problems of blocking and/or damage to the distillation column when the column is washed directly with aqueous sodium hydroxide solution.

- 3.6 Since in the present case the alleged advantages, i.e. improved operation time and avoidance of blocking and/or damage of the device, are not achieved throughout the entire ambit of the claimed subject matter, the technical problem as defined above (see point 3.3 *supra*) needs to be redefined in a less ambitious way, and in view of the teaching of document (10) can merely be seen in the provision of a further method for the production of (meth)acrylic esters comprising cleaning a device constructed for the production thereof in order to remove polymer and precipitate adhered to said device (see T 939/92, OJ EPO 1996, 309, point 2.5.4 of the reasons).
- 3.7 Finally, it remains to decide whether or not the proposed solution to that objective problem underlying the patent in suit is obvious in view of the state of the art.
- 3.7.1 Document (10) already teaches that after washing a plant for the production of (meth)acrylic ester with alkali metal hydroxide solution, the plant parts may thereafter be rinsed with water. Rinsing with water necessarily implies that the pH value of the waste water emanating from said rinsing procedure is continuously reduced to an undefined level. Hence, the threshold pH value of 9 at 50°C, which the waste water should at least attain according to the claims of the patent in suit, is neither critical nor a purposive choice for solving the objective problem underlying the patent in suit, since no unexpected effect has been shown to be associated with this particular threshold value. The act of picking out at random an upper limit for the pH of the waste water is within the routine



activity of the skilled person faced with the mere problem of providing a further method for the production of (meth)acrylic esters comprising cleaning a device constructed for the production thereof in order to remove polymer and precipitate adhered to said device. Therefore, the arbitrary choice of a threshold pH value of the waste water of 9 at 50°C cannot provide the claimed method with any inventive ingenuity.

3.7.2 Pre-washing a device constructed for the production of (meth)acrylic esters with a suitable solvent belongs to the common general knowledge of the skilled person. This view is supported by document (33) (cf. page 99, left hand column, section entitled "Washing the column", first paragraph), which reflects common general knowledge, and teaches that it is common practice during column start-up to water-wash the column to remove scale, as submitted by the Respondent. That water is such a suitable solvent is already known from document (10), as it is used therein as the solvent for the alkali hydroxide wash and for the rinsing thereafter. The Board thus concludes that it is within the routine practice of the skilled person, faced with the mere problem of providing a further method comprising cleaning a device in order to remove polymer and precipitate adhered thereto, to pre-wash the device with water, such that this feature also cannot contribute to inventive ingenuity.

3.7.3 The Appellant argued that the teaching of document (33) was of a very general nature and was not in any way related to the production of (meth)acrylic esters, such that the skilled person would not have combined its teaching with that of document (10).

However, pre-washing a column with water belongs to the common general knowledge of the skilled person (cf. point 3.7.2 *supra*), document (33) being cited merely to illustrate this fact, the very generality of document (33) underlining its character as common general knowledge and its applicability to any column start-up, regardless of whether it is constructed for the production of (meth)acrylic esters or not.

3.8 For these reasons, the solution proposed in claim 2 of the main request to the problem underlying the patent in suit is obvious in the light of the prior art.

4. As a result, the Appellant's main request is not allowable for lack of inventive step pursuant to Article 56 EPC.

4.1 Since claim 1 of the second auxiliary request is also directed to the subject-matter of claim 2 of the main request (cf. point 3.1 *supra*), the considerations having regard to inventive step given in points 3.2 to 3.8 *supra* and the conclusion drawn in point 4 *supra* with respect to the main request apply also to the second auxiliary request, i.e. the subject-matter claimed is obvious and does not involve an inventive step.

5. In these circumstances, the Appellant's second auxiliary request shares the fate of the main request in that it too is not allowable for lack of inventive step pursuant to Article 56 EPC.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

C. Rodríguez Rodríguez

R. Freimuth