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**D E C I S I O N**  
**of 22 June 2004**

**Case Number:** T 0788/00 - 3.3.1

**Application Number:** 95303759.5

**Publication Number:** 0686622

**IPC:** C07C 67/60

**Language of the proceedings:** EN

**Title of invention:**

Removal of carbonyl impurities from alpha, beta-unsaturated  
carboxylic acid esters

**Patentee:**

ROHM AND HAAS COMPANY

**Opponent:**

BASF Aktiengesellschaft, Ludwigshafen

**Headword:**

Purification of esters/ROHM AND HAAS

**Relevant legal provisions:**

EPC Art. 104, 56, 114

**Keyword:**

"Admissibility of late-filed documents (yes)"

"Inventive step (no) - obvious solution of the technical  
problem"

"Apportionment of costs (no)"

**Decisions cited:**

T 0117/96, T 0951/91

**Catchword:**

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Case Number: T 0788/00 - 3.3.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.1  
of 22 June 2004

**Appellant:** BASF Aktiengesellschaft, Ludwigshafen  
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**Respondent:** ROHM AND HAAS COMPANY  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 5 June 2000  
rejecting the opposition filed against European  
patent No. 0686622 pursuant to Article 102(2)  
EPC.

**Composition of the Board:**

**Chairman:** A. J. Nuss  
**Members:** J. M. Jonk  
J. H. Van Moer

## Summary of Facts and Submissions

I. The Appellant (Opponent) lodged an appeal against the decision of the Opposition Division rejecting the opposition against the European patent No. 0 686 622 (European patent application No. 95 303 759.5), the independent Claim 1 reading as follows:

"A process for removing carbonyl-containing impurities from an  $\alpha,\beta$ -unsaturated carboxylic acid ester, which comprises the steps of :

- a. effectively admixing the ester and an aqueous solution of a salt selected from bisulfites and dithionites; and
- b. separating the ester from the aqueous solution."

II. The opposition was filed against the patent as a whole, and based on the ground of lack of inventive step as indicated in Article 100(a) EPC. It was supported by several documents including:

- (1) Organikum, Organisch-Chemisches Grundpraktikum, 10. Auflage, VEB Deutscher Verlag der Wissenschaften, Berlin 1971, page 434.

III. The Opposition Division held that the subject-matter of the patent in suit involved an inventive step. In this context, it held in particular that the problem underlying the patent in suit was to provide an effective process for removing remaining undesirable carbonyl-containing impurities from  $\alpha,\beta$ -unsaturated

carboxylic acid esters and that the cited documents, which did not relate to this technical problem, did not provide an incentive to its solution as claimed in the patent in suit.

IV. Oral proceedings before the Board were held on 22 June 2004.

V. The Appellant argued that the subject-matter of Claim 1 as granted lacked inventive step in view of document (1), as well as documents

(3) JP 9093-027A (German translation) and

(4) EP-A-0 102 642

which were cited in the patent in suit for the purpose of elucidating the technical problem underlying the patent in suit and, therefore, formed part of the present appeal proceedings.

He submitted in particular that the process of Claim 1 was obvious to the skilled person, since

(a) the forming of bisulphite compounds for the purpose of removing aldehyde and ketone impurities was commonly known as follows from document (1), and

(b) the removal of carbonyl-containing impurities from  $\alpha,\beta$ -unsaturated carboxylic acids, such as (meth)acrylic acid, by admixing the acid and an aqueous bisulphite solution, and separating the

acid from the aqueous solution, was known from documents (3) and (4).

VI. The Respondent (Patentee) argued that the late cited documents (3) and (4) should not be admitted into the appeal proceedings, since they related to a different technical problem and, consequently, were not relevant in assessing inventive step. In support he referred to the decisions T 117/86 and T 951/91. In this context, he also found that in the circumstances of the present case the late filing of said documents called for an apportionment of costs.

Furthermore, he disputed that the process of Claim 1 of the patent in suit would not involve an inventive step. In this respect, he argued essentially that the cited state of the art did not provide any incentive to the skilled person that carbonyl-containing impurities could be removed from esters of  $\alpha,\beta$ -unsaturated carboxylic acids. In fact, the prior art clearly taught that such impurities had to be removed from the  $\alpha,\beta$ -unsaturated carboxylic acids before their esterification.

In order to meet possible formal and/or substantial objections with respect to Claim 10 filed on 30 April 2001, he also filed during the oral proceedings before the Board a new set of Claims 1 to 9 as auxiliary request, which set of claims corresponded to Claims 1 to 9 as granted.

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

the Respondent's request for apportionment of costs be rejected.

The Respondent requested that the appeal be dismissed and that the patent be maintained on the basis of Claims 1 to 9 as granted and Claim 10 filed on 30 April 2001 (main request), or on the basis of Claims 1 to 9 submitted at the oral proceedings (auxiliary request). He also requested apportionment of costs.

VIII. At the conclusion of the oral proceedings the Board's decision was pronounced.

### **Reasons for the Decision**

1. The appeal is admissible.
2. Procedural matters
  - 2.1 Referring to the decisions T 117/86 and T 951/91 the Respondent submitted that the late cited documents (3) and (4) should not be admitted into the appeal proceedings, since they related to a different technical problem and, consequently, were not relevant in assessing inventive step.
  - 2.2 According to Article 114(2) EPC the EPO may indeed disregard facts or evidence which are not submitted in due time by the parties concerned. In this context, a considerable body of jurisprudence has been developed by the boards of appeal showing that the main criterion for deciding on the admissibility of late-filed documents is their relevance, i.e. their evidential

weight in relation to other documents already in the case. Moreover, other criteria, such as how late the documents were and whether their submission constituted a procedural abuse or whether admitting the late-filed documents could lead to an excessive delay in the proceedings, have also been held to be decisive. In this respect, the Board refers to the Case Law of the Boards of Appeal of the EPO, 4<sup>th</sup> edition 2001, VI. F. 1 - 3, pages 324 to 332).

2.3 In the present case, the Appellant introduced the documents (3) and (4) into the appeal proceedings together with the Grounds of Appeal, i.e. at the earliest stage of the appeal proceedings. Moreover, both documents were mentioned in the patent in suit as highly relevant prior art for the purpose of elucidating the technical problem underlying the patent in suit, apparently, since both documents disclosed the removal of carbonyl-containing impurities from  $\alpha,\beta$ -unsaturated carboxylic acids with an aqueous solution of a bisulfite salt and because the same undesirable carbonyl-containing impurities should be removed from the corresponding  $\alpha,\beta$ -unsaturated carboxylic acid esters (see the patent in suit, page 2, lines 5 to 32). Therefore, the Respondent was quite familiar with said prior art.

2.4 Thus, in applying the criteria developed by the Boards of Appeal for deciding on the admissibility of late-filed documents as indicated above (Point 2.2) the Board does not see any reason not to admit said documents (3) and (4) into the appeal proceedings.

2.5 It is true that it is indicated in the decisions T 117/86 and T 951/91 that late-filed evidence may or may not be admitted into the proceedings as a matter of discretion under Article 114(2) EPC and that it would be justified to refuse admitting such evidence if it would lead to an excessive delay in the proceedings or to forestall tactical abuse.

However, for deciding on the admissibility of late filed evidence the boards of appeal are each time obliged to consider the particular facts of the case, so that a reference to an earlier decision in this respect would only make sense if all the facts leading to that decision would be entirely comparable.

In case of the decision T 117/86 the board of appeal did not decide on the question of admissibility at all (see Point 5 of the Reasons for the Decision) and in case of the decision T 951/91 the question to be decided was whether or not to disregard evidence not submitted in due time by a party, before that evidence had actually been filed (see Point 5 of the Reasons for the Decision). Therefore, the facts of these cases are not comparable with those of the present case and, consequently, said decisions lack any relevance to the present decision.

### 3. *Main request*

#### 3.1 Inventive step

3.1.1 In assessing inventive step the Boards of Appeal consistently apply the problem and solution approach, which essentially involves identifying the closest



prior art, determining in the light thereof the technical problem which the claimed invention addresses and successfully solves, and examining whether or not the claimed solution to this problem is obvious for the skilled person in view of the state of the art.

- 3.1.2 The Board considers, in agreement with the parties to the proceedings, that the closest state of the art with respect to the claimed subject-matter of the patent in suit is the common general knowledge concerning the production of  $\alpha,\beta$ -unsaturated carboxylic acid esters as indicated in the patent in suit (see lines 5 to 15).

This prior art relates in particular to the preparation of  $\alpha,\beta$ -unsaturated carboxylic acid esters, such as methacrylic acid esters, incorporating oxidative steps, such as the vapour phase oxidation of isobutylene to give methacrylic acid followed by esterification to a methacrylic acid ester. Such a preparation method produces product mixtures containing undesirable aldehyde or other carbonyl-containing impurities, such as benzaldehyde, protoanemonin and furfural, which should be removed from the esters (see page 2, lines 5 to 15 of the patent in suit).

With respect to this prior art, the Respondent submitted that the process of the claimed invention provided a simple and effective way for removing said undesirable impurities.

- 3.1.3 Thus, in the light of the closest state of the art, the technical problem underlying the patent in suit can be seen in the provision of a simple process for effectively removing carbonyl-containing impurities

from  $\alpha,\beta$ -unsaturated carboxylic acid esters (see also page 2, lines 14 to 15 and 27 to 32, of the patent in suit).

In this context, the Board observes that the advantages indicated in the patent in suit, namely, the performance of the purification process under neutral conditions and the possibility to avoid the use of an organic solvent (see page 2, lines 27 to 32), could not be applied for defining the technical problem, since the Appellant's submission that the process as claimed involved the use of mild acid conditions has not been contested by the Respondent and because in the light of the patent in suit (see page 2, lines 35 to 37, and page 2, line 56 to page 3, line 1; and Claim 8) the process of Claim 1 actually includes the use of organic solvents.

- 3.1.4 According to Claim 1 of the patent in suit this technical problem is solved by effectively admixing the ester and an aqueous solution of a salt selected from bisulfites and dithionites (optionally in the presence of an organic solvent), and separating the ester from the aqueous solution.

Furthermore, in view of the examples of the patent in suit, the Board is satisfied that the technical problem as defined above has indeed been solved. This has not been disputed by the Appellant.

- 3.1.5 The question now is whether the solution of the technical problem underlying the patent in suit by the process of Claim 1 would have been obvious to the

skilled person in view of common general knowledge and the cited prior art.

- 3.1.6 Document (1), representing common general knowledge, discloses that the forming of bisulphite addition compounds is frequently used for the purpose of removing aldehyde and ketone impurities (see page 434, paragraphs 3 to 6). It does not indicate any restriction with respect to compositions to be purified.

Furthermore, documents (3) and (4) disclose the removal of carbonyl-containing impurities from crude methacrylic acid, by admixing the acid and an aqueous bisulphite solution in the presence of an organic solvent, and separating the acid containing organic phase from the aqueous solution (see document (3) (translation), page 2, third paragraph to page 3, first paragraph, and document (4), page 4, second paragraph to page 6, line 1). As said carbonyl-containing impurities depend on the method of the preparation of the methacrylic acid, the impurities to be removed from the corresponding esters in accordance with the patent in suit will be essentially the same (see page 2, lines 50 to 55, of the patent in suit and e.g. the examples of documents (3) and (4)).

Therefore, the skilled person faced with the technical problem underlying the patent in suit would find in this prior art a clear pointer to the solution of the technical problem as claimed.

- 3.1.7 The Respondent submitted that the skilled person did not find any incentive in the prior art that carbonyl-containing impurities could be removed from esters of

$\alpha,\beta$ -unsaturated carboxylic acids, and that the prior art rather taught that the carbonyl-containing impurities had to be removed from the  $\alpha,\beta$ -unsaturated carboxylic acids before their esterification.

However, the Board does not see any reason why the process for the removal of carbonyl-containing impurities from  $\alpha,\beta$ -unsaturated carboxylic acids as applied according to the cited documents (3) and (4) would not be appropriate for purifying the crude corresponding esters. In fact, the Respondent could not provide any reason or evidence in this respect either. Moreover, the Board notes that in accordance with the established jurisprudence of the boards of appeal lack of inventive step is not only at hand when the results to be achieved are clearly predictable but also when in the light of common general knowledge or prior art there was a reasonable expectation of success.

- 3.1.8 Thus, in view of these considerations the Board concludes that the solution of the above defined technical problem as claimed in Claim 1 of the patent in suit is obvious to the skilled person, and consequently does not involve an inventive step within the meaning of Article 56 EPC.

Claims 2 to 10 fall with Claim 1, since the Board can only decide on the Appellant's request as a whole.

#### 4. *Auxiliary request*

- 4.1 This request fails too for the same reasons, since its Claims 1 to 9 are identical to the respective Claims 1 to 9 of the main request.

5. *Apportionment of costs (Article 104(1) EPC)*

5.1 Having regard to the Board's considerations indicated above (see Point 2) concluding that in applying the criteria developed by the boards of appeal for deciding on the admissibility of late-filed documents the introduction of the documents (3) and (4) into the proceedings did not point towards circumstances that would amount to an abuse of the proceedings or to an excessive delay in the proceedings, there is no reason of equity which would justify an apportionment of costs in the Respondent's favour.

**Order**

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

1. The decision under appeal is set aside.
2. The patent is revoked.
3. The request for apportionment of costs is rejected.

The Registrar:

The Chairman:

D. Sauter

A. Nuss