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**D E C I S I O N**  
**of 7 September 2000**

**Case Number:** T 1053/97 - 3.3.3

**Application Number:** 93914069.5

**Publication Number:** 0642542

**IPC:** C08F 246/00

**Language of the proceedings:** EN

**Title of invention:**

Aircraft anti-icing fluids thickened by associative polymers

**Applicant:**

UNION CARBIDE CHEMICALS AND PLASTICS COMPANY, INC.

**Opponent:**

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**Headword:**

-

**Relevant legal provisions:**

EPC Art. 84

**Keyword:**

"Claims - clarity (yes, after amendment) - support by  
description (yes, after amendment)"

**Decisions cited:**

-

**Catchword:**

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Case Number: T 1053/97 - 3.3.3

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.3  
of 7 September 2000

**Appellant:** UNION CARBIDE CHEMICALS AND PLASTICS  
COMPANY, INC.  
39 Old Ridgebury Road  
Danbury  
Connecticut 06817-0001 (US)

**Representative:** Wibbelmann, Jobst, Dr., Dipl.-Chem.  
Wuesthoff & Wuesthoff  
Patent- und Rechtsanwälte  
Schweigerstrasse 2  
D-81541 München (DE)

**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 30 May 1997  
refusing European patent application  
No. 93 914 069.5 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** C. Gérardin  
**Members:** B. ter Laan  
V. Di Cerbo

## Summary of Facts and Submissions

I. European patent application No. 93 914 069.5, filed on 24 May 1993 as the International patent application No. PCT/US93/04865, claiming priority from an earlier application in the USA (887643 of 29 May 1992) and published on 9 December 1993 under No. WO 93/24543, was refused by a decision of the Examining Division of the European Patent Office dated 30 May 1997. That decision was based on a set of twenty claims filed on 7 November 1995, Claim 1 reading:

"An aircraft anti-icing fluid comprising, in admixture, a glycol, water, and a hydrophobe-bearing, alkali-swellable, polymeric thickener which thickens principally by an intermolecular association among hydrophobe groups, said fluid being sufficiently viscous to adhere to the airfoil surfaces of an aircraft at rest, but becoming sufficiently fluid under the influence of wind shear forces to flow off the airfoil surfaces when they are at or near take-off speed."

Dependent Claims 2 to 9 referred to preferred embodiments of the fluid according to Claim 1.

Claim 10 read:

"A composition comprising an anti-icing fluid suitable for ground treatment of aircraft which comprises a glycol-based aqueous solution containing macromonomer-containing polymer thickener in an amount sufficient to thicken the fluid to promote its adherence to aircraft surfaces when applied to a stationary aircraft but also allow for its wind shear-induced removal during the takeoff run prior to rotation, wherein the

macromonomer-containing polymer comprises:

- (A) about 1-99.9 weight percent of one or more alpha,beta-monoethylenically unsaturated carboxylic acids;
- (B) about 0-98.9 weight percent of one or more monoethylenically unsaturated monomers;
- (C) about 0.1-99 weight percent of one or more monoethylenically unsaturated macromonomers;
- (D) about 0-20 weight percent or greater of one or more polyethylenically unsaturated monomers;

and the glycol is present in an amount of at least about 40 weight percent, based on the total composition."

Dependent Claims 11 to 20 were directed to preferred embodiments of the composition of Claim 10.

II. The Examining Division held that the claimed subject-matter did not satisfy the requirements of Articles 84 and 83 EPC. In particular, it was found that the term "polymeric thickener" was obscure and that "which thickens principally by an intermolecular association among hydrophobe groups" was a paraphrase of what was assumed to be the predominant mechanism rather than a parameter. It was not possible to read the claim with an attempt to make technical sense out of it and the invention could have been defined more precisely without unduly restricting the scope of the claim. To allow such claims would result in an unjustified monopoly with respect to the disclosure of the application and the unclarities therein. Moreover, the functional definitions used in the claims comprised a host of possible alternatives imposing an undue burden on the skilled person looking for thickeners and fluids

to meet these requirements.

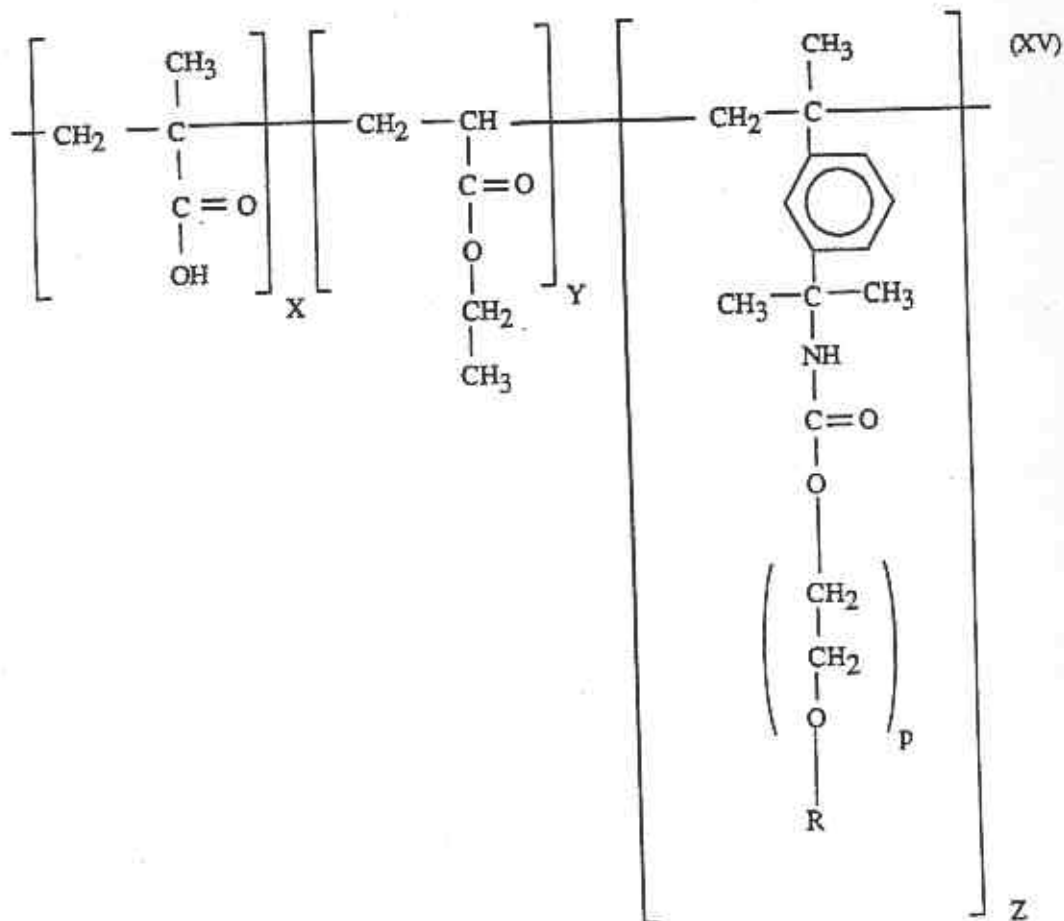
The Examining Division also stated that although Claims 10 and 11 would appear to provide some of the necessary definitions, it was not certain that all such thickeners would be able to perform as suitable components in an anti-icing fluid composition.

III. On 30 July 1997 a Notice of Appeal was lodged against that decision, together with payment of the prescribed fee. The Statement of Grounds of Appeal was filed on 24 September 1997. In conclusion of its arguments supporting the broad formulation of the claims on file, the Appellant requested that, should the Board decide to allow only a more restrictive formulation, a question of law be referred to the Enlarged Board of Appeal. By a fax received on 6 September 2000, an alternative set of ten claims was filed.

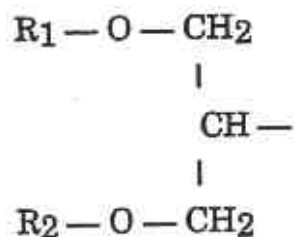
IV. At the oral proceedings before the Board, held on 7 September 2000, after several objections by the Board concerning the wording of the claims according to the main and the auxiliary requests, both requests were abandoned and replaced, as the sole request, by a new Claim 1 forming the basis of a new set of claims to be completed later. That Claim 1 reads as follows:

"An aircraft anti-icing fluid with an apparent viscosity of 100 - 20,000 mPa.s, which adheres to the airfoil surfaces of an aircraft at rest, but becomes sufficiently fluid under the influence of wind shear forces to flow off the airfoil surfaces when they are at or near take-off speed, comprising a glycol in an amount of at least about 40 weight percent, based on the total composition, water and less than 5 weight

percent of a polymeric thickener conforming to the following formula:



wherein acid monomer X is 10-40%, co-polymerizable non-associative monomer Y is 10-50%, associative monomer Z is 5-30% with p equal to 20-80 moles of ethoxylation, the hydrophobe R is an alkaryl or has the following structure:



wherein  $R_1$  and  $R_2$  are the same or different and are hydrogen or a substituted or unsubstituted monovalent hydrocarbon residue."

The Appellant, which thereafter no longer maintained its request to refer questions to the Enlarged Board of Appeal, reserved the right to file dependent claims in case of referral to the first instance.

V. The arguments concerning the wording of the claim submitted during the oral proceedings can be summarised as follows:

- (i) Although the point had not previously been raised in the appeal procedure, the Appellant drew the Board's attention to a substantial procedural violation by the Examining Division, since a request for oral proceedings had been ignored.
- (ii) Regarding Article 123(2) EPC, the application as originally filed provided an adequate basis for the amendments.
- (iii) Regarding Article 84 EPC, the present wording of the claims provided a clear definition of the claimed subject-matter. In particular, the

composition of the anti-icing fluid and the polymeric thickener as well as the unsaturated carboxylic acid moiety, the monoethylenically unsaturated monomer moiety and the macromonomer moiety, which the Board had indicated to be all essential features of the invention, were now precisely defined.

- VI. The Appellant requested that the decision under appeal be set aside and that the case be remitted to the Examining Division for further prosecution on the basis of Claim 1 as filed at the oral proceedings.

### **Reasons for the Decision**

1. The appeal is admissible.

#### *Article 123(2) EPC*

2. With respect to the wording of Claim 1 as originally filed, the present version differs by (i) the apparent viscosity, (ii) the amount of glycol, (iii) the amount of polymeric thickener and (iv) the composition of the polymeric thickener.

2.1 The range of 2,000 to 10,000 mPa.s for the apparent viscosity of the anti-icing fluids is disclosed on page 30, paragraph 5 of the original application.

2.2 The amount of glycol finds its basis on original page 5, third full paragraph.

2.3 The amount of polymeric thickener is supported by page 5, first full paragraph, of the application as



originally filed.

- 2.4 The composition of the polymeric thickener is disclosed on original pages 19 and 20, in conjunction with original page 9, first full paragraph.
- 2.5 Hence, the amendments to the claims are in conformity with the requirements of Article 123(2) EPC.

*Article 84 EPC*

- 3. The compliance with the requirements of this article has to be examined not only in terms of clarity and support by the description, but also in terms of consistency of the description made of the alleged invention.
  - 3.1 As explained by the Board during oral proceedings with reference to the original application, the characterisation of anti-icing fluid compositions by means of functional definitions raises questions which need to be considered on two levels.
    - 3.1.1 The first one appears if one considers Claim 1 of the original application, which was worded only in functional terms amounting to mere desiderata. Such a formulation of the claimed subject-matter would oblige the skilled reader, wishing to give a practical meaning to the claims, to make himself the invention. As set out in the decision T 39/93 (OJ EPO 1997, 134), however, such a contribution could not be expected from a person skilled in the art, because as an ordinary practitioner and unlike the inventor he was not possessed of any inventive capability.

3.1.2 The second level appears if one tries to formulate a claim on the basis of the features allegedly essential, as they appear from the description, in particular from the "Disclosure of the Invention" and the "Detailed Description" (page 3, paragraph 2 to page 18, paragraph 1). This would result in a claim incorporating the definitions of (a) the macromonomer-containing polymer, (b) the monoethylenically unsaturated macromonomer and (c) the complex hydrophobe compound, corresponding broadly to a combination of original Claims 1, 10, 11 and 12. In the Board's opinion, in view of the information provided about the various rheology modifier design variables and their influence on the fluid's steady shear viscosity profile, the viscoelastic and extensional properties as well as the thickening efficiency (see page 32, line 3 to page 33, line 4), a skilled person operating within the framework corresponding to the definition of the various components would be able, without inventive contribution, to obtain anti-icing fluids having the desired properties.

3.2 However, as further explained by the Board during oral proceedings, such a definition of the claimed subject-matter, although based on both the general and the specific disclosure of the invention, would be inconsistent with the statement bridging page 20 and 21, which says that "The essence of the macromonomer is a complex hydrophobe carrying a polyethoxylate chain (which may include some polypropoxylate group) and which is terminated with at least one hydroxy group". This requirement is clearly incompatible with the broad definitions of the various groups indicated by "R" as well as the definition of the complex hydrophobe compound (compare Formulae (i) and (ii); original

Claim 12), in which the indices are such that the ethyleneoxy segments may be totally absent.

- 3.3 The limitation to the preferred polymeric thickener according to formula XV, which corresponds to a terpolymer methacrylic acid / ethyl acrylate / macromonomer containing 20 to 80 moles of ethoxylation, overcomes all these inconsistencies. It also is in conformity with the above-mentioned paragraph of the description, according to which the polyethoxylate chain may include some polypropoxylate groups, in contrast to the broader statement on page 19 which regards propoxylation as an alternative to ethoxylation.

The present wording of Claim 1 further provides a clear definition of the claimed subject-matter as regards the amounts and the composition of the various components of the anti-icing fluid as well as the apparent viscosity which the fluid should possess in order to comply with the requirements of adherence to the airfoil surfaces of an aircraft.

Moreover, this formulation is not less specific than that of the prior art compositions referred to in the application in suit, which clearly identify the various ingredients.

- 3.4 For these reasons, the Board is satisfied that the requirements of Article 84 EPC are fulfilled.

*Substantial Procedural violation*

4. During the oral proceedings before the Board the Appellant pointed out for the first time that a

substantial procedural violation had occurred before the first instance since a request for oral proceedings had been ignored. The Appellant did however not request any reimbursement of the appeal fees or any other consequential remedy.

- 4.1 The Appellant explained the fact that the point had been raised at such an extremely late stage by admitting that they themselves had not noticed it any earlier.
- 4.2 From the file it appears that an auxiliary request for oral proceedings was filed with a letter dated 6 November 1995, whereas two requests for "... a reasoned decision which will then be appealed by the Patentee. " (letter of 21 March 1996, page 2, last paragraph) and "... a reasoned decision by the Examining Division ... " (letter of 2 April 1997, page 2, last line) were filed after that. Although the request for oral proceedings was not explicitly withdrawn and a proposal for a possible presentation of advantages and broad applicability was made in rather vague words (letter of 8 November 1996, page 2, first full paragraph) the requests for an appealable decision were formulated in such unreserved terms that the clear impression was conveyed that oral proceedings were not desired anymore. Therefore, in the Board's view, no substantial procedural violation has taken place.
- 4.3 Furthermore, the Board fails to see the rationality for the complaint since no request concerning the consequences of a substantial procedural violation had been filed (e.g. reimbursement of the appeal fee or to declare the decision under appeal null and void).

5. In view of the major amendments to Claim 1 the Appellant's request for the possibility to file dependent claims at a later stage, should the Board decide to remit the case to the first instance for further prosecution, was allowed.

## **Order**

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

1. The decision under appeal is set aside.
2. The case is remitted to the Examining Division for further prosecution on the basis of Claim 1 as filed at the oral proceedings.

The Registrar:

The Chairman:

E. Görgmaier

C. Gérardin