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**D E C I S I O N**  
**of 25 January 2000**

**Case Number:** T 0734/96 - 3.2.2

**Application Number:** 90912512.2

**Publication Number:** 0514376

**IPC:** C23F 11/14

**Language of the proceedings:** EN

**Title of invention:**

Compositions and process for corrosion inhibition of ferrous metals

**Applicant:**

Solutia Inc.

**Opponent:**

-

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 84, 54, 56

**Keyword:**

"Novelty, inventive step, clarity (yes) after amendment"

**Decisions cited:**

-

**Catchword:**

-



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Boards of Appeal

Chambres de recours

**Case Number:** T 0734/96 - 3.2.2

**D E C I S I O N**  
**of the Technical Board of Appeal 3.2.2**  
**of 25 January 2000**

**Appellant:** Solutia Inc.  
10300 Olive Boulevard  
P.O. Box 66760  
St. Louis  
Missouri 63166-6760 (US)

**Representative:** Colens, Alain  
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1050 Bruxelles (BE)

**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 15 March 1999  
refusing European patent application  
No. 90 912 512.2 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** W. D. Weiß  
**Members:** R. Ries  
J. C. M. De Preter

## Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal against the decision of the Examining Division posted 15 March 1996 to refuse European patent application No. 90 912 512.2.

The Examining Division held that the application failed to satisfy the requirements of Article 84 EPC (lack of clarity) and did not meet the requirements of Article 54 (novelty) and Article 56 (lack of inventive step), having regard to the documents

D1: JP-A-56-098482

D2: US-A-36 535 095

D3: JP-A-50-091546

D4: GB-A-2 125 833

In the statement of grounds filed on 15 July 1996, the appellant additionally referred to the documents

D5: Journal of the American Chemical Society, 1958, volume 80, pages 3361 to 3366

D6: Journal of the American Chemical Society, 1958, volume 80, pages 4631 to 4634

D7: Sigma Chemie, Biochemical, organic Compounds, pages 1768 to 1770, page 1774

Enclosed with its letter of 2 May 1997, a translation of document D1 was submitted (document D1') by the

appellant.

II. In a Communication the Board referred to document

D8: Basic Principles of Organic Chemistry, 2nd  
edition, J. D. Roberts, M. C. Caserio,  
W. A. Benjamin Inc., 1979, pages 1212, 1213

and expressed the view that the claims of the second  
auxiliary request were possibly allowable.

III. In its letter of 10 August 1999 in response to the  
Official Communication by the Board, the appellant  
unambiguously declared that it shared the Board's view  
on the case and that it complied with the formal  
requirements recorded in the communication. In  
consequence thereof, the appellant requested that:

- the decision under appeal be set aside and
- a patent be granted on the basis of the claims of  
the second auxiliary request:  
claims 1 to 7 (part I) submitted on 12 August 1999  
claims 7 (part II) to 20 submitted on 24 September  
1996  
description pages 2, 2A, 5A, 6, submitted on  
12 August 1999  
description pages 1, 3, 7 to 21, 23 to 26, 28 to  
34 as originally filed,  
description pages 4, 5, 22, 27, 35, submitted on  
8 October 1999  
figures 1 to 4 as originally filed.

IV. Independent claims 1 and 8 read as follows:

"1. A composition for inhibiting corrosion of ferrous metals in the presence of an aqueous medium, which composition comprises:

- (a) an amino acid selected from the group consisting of aspartic acid, polyaspartic acid, and salts thereof in an amount sufficient to provide an amino acid concentration in the aqueous medium under use conditions of from 100 ppm to 5.0 weight percent, and
- (b) a base in an amount effective to provide a pH in the aqueous medium under use conditions of at least 8.9."

"8. A process for inhibiting corrosion of ferrous metals in the presence of an aqueous medium, which process comprises adding to an aqueous medium

- (a) an amino acid selected from the group consisting of aspartic acid, polyaspartic acid and salts thereof sufficient to provide an amino acid concentration in the aqueous medium under use conditions of from 100 ppm to 5.0 weight percent, and
- (b) a base in an amount sufficient to provide a pH in the aqueous medium under use conditions of at least 8.9."

V. The appellant essentially argued as follows:

The composition now claimed, i.e. the aspartic or polyaspartic species in combination with a base in

sufficient amount to provide a pH of at least 8.9 so adjusted that the polyaspartic species exists in the fully ionized (conjugate base) form is neither disclosed nor referred to in any manner within the disclosure of any of documents D1 to D4. Therefore, the claimed composition is novel. Moreover, no inducement whatsoever is found in any of these documents to provide an (amino acid + base)-composition in the fully ionized form to reverse the corrosion rate of ferrous metals as does the present invention. Hence, the claimed composition also involves an inventive step. Moreover, given that the present claims define all the essential components and the pH value of the claimed composition, the requirements of Article 84 EPC are also met.

## **Reasons for the Decision**

### 1. *Amendments*

The combination of the features of claim 1 now on file is disclosed in originally filed claims 1 to 4 and 9. Claims 2 to 7 correspond to former claims 5 to 7 and 10 to 12. Independent claim 8 results from a combination of claims 13 to 16 and 21 as originally filed. Dependent claims 9 to 11 and 12 to 20 are based on originally filed claims 17 to 19 and 22 to 30, respectively.

The description has been suitably adapted to the amended claims.

Hence, the amendments to the claims and to the

description do not offend against Article 123(2) EPC.

2. *Clarity*

The corrosion inhibiting aqueous solution forming the subject-matter of claim 1 of the present application is clearly defined by the mandatory presence of aspartic or polyaspartic acid and salts thereof in an amount of 100 ppm to 5.0 wt% and a pH value of at least 8.9 by adding a base. The dependent claims 2 to 7 are directed to preferred embodiments of the composition given in claim 1, these embodiments relating to restricted ranges of the composition and the pH value of the claimed corrosion inhibiting agent.

The same statement is true for claims 8 to 20 relating to a process for inhibiting corrosion of ferrous metals which use the composition defined in claim 1.

The present claims, therefore, meet the requirements of Article 84 EPC.

3. *Novelty*

Document D1 (see in particular translation into English D1') discloses an anticorrosive agent comprising an alkali hydroxide and at least one component selected from polyhydric alcohol, amino acid or saccharide. The inhibitor shows, when added to calcium chloride brine in suitable amounts, excellent anticorrosive protection of metals such as mild steel or cast iron in contact with said brine. Although document D1' - amongst other amino acids - specifically mentions sodium L-aspartate, none of the examples actually comprises aspartate and

no information is given about the actual pH value of the agent under use conditions.

The latter statement is also true for document D3 which fails to mention the presence of a base and a specific pH value.

Documents D2 and D4 do not relate to a corrosion inhibiting solution comprising either aspartic acid or polyaspartic acid or salts thereof as does claim 1 of the disputed patent application.

Consequently, the subject-matter claim 1 is novel with respect to the technical teaching given in any of documents D1 to D4.

4. *Inventive step*

Like the present application, document D1 is concerned with the provision of a non-toxic corrosion inhibiting agent which exhibits a marked corrosion prevention in terms of ferrous metals and which is harmless to the human body. Inter alia, the agent can comprise Na L-aspartate as amino acid in combination with sodium hydroxide (cf. D1'). Therefore, document D1' represents the closest prior art.

Starting from D1', the problem underlying the present patent application is, therefore, seen in providing a biodegradable corrosion inhibitor which under static immersion and under dynamic fluid movement conditions as well as at temperatures up to 90°C brings about a pronounced benefit in terms of improvement to the corrosion protection for ferrous metals.



The solution to this problem consists in an aqueous agent having a pH value of 8.9 or more at which the aspartic or polyaspartic acid or salts thereof exist in the fully ionized (conjugate base) form. It is apparent from the examples that the problem has been successfully solved by the claimed composition. The conjugate base form of aspartic or polyaspartic acid is one of the key features of the present application. That this is so may be seen from the examples which show that an aqueous solution not comprising aspartic acid in the fully ionized condition impairs the anti-corrosion properties rather than improves them.

Nothing in document D1' or any of documents D2 to D4 discloses or suggests the significance of the pH value, i.e. to adjust the pH value of the solution to 8.9 or higher so that the amino acid exists in the fully ionized form. To be specific, document D1' remains completely silent about the pH value selected in the examples, and none of them even comprises polyaspartic acid or salts thereof. Document D3 does not even mention the presence of alkali hydroxide and, consequently, cannot be helpful for the selection of the suitable pH value. Documents D2 and D4 are even more remote in that they are concerned with corrosion reducing agents totally different in composition to those claimed in the present application.

Consequently, none of documents D1 to D4, taken either separately or in combination, would give one clue to the solution of the problem underlying the present application. Given this situation, the subject-matter of claim 1 involves an inventive step within the meaning of Article 56 EPC.

The claimed composition being novel and inventive, this is also true for independent claim 8 which is directed to a process using the claimed composition.

## 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 in the following version:

**Claims:** 1 to 7 (part I) submitted on 12. August 1999 with letter of 28 July 1999; 7 (part II) to 20 filed on 24 September 1996 with letter of 20 September 1996.

**Description:** pages 1, 3, 7 to 21, 23 to 26, 28 to 34 as originally filed;  
pages 2, 2A, 5A, 6, submitted on 12 August 1999 with letter of 28 July 1999;  
pages 4, 5, 22, 27, 35 submitted on 8 October 1999 with letter of 5 October 1999;

**Drawings:** sheets 1 to 4 as originally filed.

The Registrar:

The Chairman:

S. Fabiani

W. D. Weiß