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Datasheet for the decision of 17 February 2023

Case Number: T 1541/19 - 3.3.03

Application Number: 12806238.7

Publication Number: 2785803

IPC: C09D5/00, C09K3/18

Language of the proceedings: EN

Title of invention:
METHOD OF MITIGATING ICE BUILD-UP ON A SUBSTRATE

Patent Proprietor:
PPG Industries Ohio Inc.

Opponent:
Jotun A/S

Relevant legal provisions:
EPC Art. 56
RPBA Art. 12(4)

Keyword:
Inventive step - improvement not credible - obvious combination of known features
Inventive step - main request (no)
Late-filed request - admitted (yes)
Inventive step - auxiliary request (no)

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Case Number: T 1541/19 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 17 February 2023

Appellant: (Opponent)	Jotun A/S P.O. Box 2021 3202 Sandefjord (NO)
Representative:	Dehns St. Bride's House 10 Salisbury Square London EC4Y 8JD (GB)
Respondent: (Patent Proprietor)	PPG Industries Ohio Inc. 3800 West 143rd Street Cleveland, OH 44111 (US)
Representative:	f & e patent Braunsberger Feld 29 51429 Bergisch Gladbach (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 15 March 2019 concerning maintenance of the European Patent No. 2785803 in amended form.**

Composition of the Board:

Chairman	D. Semino
Members:	M. Barrère
	A. Bacchin

Summary of Facts and Submissions

I. The appeal of the opponent lies against the interlocutory decision of the opposition division concerning maintenance of European Patent number 2 785 803 in amended form on the basis of the claims of the first auxiliary request filed with letter of 30 November 2017 and an amended description.

II. The following documents were *inter alia* cited in the contested decision:

D1: WO 02/059210 A2
D3: US 5,804,616
D5: US 5,618,860
D6: Safety Data Sheet for PSX 700 Resin (PPG)
D7: Safety Data Sheet for PSX 700 Cure (PPG)
D8: Technical Data Sheet for RHODORSIL OILS 48 V 750 to V 1 000 000
D10: test report submitted by the patentee with letter of 10 October 2018

III. In that decision the opposition division held, amongst others, that:

- D1 was the closest prior art for claim 1 of the first auxiliary request. Claim 1 differed from example 3 of D1 in that the polyepoxide was

  i) a non-aromatic hydrogenated resin containing more than one glycidyl ether or ester group per molecule.

The problem to be solved was the provision of an improved curable film-forming composition for mitigating ice build-up on a substrate. Documents D1, D3 and D5 did not teach that a non-aromatic polyepoxide might be advantageous for mitigating ice build-up on a coated substrate. Therefore claim 1 involved an inventive step over D1 as the closest prior art.

IV. The opponent (appellant) filed an appeal against said decision.

V. With the rejoinder to the statement of grounds of appeal, the patent proprietor (respondent) filed a set of claims as first auxiliary request as well as the following document:

D13: Declaration of Scott J. Moravek, dated 6 December 2019.

VI. Oral proceedings were held before the Board on 17 February 2023.

VII. The final requests of the parties were as follows:

(a) The appellant requested that the decision under appeal be set aside and the patent be revoked.

(b) The respondent requested that the appeal be dismissed. In the alternative the respondent requested that the appealed decision be set aside and the patent be maintained in amended form on the basis of a first auxiliary request, filed with the rejoinder to the statement of grounds of appeal.

VIII. Claim 1 of the main request of the respondent in appeal (the first auxiliary request underlying the appealed decision) read as follows:

"1. A curable film-forming composition for mitigating ice build-up on a substrate, comprising:

(a) a resinous component comprising:

(i) a polyepoxide;

(ii) a polysiloxane; and

(iii) an organooxysilane;

(b) a polyamine and/or an aminosilane;

(c) at least one additional polysiloxane different from the polysiloxane of (ii) above, and

(d) optionally a catalyst; wherein

the polyepoxide (i) comprises a non-aromatic hydrogenated resin which contains more than one glycidyl ether or ester group per molecule."

In the first auxiliary request, claim 1 was amended with respect to the main request by adding the following expression at the end of the claim:

"and the organooxysilane (iii) has the formula: R_3-Si$(OR_4)_3$ where R_3 is selected from aryl, alkyl, and cycloalkyl groups containing up to six carbon atoms and where R_4 is independently selected from alkyl, hydroxyalkyl, alkoxyalkyl and

hydroxyalkoxyalkyl groups containing up to six carbon atoms."

The remaining claims of these requests are not relevant to the present decision.

IX. The appellant's submissions, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. They were essentially as follows:

(a) Main request (amended claims according to the first auxiliary request considered allowable in the appealed decision)

(i) Inventive step

The subject-matter of claim 1 of the main request did not involve an inventive step over D1 alone.

(b) First auxiliary request

(i) Admittance

The first auxiliary request should not be admitted into the appeal proceedings.

(ii) Inventive step

The subject-matter of claim 1 of the first auxiliary request did not involve an inventive step over D1 in combination with D5.

X. The respondent's submissions, in so far as they are pertinent to the present decision, may be derived from

the reasons for the decision below. They were essentially as follows:

(a) Main request (amended claims according to the first auxiliary request, considered allowable in the appealed decision)

(i) Inventive step

The subject-matter of claim 1 of the main request involved an inventive step over D1 alone.

(b) First auxiliary request

(i) Admittance

The first auxiliary request should be admitted into the appeal proceedings.

(ii) Inventive step

The subject-matter of claim 1 of the first auxiliary request involved an inventive step over D1 as the closest prior art. In particular the teaching of D3 and D5 was not compatible with D1.

Reasons for the Decision

Main request (amended claims according to the first auxiliary request, considered allowable in the appealed decision)

1. Inventive step

1.1 Closest prior art and distinguishing feature

The parties agree that D1 is the closest prior art for the subject-matter of claim 1 and that claim 1 differs from example 3 of D1 in that the polyepoxide is

i) a non-aromatic hydrogenated resin containing more than one glycidyl ether or ester group per molecule (instead of an aromatic polyepoxide: "Epon 862")

The Board has no reason to depart from this view.

1.2 Problem to be solved

Regarding the problem to be solved, the parties had different opinions.

1.2.1 According to the respondent, the additional experimental evidence D10 shows that a coating composition according to present claim 1 is characterised by a reduction of the ice adhesion after weathering compared to a coating composition comprising an aromatic polyepoxide. Furthermore, the alleged deficiencies of D10 (raised by the appellant) were addressed in D13 showing that the comparative tests of D10 were valid and meaningful. Therefore the respondent agreed with the conclusion of the opposition division that the objective problem to be solved over D1 should be formulated as the provision of a coating composition providing reduced ice adhesion.

1.2.2 In the appellant's view, it is not credible that the compositions according to present claim 1 provide any advantage over example 3 of D1 for the following reasons:

(a) the comparative example provided in the test report D10 is not suitable to show an effect over D1 and

(b) it is not plausible that the alleged advantage in term of reduced ice adhesion be achieved over the whole ambit of claim 1 (breadth of claim 1).

Therefore the appellant concludes that the objective problem to be solved should be reformulated as the provision of an alternative curable coating composition that mitigates ice build-up on a substrate.

1.2.3 The Board agrees with the appellant for the following reasons:

(a) According to established case law, if comparative tests are chosen to demonstrate an inventive step on the basis of an improved effect, the nature of the comparison with the closest state of the art must be such that the alleged advantage or effect is convincingly shown to have its origin in the distinguishing feature of the invention compared with the closest state of the art (see Case Law of the Boards of Appeal, 10th edition 2022, I.D. 4.3.2).

In the present case, the respondent provided test report D10 as evidence for an alleged effect related to the presence of a non-aromatic hydrogenated polyepoxide instead of an aromatic polyepoxide. In particular, the compositions of the examples of D10 are described as follows:

Example A: PSX700 (lab batch) with 10wt% Bluesil 48V 3500

Example B (comparative): PSX700 (lab batch) with EPON 828 replacement and 10wt% Bluesil 48V 3500

In order to conclude that any effect shown in D10 has its origin in the nature of the polyepoxide, the Board should be able to rule out the influence of any other aspect of the composition (such as the nature and weight percentages of the various components present in the compositions). Furthermore, the Board should be able to assess whether, in the present case, the composition of example A falls within the scope of claim 1 of the main request.

While it may be derived from D10 that a hydrogenated resin (present in example A) was replaced by EPON 828 corresponding to an aromatic polyepoxide, D10 does not mention the amount of the various components or the nature of all components present. In particular, the composition of "PSX700 (lab batch)" is not disclosed. Therefore, on the basis of D10 alone, the Board and the appellant are not able to evaluate:

(i) whether the technical effects shown in D10 result from the above distinguishing feature i) alone or from any other possible difference between examples A and B and

(ii) whether the composition of example A is according to present claim 1.

These questions are not clarified even taking into account the declaration D13, which was filed with the rejoinder to the statement of grounds of appeal. It is stated in D13 that the replacement of

the polyepoxide was done so as to maintain the reaction stoichiometry. It was furthermore mentioned therein that, due to the difference of epoxy equivalent weight (EEW) between the hydrogenated epoxy of example A and the aromatic epoxy of example B, the amount of reactive components in terms of wt% of total solids in the formula was scaled to maintain the same pigment to binder ratio (P/B).

However, declaration D13 still does not disclose the exact compositions of examples A and B. Therefore D13 neither overcomes the deficiencies of D10 nor allows the Board or the appellant to assess whether the only meaningful difference between examples A and B is indeed the nature of the epoxy resin.

Moreover, D13 raises additional questions as to the exact composition of examples A and B. It is indeed mentioned in D13 that the amount of resin was adjusted in example B in order to maintain the same P/B. However, according to D10, the coating composition of example A comprises PSX700 (lab batch) with 10wt% Bluesil 48V 3500. As pointed out by the appellant, the commercial versions of these components do not appear to contain any pigment (see D6, page 2, section 3.2; D7, page 1, section 3; D8, page 1, description). It must therefore be concluded that the compositions of examples A and B include additional components (such as a pigment) which are not mentioned in D10.

For these reasons, the experimental data presented in D10 (even taking D13 into account) are not sufficient to make it credible that there is a

technical effect related to the epoxy resin as distinguishing feature.

(b) The appellant further criticised that it would not be credible that the alleged advantage was achieved over the whole scope of claim 1.

According to established case law, if the inventive step of a claimed invention is based on a given technical effect, the latter should, in principle, be achievable over the whole area claimed (see Case Law, *supra*, I.D.4.3.1). Furthermore, if the proprietor of a patent alleges the fact that the claimed invention improves a technical effect, then the burden of proof for that fact rests upon him.

As noted previously, the experimental data submitted in D10 and D13 are not considered sufficient to show an effect of the alleged invention. The only examples according to present claim 1 are therefore formulations 2 and 3 of the opposed patent.

However, as pointed out by the appellant, present claim 1 covers a large number of embodiments with no limitation as to the amount of the various components. Besides, due to the wording "comprising", claim 1 covers compositions including aromatic polyepoxides (which are allegedly disadvantageous). Hence, the Board is not convinced that the two formulations submitted in the patent are sufficient to make it credible that an alleged technical effect is obtained over the whole scope of claim 1.

For these reasons, the objective problem to be solved must be reformulated as the provision of an alternative curable coating composition that mitigates ice build-up on a substrate.

1.3 Obviousness of the solution

For the Board, it remains to be evaluated whether it was obvious for a skilled person wishing to provide an alternative to the ice-mitigating composition of example 3 of D1 to replace the aromatic epoxy resin by a non-aromatic hydrogenated epoxy resin as defined in present claim 1.

The respondent holds that D1 teaches away from using a non-aromatic hydrogenated epoxy resin. This document would disclose a single example of epoxide as defined in present claim 1, however aromatic epoxides would be clearly preferred. Furthermore the teaching of documents D3 and D5 would not be compatible with D1 so that these additional documents could not lead to the claimed invention.

According to the appellant, the alternative suggested in claim 1 would be obvious in view of D1, D3 and D5. The appellant further argued that the line of defence concerning the alleged incompatibility of D1 with D3 and D5 was late filed and should not be admitted into the proceedings.

The Board cannot follow the respondent's line of argument for the following reasons:

As noted previously, the problem to be solved over D1 is seen as the provision of an alternative coating composition that mitigates ice build-up on a substrate.

D1 discloses that the epoxy resin may be selected from a list including the polyglycidyl ether of 2,2-bis(4-hydroxy cyclohexyl) propane corresponding to a non-aromatic hydrogenated epoxide as defined in claim 1 (see D1, page 5, lines 20 to 23). While the said resin may not be the preferred one, it is nevertheless a clear alternative to the aromatic epoxy resin used in example 3 of D1.

It is therefore an obvious option for the skilled person wishing to provide an alternative ice-mitigating coating composition to replace the aromatic epoxide of example 3 of D1 with the polyglycidyl ether of 2,2-bis(4-hydroxy cyclohexyl) propane as suggested by D1. The subject-matter of present claim 1 therefore lacks an inventive step over D1 alone and the Board need not further consider the alleged incompatibility of D1 with D3 or D5.

First auxiliary request

2. Admittance

2.1 The first auxiliary request was filed with the rejoinder to the statement of grounds of appeal. Its admission into the proceedings, which is contested by the appellant, is subject to the discretionary power of the Board in accordance with Article 12(4) RPBA 2007, which applies in view of the transitional provisions in Article 25(2) RPBA 2020.

2.2 According to the respondent, the first auxiliary request was filed in reaction to the arguments presented by the appellant and did not raise any new issues (see rejoinder, page 7, first paragraph).

2.3 The appellant considered that the factual and legal framework of the case had not changed. The prior art was the same and there was no new evidence filed with the statement of grounds of appeal. Therefore the first auxiliary request could and should have been filed earlier.

2.4 It is undisputed that the first auxiliary request is a new request filed for the first time during appeal proceedings.

It is however pointed out that the opposition division was of the preliminary opinion that the first auxiliary request (corresponding to the present main request) did not involve an inventive step (see communication accompanying the summons to oral proceedings, points 20 to 25). The respondent reacted to this preliminary opinion by filing test report D10 in support of inventive step of the first auxiliary request. On the basis of D10, this request was finally found to be allowable by the opposition division during oral proceedings so that the respondent had no reason to file further requests. Moreover, the present first auxiliary request was filed at the onset of the appeal proceedings and the subject-matter of its claim 1 is identical to claim 3 of the main request. Therefore, it does not introduce new subject-matter surprising for the appellant.

2.5 Under these circumstances, as no abusive behaviour by the respondent is apparent and no reason can be found why the respondent should have filed such a request in opposition proceedings, the Board does not find it appropriate to exercise its power under Article 12(4) RPBA 2007 to hold the first auxiliary request inadmissible.

3. Inventive step

3.1 Claim 1 of the first auxiliary request corresponds to claim 3 of the main request. It differs from claim 1 of the main request in that the organooxysilane (iii) is characterised by the formula:

> "R_3-Si$(OR_4)_3$ where R_3 is selected from aryl, alkyl, and cycloalkyl groups containing up to six carbon atoms and where R_4 is independently selected from alkyl, hydroxyalkyl, alkoxyalkyl and hydroxyalkoxyalkyl groups containing up to six carbon atoms"

3.2 Closest prior art and distinguishing feature

The parties agree that D1 is the closest prior art for the subject-matter of claim 1 and that claim 1 differs from example 3 of D1 in that

> i) the polyepoxide is a non-aromatic hydrogenated resin containing more than one glycidyl ether or ester group per molecule (instead of an aromatic polyepoxide "Epon 862") and
>
> ii) the coating composition further comprises a organooxysilane (iii) of formula R_3-Si$(OR_4)_3$ as defined in claim 1.

The Board has no reason to depart from this view.

3.3 Problem to be solved

The parties acknowledged that there was no example of a composition comprising an organooxysilane (iii) in the

opposed patent or in D10 and considered that the problem to be solved should be formulated as the provision of an alternative ice-mitigating coating composition.

The Board has also no reason to depart from this view.

3.4 Obviousness of the solution

For the Board, it needs to be evaluated whether it was obvious for a skilled person wishing to provide an alternative to the ice-mitigating composition of example 3 of D1 to:

i) replace the aromatic epoxy resin by a non-aromatic hydrogenated epoxy resin as defined in present claim 1 and

ii) add to the said composition an organooxysilane (iii).

In view of the fact that the two distinguishing features i) and ii) do not contribute to a common technical effect, it is to be evaluated whether each of the distinguishing features (taken individually) was obvious in view of the cited prior art.

As far as the first distinguishing feature is concerned (non-aromatic hydrogenated epoxy resin), the Board already came to the conclusion that it was obvious in view of D1 alone to replace the aromatic epoxy resin by a non-aromatic hydrogenated epoxy resin as defined in claim 1 (reference is made to point 1.3 of the present decision).

It remains to be assessed whether it was also obvious for the skilled person to add an organooxysilane (iii) to the composition of example 3 of D1 in order to provide an alternative ice-mitigating coating composition.

3.4.1 According to the respondent, there is no pointer in D1 towards the use of alkoxysilane (iii). Furthermore D3 and D5 do not relate to anti-icing coating and, therefore, cannot give any hint to a person skilled in the art wishing to provide an alternative ice-mitigating coating.

During the oral proceedings, the respondent further argued that the teaching of D1 would be incompatible with the disclosure of D3 or D5, so that the skilled person would not have taken these additional documents into consideration when looking for an alternative to the composition of D1. In particular, the respondent contended that D1 pertained to anti-icing coatings made of an epoxy-modified interpenetrating polymer network (IPN) of glass and epoxy (see D1, page 2, lines 21-25). Conversely, D3 would relate to a non-interpenetrated polymer network which would not be compatible with the IPN coatings according to D1 (see D3, abstract and column 8, lines 36-40). Although, according to the respondent, D5 did not mention the term IPN, the same consideration would apply to this document in view of the similarities with D3. The skilled person would therefore have been aware that the scope D3 and D5 is limited to non-IPN coatings.

3.4.2 The appellant considers that the use of an organooxysilane (iii) was obvious in view of D5. Furthermore, the line of defence concerning the alleged

incompatibility of D1 with D3 and D5 was late-filed and should not be admitted into the proceedings.

3.4.3 It is not disputed that D5 discloses an organooxysilane as defined in present claim 1 (see D5, column 5, lines 1-13). However, it should be evaluated whether the skilled person, wishing to provide an alternative to the ice-mitigating coating composition of D1, would have considered the teaching of D5 and used said organooxysilane in the composition.

(a) The opposed patent and D1 relate to anti-icing coating compositions suitable for use on a variety of outdoor substrates (see opposed patent, paragraphs [0001] and [0002] and D1, page 1, field of the invention). D5 pertains to epoxy based coatings having a good weatherability (see D5, column 1, lines 11-14 and column 3, lines 55-57). Icing is essentially a weathering phenomenon. D5 also mentions that epoxy coatings are typically used as protective coating of external surfaces such as aircraft (see D5, column 1, lines 19-23). In cold weather, aircraft surfaces are typically exposed to snow, ice, freezing rain or frost. In view of the similarities in terms of properties and technical field, the Board holds that the skilled person wishing to provide an alternative to the anti-icing coatings of D1 would have taken into consideration the disclosure of D5.

(b) The respondent argued that the teaching of D1 would not be compatible with D3 and D5. In this context, it was referred to the fact that the coating of D1 was an IPN coating while D3 and D5 would relate to non-IPN coatings. Independently of the admittance of this line of defence, the Board notes that the

parties did not contest that the terms "IPN" or "non-IPN" were not explicitly mentioned in D5. Already for that reason, the Board considers that the respondent's line of defence does not apply to document D5. The respondent argued that the similarities between D3 and D5 would have lead the skilled person to the conclusion that D5 is also limited to non-IPN coatings. However, D5 is a stand-alone disclosure without explicit reference to D3. Hence, the Board has no reason to believe that the disclosure of D3 in any way limits the teaching of D5. For these reasons, the respondent's additional line of defence fails to convince, so that a decision on its admittance into the proceedings can be left aside.

(c) In conclusion, the skilled person wishing to provide an alternative to the anti-icing coating composition of D1 would consider the disclosure of D5. As noted above, D5 teaches that organooxysilane (iii) can be used in weather resistant coatings. The use of the said silane therefore represents an obvious option to the skilled person.

3.4.4 Consequently, the subject-matter of claim 1 of the first auxiliary requests lacks an inventive step over D1 in combination with D5.

4. As all operative requests are not allowable, the decision under appeal is to be set aside and the patent is to be revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

D. Hampe D. Semino

Decision electronically authenticated