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**D E C I S I O N**  
**of 18 June 1999**

**Case Number:** T 0527/96 - 3.3.5

**Application Number:** 89901656.2

**Publication Number:** 0346452

**IPC:** C06B 47/14

**Language of the proceedings:** EN

**Title of invention:**

Salt compositions and explosives using same

**Applicant:**

The Lubrizol Corporation

**Opponent:**

-

**Headword:**

Explosive emulsions/LUBRIZOL

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

"Inventive step - yes (after amendment), non-obvious improvement"

**Decisions cited:**

-

**Catchword:**

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Boards of Appeal

Chambres de recours

**Case Number:** T 0527/96 - 3.3.5

**D E C I S I O N**  
**of the Technical Board of Appeal 3.3.5**  
**of 18 June 1999**

**Appellant:** The Lubrizol Corporation  
29400 Lakeland Boulevard  
Wickliffe  
Ohio 44092 (US)

**Representative:** Crisp, David Norman  
D. Young & Co.  
21 New Fetter Lane  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 15 January 1996  
refusing European patent application  
No. 89 901 656.2 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** R. K. Spangenberg  
**Members:** G. J. Wassenaar  
J. H. Van Moer

## Summary of Facts and Submissions

I. European patent application No. 89 901 656.2, based upon international patent application PCT/US88/04501 and published as WO89/05786, was refused by a decision of the Examining Division.

II. The Examining Division held that the subject matter of claim 1, submitted during oral proceedings on 14 December 1995, lacked an inventive step in view of WO87/03613 (D2).

In its decision, the Examining Division considered that the product of claim 1 was a selection of the products of D2 without any surprising effect. The comparative example presented by the appellant during oral proceedings was considered irrelevant because the comparison was not made with a product according to D2.

III. The appellant lodged an appeal against this decision. With the Statement of the Grounds of Appeal, the appellant filed an amended claim 1 and new comparative examples, whereby the shear stability of two explosive emulsions was compared. In a communication of the Board pursuant to Article 110(2) EPC, it was indicated that the new comparative examples did not show an improvement of the properties mentioned in the application as filed with respect to compositions according to D2. With a letter dated 1 April 1999, new comparative examples were presented, whereby the stability of an explosive emulsion comprising an emulsifier essentially made according to example 1 of the present application was compared with a similar emulsion comprising an emulsifier made according to

example 5 of D2.

Amended claim 1 reads as follows:

"A composition comprising:

(A) at least one salt moiety derived from  
(A)(I) at least one high-molecular weight polycarboxylic acylating agent, said acylating agent (A)(I) having at least one hydrocarbyl substituent having an average of from 40 to 500 carbon atoms, and  
(A)(II) ammonia, at least one amine, at least one alkali or alkaline earth metal, and/or at least one alkali or alkaline earth metal compound;

(B) at least one salt moiety derived from  
(B)(I) at least one low-molecular weight polycarboxylic acylating agent, said acylating agent (B)(I) having at least one hydrocarbyl substituent having an average of up to 18 carbon atoms, and  
(B)(II) ammonia, at least one amine, at least one alkali or alkaline earth metal, and/or at least one alkali or alkaline earth metal compound;

said moieties (A) and (B) being coupled together through

amide and/or ester linkages by

(C) at least one component having  
(i) two or more primary amino groups,  
(ii) two or more secondary amino groups,  
(iii) at least one primary amino group and at least one secondary amino group,  
(iv) at least two hydroxyl groups or  
(v) at least one primary or secondary amino group and at least one hydroxyl group;

and wherein the ratio of equivalents of component (A)(I)

to component (B)(I) employed in the preparation of the composition is 0.5 : 1 to 2 : 1."

- IV. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of amended claim 1, filed with the grounds of the appeal on 15 May 1996, amended claims 2 to 10 filed with the letter of 21 July 1994, and a description with amended pages 1, 4, 35, 43, 49, 57 and 58 filed with the letter of 21 July 1994 and amended pages 5, 10, 11, 13, 15 and 39 filed with the grounds of the appeal on 15 May 1996.

#### **Reasons for the Decision**

1. The appeal is admissible
2. *Allowability of amendments*

A main claim according to present claim 1 has already been discussed by the Examining Division and found to comply with the requirements of Article 123(2) EPC. The Board agrees with the reasons given under point 1 of the contested decision. Claims 2 to 10 are based on original claims 3, 6, 16, 25, 35, 38, 50, 59 and 60 respectively. The present amended claims 1 to 10, therefore, satisfy the requirements of Article 123(2)EPC.

3. *Novelty*

The subject-matter of present claim 1 was also held to

be novel by the Examining Division. The Board agrees with the reasons given in the contested decision under points 2 to 4. Present claim 1, therefore, also satisfies the requirements of Article 54(1) EPC.

4. *Inventive step*

4.1 The Board agrees with the Examining Division that D2 represents the closest prior art. D2 discloses salts derived from polycarboxylic acylating agents having at least one hydrocarbyl substituent having an average of from about 20 to about 500 carbon atoms coupled together through amide and/or ester moieties. These salts are suitable as emulsifier in explosive emulsion compositions; see claim 50 and in particular examples 2, 3 and 5. An inherent problem with explosive emulsions is their shelf stability (page 57 of the application). The problem underlying the invention can be seen in providing an emulsifier which improve the stability of explosive emulsion compositions. The appellant proposes to solve this problem by choosing from the emulsifying compositions according to D2 salt compositions having a high-molecular weight part (A) and a low-molecular weight part (B) according to present claim 1. With the comparative examples in appellant's letter of 1 April 1999, it was shown that for a specific explosive emulsion composition a stable emulsion could be obtained with a salt composition according to claim 1, whereas with the same amount of emulsifier according to example 5 of D2 no emulsion was formed. On that basis the Board finds it credible that the use of emulsifiers according to present claim 1 improves the stability of explosive emulsions. In the absence of any evidence to the contrary the Board

- therefore accepts that the salt compositions according to present claim 1 actually solve the above-mentioned technical problem.
- 4.2 It remains to be decided whether the claimed solution was obvious to a person skilled in the art. The salt compositions according to claim 1 differ from compositions according to D2 essentially in that a high-molecular weight polycarboxylic acylating agent, having at least one hydrocarbyl substituent with from 40 to 500 carbon atoms is coupled with a low-molecular weight polycarboxylic acylating agent, having at least one hydrocarbyl substituent with up to 18 carbon atoms.
- 4.3 In the examples of D2 only high molecular weight polyisobutylene (Mn=950 or Mn=1700) substituted succinic anhydrides are coupled with each other. In the general description of D2 there is no suggestion to couple high molecular weight agents with low molecular weight agents, let alone that by such a coupling an emulsifier can be obtained which, in use in explosive emulsions, improves the stability of such emulsions. Thus D2 provides no pointer towards the claimed solution.
- 4.4 The Board has examined the other prior art documents cited in the search report and has reached the conclusion that these documents do not contain any such pointer either. Since the contested decision does not rely on any of these documents it is not necessary to discuss these documents any further.
- 4.5 In view of the preceding considerations, the subject-matter of claim 1 is considered to involve an inventive

step as required by Article 56 EPC. The same applies to claims 2 to 10, which define subject matter of more limited scope, comprising all the features of claim 1.

- 4.6 However, in the Board's judgment the application is not yet in order for grant, in particular since the description does not properly acknowledge D2 as the closest state of the art. The Board therefore makes use of its power under Article 111(1) EPC and refers the case back to the Examining Division for the necessary amendment of the description.

## **Order**

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

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent on the basis of claims 1, filed with the grounds of the appeal on 15 May 1996, amended claims 2 to 10 filed with the letter of 21 July 1994, with a description adapted thereto and wherein document D2 is acknowledged.

The Registrar:

The Chairman:

S. Hue

R. Spangenberg