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**D E C I S I O N**  
**of 3 March 1999**

**Case Number:** T 0163/97 - 3.3.3

**Application Number:** 91110051.9

**Publication Number:** 0519097

**IPC:** C08F 212/04

**Language of the proceedings:** EN

**Title of invention:**

Process for the preparation of copolymers with units derived from glycidyl esters or glycidylethers

**Patentee:**

GE Plastics ABS Europe B.V.

**Opponent:**

BASF Aktiengesellschaft, Ludwigshafen

**Headword:**

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**Relevant legal provisions:**

EPC Art. 56, 114(2)

**Keyword:**

"Late-filed evidence - irrelevant (excluded)"  
"Inventive step (yes) - ex post facto analysis"

**Decisions cited:**

T 1002/92

**Catchword:**

-





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Boards of Appeal

Chambres de recours

Case Number: T 0163/97 - 3.3.3

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.3  
of 3 March 1999

**Appellant:** BASF Aktiengesellschaft, Ludwigshafen  
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**Respondent:** GE Plastics ABS Europe B.V.,  
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**Representative:** Grever, Frederik  
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**Decision under appeal:** Decision of the Opposition Division of the European Patent Office dated 17 October 1996, issued in writing on 25 November 1996 rejecting the opposition filed against European patent No. 0 519 097 pursuant to Article 102(2) EPC.

**Composition of the Board:**

**Chairman:** C. Gérardin  
**Members:** R. Young  
A. Lindqvist

## Summary of Facts and Submissions

I. The mention of the grant of European patent No. 0 519 097, with seven claims, in respect of European patent application No. 91 110 051.9, filed on 19 June 1991, was announced on 16 March 1994 (Bulletin 94/11). Claim 1 reads as follows:

"Process for the preparation of copolymers, whereby 50-100 parts by weight of an aromatic vinyl compound, 0,1-15 parts by weight of a glycidyl ester of an unsaturated carboxylic acid or a glycidyl vinyl ether, 0-50 parts by weight of a cyanated vinyl compound, and 0-100 parts by weight of other vinyl monomers are copolymerized in emulsion or suspension, wherein the process is carried out at a pH which is kept at a value between 6 and 8 during the copolymerisation reaction."

Claims 2 to 7 are dependent claims directed to elaborations of the process according to Claim 1.

II. Notice of Opposition was filed on 5 December 1994 on the ground of lack of inventive step. The opposition was supported *inter alia* by the documents:

EH1: US-A-2 580 901; and

EH4: DE-A-3 427 441.

III. By a decision taken at the end of oral proceedings held on 17 October 1996 and issued in writing on 25 November 1996, the Opposition Division rejected the opposition.

According to the decision, the only difference between

the claimed process and that of the closest state of the art EH1 lay in the specified range of pH, of 6 to 8. EH1 was not only silent about pH, however, but also did not mention the relevant problem of controlling the content of incorporated epoxy groups. The argument that it was obvious to control the pH in such a way as to avoid hydrolysis of the epoxy groups, as taught by EH4, relied upon the assumption that hydrolysis was the reason for the problem. In any case, EH4, although mentioning a pH range of 2 to 9, exemplified a pH of 3. Finally, an advantageous effect had been demonstrated by the worked experiments of the patent in suit, which showed a significant increase of the content of glycidyl methacrylate in the final polymer, where the pH had been controlled by the use of a buffer, compared to where no pH control had been exerted. Hence, the technical problem and its solution were not known or rendered obvious by the prior art.

IV. On 31 January 1997, a Notice of Appeal against the above decision was filed, together with payment of the prescribed fee.

In the Statement of Grounds of Appeal, filed on 4 April 1997, the Appellant (Opponent) argued in substance as follows:

- (a) The skilled person, facing the technical problem of providing an improved process for the preparation of copolymers of aromatic vinyl compounds and glycidyl esters of unsaturated carboxylic acids or glycidyl vinyl ethers, which permitted a better control of the content of epoxy groups, would know from EH4 in particular that the

epoxy groups could be unstable in dependence on the pH value. This would have led him, without inventive ingenuity, from strongly acid or alkaline pH-values, towards the neutral region.

- (b) That the region 6 to 8 did not represent an advance in the sense of a "selection" was demonstrated by the fact that a pH value of 8.9 as in Example 2 of the patent in suit, i.e. lying outside the claimed range, nevertheless led to a good result. Hence, the skilled person using his general knowledge would arrive at the expected effect of a higher content of epoxy groups in the copolymer.

V. The Respondent (Patentee) agreed, in a submission filed on 4 August 1997, with the findings of the decision under appeal, and submitted that the arguments in the Statement of Grounds of Appeal added nothing to those brought in the opposition.

VI. After the issue, on 1 October 1998, of the summons to oral proceedings by the Board, the Appellant filed, on 1 February 1999, a report of experimental work stated to have been carried out according to Examples 2 and 3 of the patent. Oral proceedings were held before the Board on 3 March 1999. After having heard the parties, the Board decided to exclude the experimental report pursuant to Article 114(2) EPC. For the rest, the parties generally repeated the arguments already submitted in writing.

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

entirety.

The Respondent requested that the appeal be dismissed.

### **Reasons for the Decision**

1. The appeal is admissible.
  
2. *Late-filed evidence*

The experimental report submitted by the Appellant on 1 February 1999 (Section VI., above), referring to experimental work stated to have been carried out by the Appellant, although received more than one month before the date set for oral proceedings, was nevertheless filed too late to allow the Respondent to repeat the relevant experimental work. The last submission of the Respondent, in this connection, was filed as long ago as August 1997, i.e. 16 months previously. The experimental report of the Appellant is therefore considered to be late-filed. The details given are furthermore extremely vague, especially as regards the crucial pH values, which are merely expressed in terms of divergence from the claimed range, without a concrete value being specified. Indeed, the report does not give any experimental details beyond the statement that Examples 2 and 3 of the patent in suit were repeated ("nachgestellt"). In any case, the intention of the evidence is to support an argument as to whether a particular example falls within the scope of Claim 1 or not, and thus relates to an issue under Article 84 EPC, which is not a ground for opposition. Thus, the Board does not consider the

submission sufficiently relevant to meet the criteria set out in the decision T 1002/92 (OJ EPO 1995, 605), namely such as to be highly likely to prejudice the maintenance of the European patent. Consequently, it was excluded from consideration pursuant to Article 114(2) EPC.

3. *The patent in suit; the technical problem*

The patent in suit is concerned with the problem of controlling the incorporation of epoxy groups in a process of preparing copolymers, wherein 50-100 parts by weight of an aromatic vinyl compound, 0,1-15 parts by weight of a glycidyl ester of an unsaturated carboxylic acid or a glycidyl vinyl ether, 0-50 parts by weight of a cyanated vinyl compound, and 0-100 parts by weight of other vinyl monomers are copolymerised in emulsion or suspension (Claim 1; page 2, lines 9 to 11).

3.1 Whilst the preparation of such copolymers is known from EH1, which relates to three-component copolymers of styrene, glycidyl methacrylate and glycidyl acrylate in the weight ratios 360:30:10 respectively (column 1, lines 24 to 32), and was generally agreed to represent the closest state of the art, there is no mention that the level of incorporation of epoxy monomers might be a problem. Nor is there any reference to the feature, admittedly distinguishing the claimed subject-matter therefrom and forming the proposed solution of the problem, namely the maintenance of the pH, during the polymerisation, in the range 6 to 8. Indeed there is no mention of pH at all, as was also explicitly admitted by the Appellant. Consequently, there is no recognition



either of the technical problem, or its solution, in EH1.

3.2 As regards EH4, there is disclosed a process for obtaining a spherical-granular polymer, involving suspension polymerising a monomer mixture comprising more than 50 wt% glycidyl (meth)acrylate in the presence of a water soluble polymer consisting essentially of ethylenically unsaturated carboxylic and sulphonic acid containing monomers or their salts, at a pH from 2 to 9 with stirring under specific conditions (Claim 1). As regards the pH value of the polymerisation system, it is found that when the acidity is too great, a ring-opening of the epoxy groups occurs, and when the alkalinity is too great, the polymer formed is hydrolysed. It is therefore necessary to establish a pH between 2 and 9, preferably from 2 to 7 (page 11, lines 11 to 18). According to the relevant Examples 1 to 3, the pH value of the polymerisation system is set to 3 (page 15).

3.2.1 Whilst it is true that the possibility of loss of epoxy groups is addressed in EH4, the analysis of the granular polymer shows the introduction of hydrophilic groups as well as intramolecular or intermolecular crosslinking reactions (page 12, lines 17 to 24), which both contribute to a reduction in the amount of epoxy groups. Thus, to the contrary, it is evident that it is not a primary concern of the disclosure to avoid such loss.

3.2.2 Even if this had not been the case, the relevance of this disclosure would not be apparent to the skilled person starting from EH1 as closest state of the art,

since the latter does not make available the relevant problem (section 3.1, above). Hence there is no incentive to combine the disclosure of EH4 with that of the closest state of the art.

3.2.3 Furthermore, the requirement in EH4 for the presence of more than 50% glycidyl methacrylate monomer is contrary to definition of the kind of monomer system with which EH1 is concerned, as well as that defined in Claim 1 of the patent in suit. Thus, the disclosure of EH4 is incompatible with an essential aspect of EH1 and the patent in suit.

3.2.4 Finally, although EH4 refers to a range of pH from 2 to 9, preferably 2 to 7, the only exemplified value is 3. This is perhaps not surprising in view of the fact that, according to EH4, the spherical grains of polymer are obtained in the presence of a highly acidic water soluble polymer. The context is therefore narrow, and there is no basis for isolating the pH control aspect of the teaching of EH4 from the remaining relevant characteristics of the process. Consequently, even if the skilled person, starting from the closest state of the art (EH1) were to try, in spite of the absence of any incentive to do so (sections 3.2.1, 3.2.2, above), and regardless of the incompatibility of the respective monomer systems (section 3.2.3, above), to apply the teaching of EH4 in some way in combination with that of EH1, the logical course would involve the presence of more than 50% glycidyl monomer as well as highly acidic water soluble polymer and also the specific stirring conditions. It would thus favour the exemplified pH value of 3. The result would thus not be a process falling within Claim 1 of the patent in suit.

- 3.3 The argument of the Appellant, that the skilled person would have been led in any case toward neutral pH values (section IV.(a), above), is not convincing, since it relies on a recognition, by the skilled person, of the relevant technical problem. The latter has, however, been found not to have been made available by EH1 (section 3.1, above).
- 3.4 The argument that the claimed pH range could not represent a "selection" from EH1 (section IV.(b), above), depends on the concept that EH1 actually teaches a pH range from which a selection can be made. The fact that no pH is mentioned in EH1 means, however, that the disclosure of EH1 does not make any specific range of pH available. In other words, it does not suggest a possible correlation between that parameter and the final amount of epoxy groups in the copolymer. Consequently, the claimed subject-matter cannot represent a selection from such a range. It is therefore immaterial, from the point of view of inventive step, whether the desired effect (improved incorporation of epoxy groups in the polymer product) is also achieved outside the claimed pH range. In this connection, it has never been denied that the relevant effect is achieved within the claimed range.
- 3.5 In summary, there is (a) no discernable relationship between the disclosures of EH4 and EH1 which would lead the skilled person to recognise the relevant technical problem, but (b) on the contrary an incompatibility which would militate against such a combination, which (c) even if it were attempted, would not lead to the claimed subject-matter. The arguments presented by the Appellant about the importance of pH considered in isolation are thus evidence of *ex post facto* analysis.

3.6 Consequently, the Board has no difficulty in concurring with the reasoned finding of the decision under appeal, that the technical problem and its solution were not known or rendered obvious from the prior art (Reasons, point 4).

## **Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

E. Görgmaier

C. Gérardin