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D E C I S I O N
of 2 March 2006

Case Number: T 0946/04 - 3.3.03

Application Number: 95932540.8

Publication Number: 0792314

IPC: C08G 77/04

Language of the proceedings: EN

Title of invention:
Epoxy polysiloxane coating and flooring compositions

Patentee:
AMERON INTERNATIONAL CORPORATION

Opponent:
J.C. Hempel's

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56

EPC R. 71(2)

RPBA Art. 11(3)

Keyword:

"Novelty - (yes) "

"Inventive step - (yes) "

Decisions cited:

G 0001/92, T 0472/92, T 0952/92

Catchword:

-



Case Number: T 0946/04 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 2 March 2006

Appellant:
(Opponent)

J.C. Hempel's
Skibsfarve-Fabrik A/S
Lundtoftevej 150
DK-2800 Lyngby (DK)

Representative:

Plougmann & Vingtoft A/S
Sundkrogsgade 9
P.O. Box 831
DK-2100 Copenhagen OE (DK)

Respondent:
(Proprietor of the patent)

AMERON INTERNATIONAL CORPORATION
245 South Los Robles Avenue
Pasadena, California 91101-2894 (US)

Representative:

Griffin, Kenneth David
Saunders & Dolleymore
9, Rickmansworth Road
Watford
Hertfordshire WD18 0JU (GB)

Decision under appeal:

Decision of the Opposition Division of the
European Patent Office dated 5 May 2004 and
posted 24 May 2004 rejecting the opposition
filed against European patent No. 0792314
pursuant to Article 102(2) EPC.

Composition of the Board:

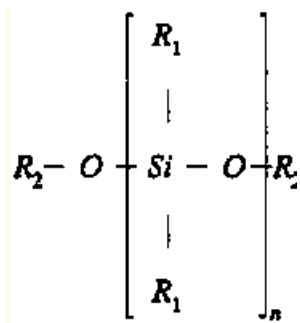
Chairman: R. Young
Members: C. Idez
C. Heath

Summary of Facts and Submissions

I. The grant of the European patent No. 0 792 314 in the name of Ameron International Corporation in respect of European patent application No. 95 932 540.8 filed on 18 September 1995 and claiming priority of the US patent application No. 342414 filed on 18 November 1994 was announced on 1 December 1999 (Bulletin 1999/48) on the basis of 25 claims.

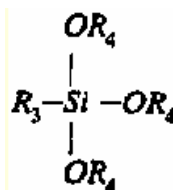
Independent Claims 1, 9, 16, 22, and 25 read as follows:

- "1. An epoxy-polysiloxane polymer coating composition prepared by combining:
water;
a polysiloxane having the formula



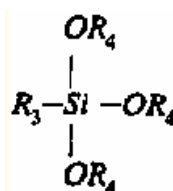
where each R_1 is selected from the group consisting of the hydroxy group and alkyl, aryl and alkoxy groups having up to six carbon atoms, each R_2 is selected from the group consisting of hydrogen and alkyl and aryl groups having up to six carbon atoms and, wherein n is selected so that the molecular weight for the polysiloxane is in the range of from 400 to 2,000; and

an organooxysilane having the formula

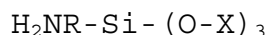


where R₃ is selected from the group consisting of aryl, alkyl, and cycloalkyl groups containing up to six carbon atoms and where R₄ is independently selected from the group consisting of alkyl, hydroxyalkyl, alkoxyalkyl and hydroxyalkoxyalkyl groups containing up to six carbon atoms;
a difunctional aminosilane hardener component;
a non-aromatic epoxide resin having more than one 1,2-epoxy groups per molecule with an epoxide equivalent weight in the range of from 100 to 2,000 that undergoes chain extension to form a fully cured non-interpenetrating polymer network epoxy polysiloxane polymer; and
a pigment or aggregate component.

9. An epoxy-polysiloxane polymer coating composition prepared by combining:
a polysiloxane selected from the group consisting of methoxy, ethoxy, and silanol functional polysiloxanes having a molecular weight in the range of from 400 to 2,000;
an organooxysilane having the formula



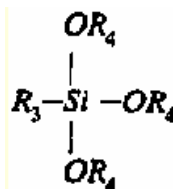
where R₃ is selected from the group consisting of aryl, alkyl, and cycloalkyl groups containing up to six carbon atoms and where R₄ is independently selected from the group consisting of alkyl, hydroxyalkyl, alkoxyalkyl and hydroxyalkoxyalkyl groups containing up to six carbon atoms; a difunctional aminosilane hardener component having the general formula



where R is a difunctional organic radical independently selected from the group consisting of alkyl, dialkylaryl, alkoxyalkyl, and cycloalkyl radicals, and where X is limited to alkyl, hydroxyalkyl, alkoxyalkyl and hydroxyalkoxyalkyl groups containing less than six carbon atoms: a non-aromatic epoxide resin that undergoes chain extension to form a fully cured epoxy-polysiloxane polymer: an organotin catalyst; and a sufficient amount of water to facilitate hydrolysis and polycondensation to form a fully cured coating at ambient temperature.

16. A method for making a fully-cured thermosetting epoxy-polysiloxane polymer coating composition comprising the steps of:
 - forming a resin component by combining;
 - a non-aromatic epoxide resin;
 - a polysiloxane selected from the group consisting of methoxy, ethoxy, and silanol functional

polysiloxanes having a molecular weight in the range of from 400 to 2,000;
an organooxysilane having the formula



where R₃ is selected from the group consisting of aryl, alkyl, and cycloalkyl groups containing up to six carbon atoms and where R₄ is independently selected from the group consisting of alkyl, hydroxyalkyl, alkoxyalkyl and hydroxyalkoxyalkyl groups containing up to six carbon atoms; and water; and

curing the resin component at ambient temperature by adding to the resin component:

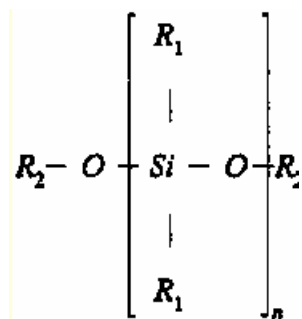
an organotin catalyst,

and an aminosilane with two active hydrogens,

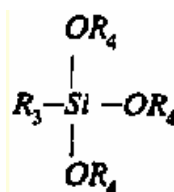
whereby the non-aromatic epoxide resin undergoes chain extension to form a fully cured epoxy-polysiloxane polymer.

22. A method for making a fully-cured thermosetting epoxy-modified polysiloxane coating composition comprising the steps of:

forming a resin component by combining:
a polysiloxane having the formula



where each R_1 is selected from the group consisting of the hydroxy group and alkyl, aryl and alkoxy groups having up to six carbon atoms, each R_2 is selected from the group consisting of hydrogen and alkyl and aryl groups having up to six carbon atoms and, wherein n is selected so that the molecular weight for the polysiloxane is in the range of from 400 to 2,000;
an organooxysilane having the formula

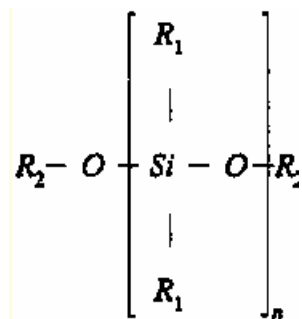


where R_3 is selected from the group consisting of aryl, alkyl, and cycloalkyl groups containing up to six carbon atoms and where R_4 is independently selected from the group consisting of alkyl, hydroxyalkyl, alkoxyalkyl and hydroxyalkoxyalkyl groups containing up to six carbon atoms;
a non-aromatic epoxide resin having more than one 1,2-epoxy groups per molecule with an epoxide

equivalent weight in the range of from 100 to 2,000; and water:

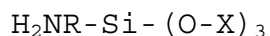
curing the resin component at an ambient temperature by adding to the resin composition: an organotin catalyst; and an aminosilane with two active hydrogens [sic], whereby the non-aromatic epoxide resin undergoes chain extension to form a fully epoxy-polysiloxane polymer.

25. A non-interpenetrating polymer network epoxy-polysiloxane polymer coating composition prepared by combining:
water;
a polysiloxane having the formula

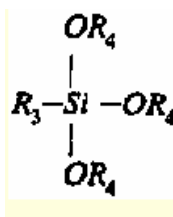


where each R_1 is selected from the group consisting of the hydroxy group and alkyl, aryl and alkoxy groups having up to six carbon atoms, each R_2 is selected from the group consisting of hydrogen and alkyl and aryl groups having up to six carbon atoms and, wherein n is selected so that the molecular weight for the polysiloxane is in the range of from 400 to 2,000;

a difunctional aminosilane hardener component having the general formula



where R is a difunctional organic radical independently selected from the group consisting of aryl, dialkylaryl, alkoxyalkyl, and cycloalkyl radicals, and where X is limited to alkyl, hydroxyalkyl, alkoxyalkyl and hydroxyalkoxyalkyl groups containing less than six atoms; an organooxysilane having the formula



where R₃ is selected from the group consisting of aryl, alkyl, and cycloalkyl groups containing up to six carbon atoms and where R₄ is independently selected from the group consisting of alkyl, hydroxyalkyl, alkoxyalkyl and hydroxyalkoxyalkyl groups containing up to six carbon atoms; and a non-aromatic epoxide resin having more than one 1,2-epoxy groups per molecular with an epoxide equivalent weight in the range of from 100 to 2,000 that undergoes chain extension to form a fully cured non-interpenetrating polymer network epoxy-polysiloxane polymer."

Claims 2 to 8, 10 to 15, 17 to 21, 23 and 24 were dependent claims.

II. A Notice of Opposition was filed against the patent by J.C. Hempel's Skibsfarve-Fabrik A/S (Opponent) on 1 September 2000 on the grounds of lack of novelty and lack of inventive step (Article 100(a) EPC). The Opponent requested that the patent be revoked in its entirety.

The opposition was supported *inter alia* by the following documents:

D1: US-A-5 618 860;

D2: US-A-5 275 645;

D3: WO-A-80/00847; and

Appendix A: Declaration of Dr. Raymond Foscante dated 30 May 1996.

In the course of the opposition proceedings, reference was made by the Parties *inter alia* to the following documents:

Evidence 0: Report from TNO Industrial Technology dated 9 May 2001;

Evidence 1: Label of PSX-700 Cure Component;

Evidence 2: Label of PSX-700 Resin Component

Evidence 3: Material Safety Data Sheet for PSX-700 Cure Component;

Evidence 4: Material Data Safety Sheet for PSX-700 Resin Component;

Evidence 5: Product Data Sheet for PSX-700;

Evidence 6: Press Release for PSX-700;

Evidence 7: Information Sheet for PSX-700;

Evidence 9: First Report from Paint Research Association to Opponent's Legal Counsel dated 15 October 2002;

Evidence 11: Second Report from Paint Research Association to Opponent's Legal Counsel dated 31 January 2003;

Evidence 12: Laboratory Report of Mrs Olsen dated 8 August 1995.

Evidence 13: Advertisement for PSX-700 in Journal of Protective Coatings + Linings, Volume 11, No. 9, September 1994;

Evidence 15: Opponent's Laboratory Analysis Data

Evidence 20: IR Spectrum of PSX-700 Resin Component, and

Evidence 21: Observations of Mr. Norman Mowrer dated 30 April 2003.

III. By a decision announced orally on 5 May 2004 and issued in writing on 24 May 2004, the Opposition Division rejected the opposition.

According to the decision, it was clear in view of the declaration of Mr. Foscante (Appendix A) that the coating composition PSX-700 was the commercialized embodiment of the non-aromatic linear epoxy-modified non-IPN polysiloxane composition of Example 1 of document D1 which was identical to Example 1 of the opposed patent. According to the decision it was undisputed that the PSX-700 coating composition was released into the market prior the priority date of the patent in suit.

The Opposition Division came to the conclusion that the Opponent had not proven that it was possible for the skilled person to analyse and reproduce the commercial product PSX-700 before the priority date of the patent in suit. Consequently, the subject-matter of

independent Claims 1, 9, 16, 22 and 25 was considered as novel.

Concerning inventive step, the decision stated that document D2 failed to disclose or suggest the use of a non-aromatic epoxy resin. It further held that the products according to the patent in suit differed from those disclosed in D3 in the selection of a non-aromatic polyepoxide and the use of polysiloxane as an additional ingredient, which led to a non-interpenetrating polymer network instead of an interpenetrating polymer network as in D3. In view of these clear structural differences, it was held in the decision that the skilled person could get no hint from D3 to prepare the claimed coating compositions of the patent in suit. Consequently, inventive step was acknowledged for the claimed subject-matter.

IV. A Notice of Appeal was filed on 26 July 2004 by the Opponent (Appellant) with simultaneous payment of the prescribed fee. With the Statement of Grounds of Appeal filed on 4 October 2004, the Appellant submitted the following documents:

Evidence 24: R. S. Bauer "Formulating weatherable epoxy resin for maximum performance"; Technical Bulletin Shell Chemical Company; Water-Borne and Higher Solids Coatings Symposium, February 17-19, 1982;

Evidence 25: Report on IR Spectra; and

Evidence 26: "The PSX 700; 1 + 1 = 3 Factor", Journal of Protective Coatings and Linings; Vol. 12, No. 6, June 1995.

It also argued essentially as follows:

(i) Concerning the validity of the priority:

(i.1) The patent claimed priority from D1, which was a continuation in part of US patent application Ser. No. 08/064,398, filed on 19 May 1993.

(i.2) Since the filing date of the application was 18 September 1995, the priority claim was invalid under Article 87(1) and (4) EPC.

(i.3) It was necessary to establish the priority date.

(i.4) The availability of the claimed product for an extensive period of time also allowed for the advantages of the product to be known to the public, and might be of relevance in establishing the presence or absence of an inventive step of the claims.

(i.5) Thus, a correction of the priority date as the filing date, namely 18 September 1995 was requested.

(ii) Concerning novelty:

(ii.1) It was acknowledged by all parties that the PSX 700 product was commercially available prior to the filing of the application of the patent in suit opposed patent, and that the PSX 700 product was an embodiment of the claimed invention.

(ii.2) Each of the features of the claimed invention could be analyzed.

(ii.3) The Appellant had been able to demonstrate that such an analysis was possible with the exception that the Appellant failed to specifically identify which aliphatic (non-aromatic) epoxide was used in the resin.

(ii.4) However, the specific chemical nature of the epoxy resin was not a feature of the claim other than that it was non-aromatic. Reference was made to the decision T 0952/92 (OJ EPO, 1995, 755).

(ii.5) There was no denying that the product was available to the public to the extent that it could be analysed, and based upon this analysis, that it could be reproduced.

(iii) Concerning Evidence 24, 25, and 26:

(iii.1) As shown by Evidence 24 (pages 3-4) non-aromatic (particularly aliphatic) epoxy resins provided superior weatherability and gloss-retention capacity compared to aromatic epoxides.

(iii.2) Thus, the skilled person reading Evidence 26, which referred to the long-term gloss retention properties of PSX 700 would understand this to relate to an aliphatic epoxy resin.

(iii.3) Evidence 26 stated that PSX 700 combined the characteristics of conventional "epoxies" and "aliphatic polyurethane". The mere combination of the terms suggested the term "aliphatic epoxy".

(iii.4) This information alone was prejudicial to the novelty of that feature in the claim.

(iii.5) Evidence 25 demonstrated that the epoxy resin was not an aromatic epoxy resin.

(iv) Concerning the decision under appeal and novelty:

(iv.1) The Opposition Division was of the opinion that the Opponent had failed to demonstrate that the person skilled in the art could analyse from the commercially available product the presence of each of the following components:

- (a) the hydroxy or alkoxy-functional polysiloxane having a molecular weight of 400-2000;
- (b) the organooxysilane; and
- (c) the non-aromatic epoxide having more than one 1,2-epoxy groups and an epoxide equivalent weight from 100 to 2000.

(iv.2) In Evidence 12 there was a clear and unambiguous identification of two components: the aliphatic (non-aromatic epoxy) and the phenyl methyl silicone (a polysiloxane).

(iv.2) This demonstrated that the product could be analysed and reproduced.

(iv.5) It was further clear in view of Evidence 24, 5, 6, and 26 that the epoxy resin was not an aromatic epoxy resin.

(iv.6) The limitation that the epoxide had more than one 1,2-epoxy groups was not a characterising feature of the component as this was understood by the average polymer chemist as necessary for cross linking.

(iv.7) Evidence 12 showed that the epoxy resin used had (at least) two epoxy groups.

(iv.8) The observed or measured low volatility of the composition, combined with the observed fluidity of the composition, disclosed to the skilled artisan that the resin was of low molecular and equivalent weight. This was also confirmed by Evidence 11.

(iv.9) Furthermore the molecular weight and the exact composition of the resin could be determined.

(iv.10) Evidence 12 disclosed that the resin contained phenylmethyl silicone.

(iv.11) The skilled artisan would understand from the material safety data sheet (MSDS) of the resin that the methanol referred to in the MSDS of the resin was from the functionality on the polysiloxane, i.e. that the phenylmethyl silicone is a alkoxy-functionalised polysiloxane.

(iv.12) Thus, hydroxy or alkoxy-functional polysiloxane having a molecular weight of 400-2000 could be analysed and reproduced.

(iv.13) The use of size exclusion chromatography, a simple technique, would easily disclose the specific

molecular weight of the base binder constituent with high precision.

(iv.14) The TNO report demonstrated that the organooxysilane could be analysed and identified as phenyltrimethoxysilane.

(iv.15) Evidence 12 revealed that the curing agent was substantially 3-aminopropyltriethoxysilane, an aminosilane as defined by the claimed invention. This was corroborated by the TNO report.

(iv.16) Evidence 12 and the TNO report revealed the presence of titanium dioxide.

(iv.17) The skilled artisan would understand that water was required as moisture curing component.

(iv.18) Thus, it had been shown that all of the features of the claimed invention could be analysed and reproduced at least to the extent of the scope of the claim.

(v) Concerning inventive step:

(v.1) A product with a claimed high gloss retention was known from Evidence 12 to consist of a resin base comprising an aliphatic epoxy resin (aliphatic diglycidyl ether) and a polysiloxane (phenylmethyl silicone) and a curing agent comprising 3-aminopropyltriethoxysilane and a pigment.

(v.2) The remaining steps to draft the patent application which led to the claimed invention were trivial.

(v.3) D2 furthermore taught the skilled person about the chemical nature of the polysiloxane and D3 also confirmed that cross-linking required at least two epoxy units in the epoxy resin.

V. In its letter dated 11 February 2005, the Patent Proprietor (Respondent) argued essentially as follows:

(i) Concerning the analysis of the product PSX-700:

(i.1) The Opponent had attempted to analyse PSX-700. (cf. Evidence 12, report of the analysis signed by Mrs Olsen).

(i.2) The techniques used were Fourier transform infrared spectroscopy, GC, gel permeation chromatography and energy dispersive X-ray fluorescence spectroscopy.

(i.3) In her report, Mrs. Olsen had concluded that the base consisted of a mixture or a reaction product of phenyl methyl silicone and aliphatic diglycidylether. It was stated that it was not possible to identify the diglycidylether.

(i.4) The Patent Proprietor had contacted three leading analytical laboratories in Europe to analyse PSX 700.

(i.5) Only TNO had conducted an analysis.

(i.6) The approach of TNO and the results of the TNO analysis were described in the declaration of Mr. Jan Maat dated 5 April 2004 and a TNO report dated 9 May 2001.

(i.7) Mr. Maat had confirmed that his analysis did not identify a polymer coating as claimed in the Patent. He had failed to identify the non-aromatic epoxy resin component.

(i.8) Thus, four laboratories had considered the PSX-700 material, two attempted to analyse it, and none had identified the invention from such analyses.

(i.9) Thus, the sale of PSX-700 did not result in the invention being clearly and unambiguously disclosed or rendered obvious.

(ii) Concerning the validity of the priority:

(ii.1) It was not the practice of a Technical Board to make a declaration on a question of priority where such question was not relevant to the substantive grounds of opposition.

(ii.2) It was not the practice of a Technical Board to remove from the face of a patent an identified claim to priority, and it was not accepted that there was power to do this.

(iii) Concerning Evidence 24, 25 and 26, and the presence of a non aromatic epoxy resin in the product PSX-700:

(iii.1) These documents added nothing to the case as they had no bearing upon the analyses carried out by the Opponent and TNO.

(iii.2) Evidence 26 did not disclose the chemical composition of PSX 700 and was furthermore published after the patent's priority date.

(iii.3) These documents were introduced to support an argument that a skilled person would suspect that there was epoxy resin present.

(iii.4) The TNO analysis of the PSX-700 material showed that it was not present.

(iii.5) The reference to PSX-700 material being "a patented Engineered Siloxane epoxy composition" in general/promotional product literature was not the same as a specific technical disclosure that a non-aromatic epoxide resin with specific features was used in its preparation.

(iv) Concerning inventive step:

(iv.1) The Appellant had argued that whatever was not disclosed by release of the PSX-700 material was obvious.

(iv.2) The approach adopted by the Appellant was a classic hindsight analysis which was entirely misconceived.

VI. With its letter dated 29 September 2005, the Respondent submitted the following document:

Declaration by Dr Colin Hull dated 20 September 2005.

VII. On 2 March 2006, oral proceedings were held before the Board, but nobody was present on behalf of the Appellant. A telephone call made by the Registrar to the office of the Representative of the Appellant revealed that nobody would attend the oral proceedings on behalf of the Appellant.

At the oral proceedings, the Respondent indicated that it had no objection to the introduction of Evidence 24, 25, and 26 submitted by the Appellant with the Statement of Grounds of Appeal into the proceedings. The discussion then focussed on the issues of (i) novelty and (ii) inventive step.

The arguments presented on these issues by the Respondent may be summarized as follows:

(i) Concerning novelty:

(i.1) The product PSX-700 corresponded to the product of Example 1 of D1.

(i.2) While IR spectroscopy analysis might be very effective for characterizing individual chemical compounds, the resin component of the PSX-700 contained several ingredients.

(i.3) The presence of other ingredients would mask the absorption characteristic of the epoxy resin.

(i.4) TNO did not detect the presence of an epoxy resin in the resin component of PSX-700, although it specially looked for epoxide groups (cf. Declaration of Mr. Jan Maat of 5 April 2004; point 6).

(i.5) The expert of the Opponent (cf. Evidence 9 point 9.2 and 9.3 thereof) confirmed that the relevant tests to reveal the presence of an epoxy resin had been done by TNO.

(i.6) The analysis carried out by Mrs Olsen (Evidence 12) did not identify an epoxy resin or an organooxysilane.

(i.7) Thus, the actual analyses carried out on the PSX-700 product did not reveal the composition of the product PSX-700.

(i.8) The considerations made by the expert of the Appellant concerning the possibility of detecting of an epoxy resin (Evidence 11) were of theoretical nature.

(i.9) Evidence 26, which was very similar to Evidence 13, could not have suggested the presence of an aliphatic epoxy resin in PSX-700.

(i.10) Evidence 24 showed that in 1982 the use of the aliphatic epoxy resin (Eponex resin) was still in a development stage. According to the declaration of Mr. Hull dated 2 October 2005, in the last 20 years no coatings company in the world had been able to commercialize a coating comprising the Eponex 1513 (i.e

the resin used in the resin component of PSX-700) and a conventional amine epoxy curing agent.

(i.11) The further analysis made by the Appellant (cf. Evidence 25) was based on a hindsight reconstruction of the composition of the PSX-700 based on the knowledge of the components obtained from the patent in suit.

(ii) Concerning inventive step:

(ii.1) Document D3 would represent the closest state of the art.

(ii.2) The coating compositions of D3 exhibited an IPN structure.

(ii.3) The use of a non aromatic epoxy resin as done in the compositions of the patent in suit led to a non IPN structure. The coating obtained had very good chemical resistance. This could not have been expected from coatings based on non-aromatic epoxy resins.

VIII. The Appellant requested that the decision under appeal be set aside and that the European patent No. 0 792 314 be revoked.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. *Procedural matters*

2.1 As mentioned in Section VII above, the Appellant was absent from the oral proceedings held on 2 March 2006.

2.2 At the oral proceedings the Board established that the Appellant had been duly summoned in accordance with the requirements of Rule 71(1) EPC and that its unexpected absence was not due to any unforeseen circumstances but to its decision, not communicated to the Board beforehand, not to attend the oral proceedings. Therefore, the oral proceedings continued in its absence (Rule 71(2) EPC).

2.3 It further follows, that, in accordance with Article 11(3) of the Rules of Procedure of the Boards of Appeal, the Board considers that the absent party relies only on its written case.

3. *Novelty*

3.1 Concerning novelty, the only issue to be decided is whether the prior sale of the product PSX-700 by Ameron International Corporation deprives the subject-matter of any of Claims 1 to 25 of the patent in suit of novelty.

3.2 According to the decision of the Enlarged Board of Appeal G 1/92 (OJ EPO 1993, 277), "where it is possible for the skilled person to discover the composition or the internal structure of the product and to reproduce it without undue burden, then both the product and its composition or internal structure become state of the art." (Reasons 1.4).

3.3 In this connection, the Board observes that, according to the declaration of Mr. Foscante dated 30 May 1996 (Appendix A), the composition of the product PSX-700 corresponds to the composition of Example 1 of the document D1, which is the US patent application corresponding to the patent in suit, and that the composition according to Example 1 of D1 exactly corresponds to the composition of Example 1 of the patent in suit.

3.4 In view of Example 1 of the patent in suit, it is thus clear that the PSX-700 comprises two components, i.e. a resin component comprising for a total of 1200 g:
385 g of Eponex 1513 (a non aromatic epoxy resin);
5 g of Nuospense 657 (a pigment wetting agent);
5 g of BYK 080 (an antifoam agent)
10 g of Dislon 6500 (a thixotropic agent)
338 g of Tioxide RTC60 (titanium dioxide)
25 g of A-163 (methyl trimethoxysilane)
432 g of DC 3074 (a methoxy functional polysiloxane);
i.e. in total 1200 g.

and a curing component comprising for 300 g of the resin component:

48 g A-1100 (aminopropyl) trimethoxysilane 20 g butyl acetate.

3.5 It is further clear that the resin component and the curing component are obtained by simple mixing of the respective ingredients.

3.6 It can hence be concluded that, provided the ingredients of both the resin component and the curing

component could be known to the skilled person, there would be no difficulty for him to reproduce the product PSX-700.

3.7 Consequently, the second requirement set out in decision G 1/92 in terms of reproducibility would, in the present case, inevitably be fulfilled, provided the first requirement in terms of analysability would be met.

3.8 In that respect, while the Appellant has submitted in view of the decision T 952/92 (cf. Headnote point IV) that a complete analysis of the sold product would not be necessary, the Board however notes that the circumstances of the present case totally differ from those underlying the decision T 952/92 for the following reasons:

3.8.1 In the case under consideration in T 952/92, the claimed product was a liquid homogeneous mixture for use in liquid scintillation technique, which does not undergo chemical reaction during its use. In contrast, the compositions according to the patent in suit are reactive products comprising two kinds of polymers, i.e. a polysiloxane and an epoxy resin which must exhibit very specific respective curing patterns in order to allow the formation of non-interpenetrating polymer network (non-IPN) structure (cf. also declaration of Mr. Foscante, point 19).

3.8.2 It hence clear that the ability of forming the non-IPN structure is directly linked to the choice of specific ingredients such as a specific polysiloxane, a specific epoxy resin, a specific organooxysilane, and a specific

aminosilane in order to obtain the necessary curing profile of the epoxy resin and the polysiloxane leading to the formation of a non-IPN structure.

- 3.8.3 This has for its consequence that the result of the analysis of the product sold before the claimed priority date should also show, for example by way of comparison with compositions exemplified in the patent in suit, that this product when cured would inherently lead to the formation of a non-IPN structure. This can only be established provided the exact composition of the sold product can be determined, i.e. provided a complete analysis has been carried out.
- 3.8.4 This conclusion is also, in the Board's view, in line with the requirement set out in G 1/92 in term of reproducibility according to which the person skilled in the art is enabled to manufacture **the product**, i.e. the product actually sold before the relevant filing date (cf. G 1/92, paragraph 1.4), and with the decision T 472/92 (OJ EPO 1998, 161) according to which concerning the issue whether an invention has been made available to the public by prior use, it must be established **exactly** (emphases by the Board) what was in prior use.
- 3.9 Thus, in the Board's view, it would be the fact that direct and unambiguous access to the exact composition of the product PSX-700 would have been possible by means of analysis, which would render such composition available to the public and thus part of the state of the art for the purpose of Article 54(2) EPC.

3.10 Consequently, the question of novelty of the subject-matter of Claims 1 to 25 boils down to the question whether it has been shown by the Appellant (Opponent) that such analysis was possible in accordance with the known analytical techniques which were available for use by a skilled person before the relevant filing date, so as to inform such skilled person that the composition of PSX-700 was in fact in accordance with the invention claimed in the patent in suit.

3.11 In that respect, the Board firstly notes that it has been admitted by all the parties that the product PSX-700 was first released for sale in May 1994, i.e. before the claimed priority date of the patent in suit (18 November 1994). The Board also notes that the Appellant has in effect further admitted (cf. page 2, of the Statement of Grounds of Appeal) that no more modern equipment was available to the skilled person between the claimed priority date and the filing date in Europe (18 September 1995); in other words the analyzability of the product PSX-700 has not been modified in that intermediate period. Consequently, there is no necessity for the Board to investigate whether the priority claim is valid or not, since this question is, for the reasons given above, irrelevant to the assessment of novelty in view of the prior sale of the product PSX-700.

3.12 In this connection, the Board notes that analyses of the product PSX-700 have been carried out, on the one hand, by the Appellant in August 1995 (Evidence 12) and, on the other hand, by the laboratory TNO in May 2001 at the request of the Patent Proprietor (Evidence 0). Although the respective dates of analysis are after the

- claimed priority date, there can be no doubt that the analytical methods used in these analyses were available before the claimed priority date, so that their evidential weight is not diminished by the fact that they have been carried out after that date.
- 3.13 According to Evidence 12, the analysis was performed using Fourier Transform Infrared Spectroscopy (FTIR) gas chromatography, gel permeation chromatography, and energy dispersive X-ray fluorescence spectroscopy. As indicated in Evidence 12 the infrared spectrum of the base (i.e. resin) component shows that the base consisted of a "mixture or a reaction product of phenyl methyl silicone and an aliphatic diglycidylether" and according to further investigation "it is probably a reaction product, but it has not been possible to identify the aliphatic diglycidylether."
- 3.14 Independently of the fact that the detailed laboratory data (Evidence 15, on which this analysis report Evidence 12 is based) only mentions the presence of an aliphatic **glycidyl** ether and not of a **diglycidyl** ether (emphasis by the Board) in view of the mono glycidyl ethers used as reference products in the IR spectroscopy (cf. page 2 of the letter of 23 February 2004, lines 4 to 24; IR Spectra 2D and 2E), it is in any case evident, in the Board's view, that the analysis carried out by the Appellant did not clearly and unambiguously reveal the presence of an epoxy resin, let alone of an epoxy resin having the chemical structure of the EPONEX 1513 used in the resin component of the product PSX-700.

- 3.15 The Board further observes that the analysis carried out by the Appellant in August 1995 (Evidence 12) did not even reveal either the presence of a methoxy polysiloxane or the presence of a methyl trimethoxysilane.
- 3.16 Consequently, the Board can only come to the conclusion that the actual analysis carried out by the Appellant in order to determine the composition of the PSX-700 product failed to reveal essential components thereof, i.e. a non aromatic epoxy resin having the chemical structure of EPONEX 1513, the methoxy polysiloxane, and the methyl trimethoxysilane. In other words, the analysis carried by the Appellant does not show that it was possible with analytical techniques which were available for use by a skilled person before the claimed priority date to determine the exact composition of the PSX-700 product, so as to inform the skilled person that the composition of PSX-700 was in accordance with the invention claimed in the patent in suit.
- 3.17 On the other hand, the analysis carried out by the laboratory TNO (cf. Evidence 0, Page 5, PSX-700 resin) did not identify the presence of an epoxy resin, let alone the presence of a non aromatic epoxy resin having the chemical structure of the EPONEX 1513, in the resin component of the PSX-700, although, as stated in the declaration of Mr. Maat of TNO of 5 April 2004 (Paragraphs 3, 6), he specifically looked for epoxide groups since there was a reference to "epoxy" in the documents (Evidence 1 to 7 and 13) submitted by the Patent Proprietor prior to conducting the analysis.

- 3.18 In this connection, the Board also notes that the expert of the Appellant (cf. Evidence 9; point 9.2) has confirmed not only that the tests carried out by TNO for trying to identify the presence of an epoxy resin in the resin component were suitable, but furthermore that the relevant tests in that respect have been performed by TNO.
- 3.19 Thus, the Board can only state that the analysis carried out on by TNO shows that it was not possible by known analytical techniques which were available for use by a skilled person before the relevant filing date to reveal the presence of a non aromatic epoxy resin having the chemical structure of the EPONEX 1513 in the resin component of PSX-700.
- 3.20 This conclusion cannot, in the Board's view, be altered by the further submissions made by the Appellant on the basis of Evidence 24, 25 and 26 in order to challenge the non detectability of the non aromatic resin in the product PSX-700.
- 3.21 According to the Appellant, Evidence 24 discloses that non aromatic epoxy resins i.e. EPONEX epoxy resins provide superior weatherability compared to aromatic epoxy resins. Hence, in view of this disclosure, the skilled artisan reading Evidence 26 where the weathering properties of PSX-700 coatings are advertised would understand that the PSX-700 coating contains a non aromatic epoxy resin of the EPONEX type. By simple IR spectroscopy as shown in Evidence 25, the skilled person would further ascertain that the PSX-700 indeed comprises a non aromatic epoxy resin of that type.

3.22 It is hence evident that the reasoning of the Appellant starting from Evidence 24 comprises the steps:

(i) firstly assuming that the PSX-700 contains a non aromatic epoxy resin and that this resin is a non aromatic resin as disclosed in Evidence 24, based on saturated bisphenol-A, i.e. an EPONEX type epoxy resin.

(ii) looking for confirmation of this assumption in Evidence 26 on the basis of the advertised weatherability of the PSX-700 product;

(iii) and further selecting the EPONEX 1510 among the non aromatic resins disclosed in Evidence 24, carrying out an IR analysis (spectrum 3b) as disclosed in Evidence 25 using EPONEX 1510 (spectrum 3b) as reference in order to ascertain the presence of an epoxy resin of the EPONEX type in the PSX-700 resin component.

3.23 In this connection, the Board, however, notes, that according to the patent in suit (cf. paragraph [0008] other types of non aromatic epoxy resin than EPONEX resins were at the disposal of the skilled person before the claimed priority date of the patent in suit.

3.23.1 Furthermore, Board also notes that, according to the declaration of Mr. Colin Hull dated 20 September 2005, in the last 20 years no coatings company had been able to commercialize a coating based on an EPONEX resin such as the EPONEX 1513 used in the product PSX-700.

- 3.24 Thus, there is, in the Board's view, no objective reason for immediately selecting Evidence 24 as starting point, so that this selection must therefore be considered as based on hindsight, i.e. on the knowledge derived from the patent in suit that the PSX-700 contains an epoxy resin of the EPONEX type, with the consequence that this vitiates *ab initio* the reasoning of the Appellant.
- 3.25 Even if for the sake of argument, one would consider that the reasoning of the Appellant had started from Evidence 26 instead of Evidence 24, it would also have suffered from the same deficiency for the following reasons:
- 3.26 While Evidence 26 describes PSX-700 as an epoxy/siloxane hybrid coating combining and enhancing the best characteristics of epoxies and aliphatic polyurethanes, it does not disclose, in the Board's view, clearly and unambiguously the use of an epoxy resin, let alone of a non aromatic epoxy resin, in the product PSX-700.
- 3.26.1 This is because the wording "epoxy" used in Evidence 26 cannot be considered as inevitably referring to an epoxy resin, since this term can also be understood as designating other chemical compounds having an epoxy group. This fact is also corroborated by the manner according to which the Appellant carried out its IR spectroscopy analyses on the PSX-700 product (cf. Evidence 15) for detecting the presence of epoxy compounds in it, while using mono glycidyl ethers (not epoxy resins) as references.

- 3.26.2 Nor could, in the Board's view, the indication of the good weatherability of the PSX-700 coatings in Evidence 26 be considered as an implicit unambiguous disclosure of the presence of a non aromatic epoxy resin in the PSX-700 product.
- 3.26.3 While it can be deduced from Evidence 24 that coatings on the basis of saturated bisphenol A epoxy resins (EPONEX type) would exhibit a good weatherability, this does not reciprocally imply that coatings containing an epoxy component and exhibiting good weatherability would inevitably be based on such non aromatic epoxy resin.
- 3.26.4 On the contrary, as shown by document D3, epoxy polymer/polysiloxane coatings comprising aromatic epoxy resins may also exhibit good weathering resistance (cf. D3, page 20, lines 10 to 12), so that the indication of good weathering properties of epoxy coatings cannot be inevitably equated with the presence of a non aromatic epoxy resin, let alone a non aromatic epoxy resin as disclosed in Evidence 24.
- 3.26.5 Furthermore, the Board also observes that the PSX-700 coating is said in Evidence 26 to have superior corrosion resistance in combination with good weathering properties, while as indicated in the patent in suit (Paragraph [0008]), non aromatic epoxy resins are generally known to have inferior corrosion resistance. Consequently, the alleged indication of the presence of a non aromatic epoxy resin in relation with good weathering properties in Evidence 26 would be clouded by the reference to superior corrosion resistance in the same document.

- 3.27 It thus follows from the above that it cannot be deduced from Evidence 26, even read in combination with Evidence 24, that the PSX-700 product comprises a non aromatic epoxy resin, let alone a non aromatic epoxy resin having the chemical composition of the EPONEX 1513.
- 3.28 Under these circumstances, there is no need for the Board to carry out a detailed evaluation of Evidence 25, since the alleged detectability of a non aromatic epoxy resin in the PSX-700 by attribution of some IR absorption bands in the IR spectrum 3b of Evidence 25 to the presence of an EPONEX resin in PSX-700 by way of comparison with the IR spectrum of the EPONEX 1510 raw material can only be based, for the reasons given above, on knowledge derived from the patent in suit.
- 3.29 Nor could the theoretical considerations made by the expert of the Appellant (cf. Evidence 11), in the Board's view, provide evidence that it would have been possible to detect the presence of the non aromatic epoxy resin having the chemical structure of EPONEX 1513 in the resin component of the PSX-700 by known analytical methods before the claimed priority date.
- 3.29.1 In this connection, the Board observes as a preliminary remark that the expert of the Appellant was already aware of the composition of the PSX-700 when he made its submissions, since its consultancy report referred to the "Opposition against European Patent Application Number 0792314".

- 3.29.2 It is further clear that the submissions made in Paragraph 3 of this report entitled "Epoxy resin" presuppose (cf. points 3.2 and 3.4) that it was known that an epoxy resin was present in the composition and that it might be of non aromatic nature.
- 3.29.3 In contrast to the expert of the Appellant, the skilled person trying to analyse the product PSX-700 before the claimed priority date of the patent in suit was not even aware of the presence of an epoxy resin in that product, so that the submissions of the expert concerning the detectability of a non aromatic epoxy resin in that product cannot be relevant for demonstrating such detectability before the claimed priority date of the patent in suit, since they are clearly based on hindsight.
- 3.29.4 Nevertheless, the Board notes, on the one hand, that, according to the expert of the Appellant (cf. point 3.4 of Evidence 11) the non occurrence of absorption bands in the IR spectrum in the region around 830 cm^{-1} would exclude the presence of an aromatic epoxy resin, and on the other hand, that the IR spectrum of the PSX-700 resin component precisely shows a broad absorption band in the region between 775 and 890 cm^{-1} (Evidence 20). Thus, a skilled person having followed the indications given by the expert of the Appellant would hence at best have concluded that an aromatic epoxy resin instead of a non aromatic epoxy one might have been present in the resin component of the PSX-700.
- 3.30 Consequently, the Board can only come to the conclusion that it has not been shown by the Appellant that the non aromatic epoxy resin having the chemical structure

of the EPONEX 1513 could have been detected by a skilled person in the PSX-700 resin component with analytical means available before the claimed priority date. In other words, at least for this reason, the composition of the product PSX-700 was not available to the public before the claimed priority date.

3.31 Thus, in accordance with the principles set out in decision G 1/92, the composition of the PSX-700 product sold before this priority date is not part of the state of the art for the purpose of Article 54(2) EPC.

3.32 Since lack of novelty of the claimed subject-matter has been alleged by the Appellant only in view of the prior sale of the PSX-700 product, the subject-matter of Claims 1 to 25 must be regarded as novel.

4. *Closest state of the art, the technical problem*

4.1 The patent in suit relates to epoxy resin/polysiloxane coating compositions.

4.2 Such compositions are known from document D3, which the Board in accordance with the Opposition Division regards as the closest state of the art.

4.3 D3 relates to a method for preparing an interpenetrating polymer network having an epoxy network intertwined with a polysiloxane network comprising the steps of:
a) mixing a silane with an epoxy resin having at least two oxirane groups per molecule, the silane being selected from the group consisting of alkoxysilane,

alkyltrialkoxysilane, aryltrialkoxysilane, and hydrolytic polycondensation products thereof;
b) distributing water substantially uniformly throughout the mixture in an amount sufficient to bring about substantial hydrolytic polycondensation of the silane to form a polysiloxane network;
and c) substantially simultaneously reacting the epoxy resin with an amino curing agent to form a polymerized epoxy resin network intertwined with the polysiloxane network (Claim 1).

4.4 The coating compositions prepared containing this IPN can be applied to a surface to be treated by conventional techniques such as spraying or brushing. The components of the coatings are supplied in a two-package system. One package contains the amine curing agent, which can include aminosilane and any accelerating agent if desired. Some solvent can be included with the curing agent. The other package contains the epoxy resin which may optionally include epoxysilane, solvent and fillers (page 15, lines 30 to 32; page 16, lines 9 to 15).

4.5 According to D3, the epoxy resins which could be used are those disclosed in the US patent No. 3 183 198 from column 3, line 27 to column 4, line 64 (page 8, lines 26 to 32). While the mentioned passage of this US patent generally mentions aliphatic and cycloaliphatic epoxy resins and specifically discloses at lines 41, 44, 45, and 50 of column 3, four non-aromatic epoxy resins, preference is clearly given in that document to aromatic epoxy resins (column 3, lines 65 to 68), and in all the examples D3 only aromatic epoxy resins are used.

- 4.6 As stated in D3, these interpenetrating polymer networks have substantial advantages over conventional epoxy polymers. D3 coatings containing these interpenetrating polymer networks IPN because of high cross-link density obtained in the presence of the polysiloxane, exhibit superior thermal stability, greater chemical and solvent resistance, and higher acid resistance than coatings containing the corresponding epoxy polymer. Coatings containing the interpenetrating polymer network are resistant to attack by strong solvents, such as acetone, methanol, and low-molecular weight amines, and provide corrosion, chemical, solvent, weathering, and heat resistance. Examples of surfaces on which these compositions can be used are steel structures of chemical processing plants, oil refineries, coal-fired power plants, and offshore drilling platforms (page 19, line 30 to page 20, line 15).
- 4.7 While according to the patent in suit its aim is to provide composition having improved weathering, corrosion and chemical resistance (Paragraph [0010]), in the absence of comparative data between the compositions of D3 and those of the patent in suit, the technical problem starting from D3 must be seen in the provision of further coating compositions having good weathering, corrosion, and chemical resistance.
- 4.8 According to the patent in suit, this problem is solved by providing a composition comprising a polysiloxane, a non aromatic epoxy resin, a difunctional amine hardener, and an organooxysilane which lead to the formation of a fully cured non interpenetrating polymer network.

4.9 In view of the Examples 1 to 3 of the patent in suit, the Board is satisfied that the problem is effectively solved by the claimed measures.

5. *Inventive step*

5.1 It remains to be decided whether the solution of the technical problem would have been obvious in view of the prior relied on by the Appellant, i.e. documents D2 and D3.

5.2 As indicated above in paragraph 4.6, D3 clearly associates the good chemical, corrosion, and weathering properties to the specific structure of the interpenetrated polymer network obtained. While the possibility of using non aromatic epoxy resins is mentioned in D3 (cf. paragraph 4.5 above), this is done in the Board's view, in passing and it is evident that this possibility cannot be not associated with any suggestion that this use might lead, in total contrast to the general teaching of D3, to the obtaining of a non-interpenetrating polymer network. Thus, D3 itself cannot render obvious the solution proposed in the patent in suit.

5.3 Nor could document D2 provide a hint to the solution proposed in the patent in suit, since while referring to polysiloxane coatings, it is totally silent on the use of epoxy resins therein, let alone the use of non aromatic epoxy resins.

5.4 Consequently, the subject-matter of Claims 1 to 25 must be considered as involving an inventive step (Article 56 EPC).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

E. Görgmaier

R. Young