Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 30 September 2020

Case Number: T 0640/17 - 3.3.06

Application Number: 10196654.7

Publication Number: 2302020

IPC: C10L1/14, C10L1/224, C10L1/22

Language of the proceedings: EN

Title of invention:
Use of additives for improving oxidation stability of a fuel oil composition

Patent Proprietor:
Innospec Limited

Opponent:
Afton Chemical Corporation

Headword:
Use of PIBSI as a fuel antioxidant / INNOSPEC

Relevant legal provisions:
EPC Art. 76(1), 123(2), 54(2), 54(3), 56, 100(b), 100(c), 100(a)

Keyword:
Divisional application - added subject-matter (no)
Sufficiency of disclosure (yes)
Novelty - (yes)
Inventive step - non-obvious alternative

Decisions cited:
T 1621/16

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 0640/17 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 30 September 2020

Appellant: (Patent Proprietor)	Innospec Limited Innospec Manufacturing Park Oil Sites Road Ellesmere Port Cheshire CH65 4EY (GB)
Representative:	Appleyard Lees IP LLP 15 Clare Road Halifax HX1 2HY (GB)
Respondent: (Opponent)	Afton Chemical Corporation 500 Spring Street Richmond, Virginia 23219 (US)
Representative:	J A Kemp LLP 14 South Square Gray's Inn London WC1R 5JJ (GB)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 19 January 2017 revoking European patent No. 2302020 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	J.-M. Schwaller
Members:	R. Elsässer
	J. Hoppe

Summary of Facts and Submissions

I. The proprietor (appellant) appealed against the decision of the opposition division to revoke the patent for lack of sufficiency of disclosure (Article 100(b)/83 EPC).

II. Claim 1 as granted reads as follows:

"*1. The use in a High Speed Direct Injection engine of a nitrogen-containing dispersant to improve the oxidation stability of a fuel composition containing biodiesel at temperatures above 120°C, wherein the nitrogen-containing dispersant is a reaction product of an acylating agent being a hydrocarbyl-substituted carboxylic acid or derivative thereof with an amine which product includes a hydrocarbyl substituent of at least 8 carbon atoms; wherein the hydrocarbon substituent of the acylating agent has a number average molecular weight of from 500 to 1500*."

III. With its grounds of appeal, the appellant requested to set aside the decision and to maintain the patent as granted (main request). Further it filed four sets of amended claims as auxiliary requests 1, 1A, 2 or 3, as well as three new documents labelled D41 (Automotive fuels - Diesel - Requirements and test methods, BS EN 590:2009), D42 (S. Westbrook, "Evaluation and Comparison of test methods to measure the oxidation stability of neat Biodiesel", NREL/SR-540-38983 (2005) and D43 (Worldwide Fuel Charter, September 2013).

IV. With its reply, the respondent requested to dismiss the appeal because the patent as granted infringed Articles 76(1) and 83 EPC and its claimed subject-matter lacked

novelty over each one of documents D1 (ES 2261063), D2 (WO 2008/049822), D3 (WO 2008/124390), D4 (EP 1847583) and D5 (R. Barbour et al., "*Diesel detergent additive responses in modern, high-speed, direct-injection, light-duty engines*", p. 509-520, SAE Papers (2007)) and over the general use of diesel vehicles in Europe. Moreover, the claimed subject-matter lacked an inventive step over documents D6 (IASH, newsletter No. 35, November 2006) and D7 (WO 02/102942). Further the respondent requested that the case not be remitted to the opposition division and that documents D32 (R. Batt et al, "*Stabiliser additive performance in Diesel fuels and Gas Oils meeting new environmental targets*", 5th Int. Conf. On Liquid Fuels, Rotterdam, (1994), D33 (R. Banavali, "*Tertiary alkyl primary amines as stabilizer for MD Fuels*", Fuel Preprints (1997), D34 (Handbook of air pollution from ICE, chapter 16: fuel effects on emissions (1998), D36 (Lubricants and special fluids, pages 315 to 318 (1992), D37 (Handbook of lubrication and tribology, pages 11-20 (1996)), D38 (Succinimide dispersants, pages 11-20 (2006), D39 (US 3445386) and D40 (European Standard EN 15751 (June 2009), filed during opposition proceedings, be admitted into the proceedings. Further it submitted a second declaration of Dr. Schwab as the new document D44.

V. In three further submissions, the respondent filed documents D45 (A. Beck et al, "*Investigation of the effect of detergent-dispersant additives on the oxidation stability of biodiesel, diesel and blends*", Biomass and Energy (2014)), D46 and D46a (Biokraftstoffquotengesetz with English translation) and D47 (decision in the opposition case EP2141220).

VI. On 26 June 2020, the respondent withdrew its request for oral proceedings.

VII. On 29 July 2020 the appellant filed arguments in favour of inventive step based on documents D1 and D7.

VIII. Oral proceedings took place on 30 September 2020 in the absence of the respondent.

IX. At the end of the oral proceedings, the final requests of the parties were established as follows:

The appellant requested that the decision under appeal be set aside and that the patent be maintained as granted (main request), or auxiliarly, in amended form, based on one of auxiliary requests 1, 1A, 2 or 3, filed with the grounds of appeal.

The respondent requested in writing to dismiss the appeal.

Reasons for the Decision

1. Admittance of D32-D34, D36-D40 and D44-D47

1.1 Although documents D32-D40 were all late-filed, the opposition division admitted D35. In contrast it did not admit documents D32-D34 and D36-D40 because it did not find them "relevant for the case". Since the opposition division decided not to admit these documents into the proceedings, the board has to assess whether the opposition division exercised its discretion in a reasonable way and used the correct principles. According to established case law, one relevant criterion for admitting a late filed document in opposition proceedings is its prima-facie relevance.

The Board notes that the decision (point 6) mentions the lack of relevance of the documents, but no reasons were given as to why the individual documents were found not to be relevant. Therefore it is not clear to the Board whether the division indeed applied the correct criterion when not admitting the documents (cf. T 544/12, reasons 2.2.4).

1.1.1 D32-D34 were filed as evidence for the opponent's view that the feature "improve the oxidation stability" should be interpreted broadly, i.e. that this feature should not be understood as being limited to a particular mechanism. This interpretation was not followed by the opposition division (decision: page 9, last paragraph) but no reasons were given. As the interpretation of this feature is of relevance in the appeal proceedings, the Board exercises its own discretion under Article 12(4) RPBA 2007, Article 25(2) RPBA 2020 to admit documents D32-D34 into the procedure.

1.1.2 D36-D37 were filed, along with D35, as evidence for the opponent's view that the improvements shown in the examples of the patent were not due to an improvement of the oxidation stability but resulted from the inherent basicity of the nitrogen-containing dispersants. While the argument as such was accepted by the opposition division (decision: middle of page 10), two of the documents supporting the argument (D36, D37) were not admitted as not relevant for the decision which is apparently a contradiction. Under these circumstances and in view of the relevance of the documents the Board uses its own discretion not to exclude D36 and D37 from the appeal proceedings (Article 12(4) RPBA 2007, Article 25(1) RPBA 2020).

1.1.3 D38 was filed as evidence in connection with the discussion of novelty and inventive step. As these issues are not discussed at all in the decision, it is not apparent that or how the opposition division assessed the prima-facie relevance of D38 for the assessment of novelty or inventive step. The Board therefore uses its own discretion not to exclude D38 from the appeal proceedings (Article 12(4) RPBA 2007).

1.1.4 D39 was filed in order to prove that the passage on page 6, lines 15-20 of the parent application did not support the feature "reaction product of an acylating agent being a hydrocarbyl-substituted carboxylic acid or derivative thereof with an amine". However, the decision under appeal (see point 2.1) is not based on that passage but on claim 2 of the application as filed and claim 3 of the parent application. Hence D39 was indeed irrelevant and the opposition division exercised its discretion in a reasonable way and used the correct principles. Thus, the Board exercised its own discretion to exclude D39 from the appeal proceedings under Article 12(4) RPBA 2007, Article 25(2) RPBA 2020.

1.1.5 D40 was filed as evidence for the opponent's argument that the Rancimat test is unsuitable for blends of mineral diesel; the opposition division accepted this argument (decision: page 10, line 6-7) but did not admit D40 for a lack of relevance which is apparently a contradiction. Under these circumstances and in view of the relevance of the document the Board uses its own discretion not to exclude D40 from the appeal proceedings (Article 12(4) RPBA 2007, Article 25(1) RPBA 2020).

1.2 As regards document D44 which has been filed for the first time with the reply to the grounds of appeal, the

Board does not see any reason for not admitting it into the appeal proceedings as it constitutes a direct response to the arguments submitted in the grounds of appeal regarding the lack of experimental data in D35 (Article 12(4) RPBA 2007, Article 25(2) RPBA 2020).

1.3 The Board, however uses its discretion not to admit D45 (filed after the reply into the proceedings) under Article 13(1) RPBA 2020, Article 25(1) RPBA 2020 because it is not prima-facie relevant for the question of sufficiency of disclosure. As claim 1 does not define any particular mechanism of how the oxidation stability is to be improved, the question whether polyimide succinimides act as "true antioxidants" or not is irrelevant.

1.4 The Board uses its discretion to admit D46 (and its translation D46a) into the appeal proceedings (Article 13(1) RPBA 2020, Article 25(1) RPBA 2020) since this document is prima facie relevant for the question of novelty over the general use of diesel vehicles in Europe, see point 4.4 below. Moreover, D46 underpins a point already made so that its admission is not detrimental to procedural economy.

1.5 D47 is a decision in the opposition case EP2141220, which documents the legal conclusions drawn by the opposition division from the facts underlying this unrelated case but does not contain new facts. Hence, D47 has no bearing for the present appeal proceedings.

2. Article 100(c) EPC

The board came to the conclusion that the ground under Article 100(c) EPC does not prejudice the maintenance

of the patent as granted for the reasons which follow.

2.1 Article 76(1) EPC

2.1.1 The subject-matter of claim 1 as granted is directly and unambiguously disclosed in the parent application PCT/GB2008/050626. The description thereof discloses three aspects of the invention (the first on page 5, line 27 ff., the second on page 21, line 5 ff. and the third on page 26, line 16 ff.). The passage relating to the third aspect of the invention (page 26, line 16-32) discloses the use of a nitrogen-containing dispersant to improve the oxidation stability of a fuel composition containing biodiesel at temperatures of 110°C and above, including 120°C. Further it discloses that the use may take place in HSDI engines. Said passage also states that the nitrogen-containing dispersants of the third aspect of the invention are preferably as defined in relation to the first or second aspects. Therefore, the features of claim 3(i) of the parent application, which concern the first aspect of the invention (compare claim 1 and page 5, line 27 to 30) equally apply to the third aspect. The same applies to the disclosure of the passage on page 8, line 11 to 15 where the molecular weight of the substituent is disclosed. Hence, claim 1 is based on the passages on page 16, line 16 to 32 and page 8, line 11 to 15 and on claim 3(i) of the parent application.

2.1.2 For the Board, the wording of granted claim 1 clearly implies that the fuel composition is used in a High Speed Direct Injection Engine and thus this aspect which is disclosed on page 26, line 32 has not been omitted from the claimed subject-matter, as alleged by the respondent. The Board does also not agree with the respondent that the claimed subject-matter would result

from mosaicking together unrelated features because, as mentioned above, the passage on page 26, lines 21 to 23 connects the various parts of the application. The Board agrees with the respondent that for the temperature and the molecular weight, alternative values are disclosed. However, the corresponding lists (molecular weight ranges on page 26, lines 27 and 28 and temperature ranges on page 8, lines 12 to 16) do not concern mutually excluding alternatives but converge towards the most preferred, most narrow ranges. According to T 1621/16, such a selection is not contrary to the requirements of Article 123(2) or 76(1) EPC, provided that certain conditions are met. In the present case, the Board is of the opinion that the conditions are fulfilled since examples 3 and 4 (additive A) fall within the subject matter of claim 1 and so act as a pointer. Thus, the restriction of the scope of protection is not arbitrary (T 1621(/16, point 1.8.7 of the reasons). Moreover the selections leading to present claim 1 are not associated with any undisclosed technical contribution.

2.1.3 Claims 2 and 3 are based on claims 4 and 5; claims 4 to 7 on claims 7 to 10 and claim 8 on page 26, line 28 of the parent application. Additional support for claim 4 can be found on page 27, lines 25-30.

2.1.4 For these reasons, the Board is satisfied that the requirements of Art. 76(1) EPC are met.

2.2 Article 123(2) EPC

The subject-matter of claim 1 also finds basis in the divisional application as filed, namely in claims 1 and 2(i) and the passages at page 8, lines 11 to 15 and page 16, lines 16 to 32. Claims 2 and 3 are based on

claims 3 and 4. Claim 4 is based on claim 5 with additional support on page 27, lines 25 to 30. Claims 5 to 7 are supported by claims 6 to 8 and claim 8 is based on page 26, line 28 of the divisional application as filed.

Hence the requirements of Art. 123(2) EPC are also met.

3. Article 100(b) EPC

3.1 In its preliminary opinion, the Board had given reasons as to why the invention was sufficiently disclosed. No counter arguments were submitted by the respondent who also did not attend the oral proceedings. Therefore the Board has no reason to deviate from said opinion which essentially was based on the following reasons.

3.2 The respondent's objection was essentially based on the absence of disclosure in the patent of a test method to measure the improvement of oxidation stability of the fuel composition claimed (which contains biodiesel) at temperatures above 120°C in a HSDI engine.

3.3 The board does not accept this approach because in the present case, the improved oxidation resistance of the claimed fuel composition is indisputably the result of the use of the claimed nitrogen-containing dispersant and not the result of a measurement method, with the consequence that the skilled person is manifestly able to reproduce the claimed invention (simply by adding the nitrogen-containing additive to the fuel/biodiesel composition).

3.4 Furthermore for the board it is undisputable that a skilled person - here a chemical engineer - is able to check whether the oxidation stability of a fuel

composition is improved or not by the presence of an additive, namely by measuring - using conventional analytical methods - the amount of oxidised compounds in the fuel with and without additive before and after having been used in the HSDI engine at T > 120°C.

3.5 Since conventional methods of analysis can be used for this purpose, the absence of a specific method of measurement is not an issue under Article 83 EPC (since as explained above the invention can easily be verified and carried out without the disclosure of such a method) but rather a clarity issue since the boundaries of the claim may be held to be vague and undefined.

3.6 The other arguments put forward by the respondent, namely that the Rancimat test was generally not suitable for measuring the oxidation stability of blends of mineral diesel and biodiesel (D22, D29, D40) and that the improvements shown by the experiments in the contested patent were not due to the prevention of oxidation but to the basicity of the polyisobutene succinimide (PIBSI) detergents used (D35, D36, D37 and D44) are irrelevant for the issue of sufficiency of disclosure. The same applies to the argument that the claim allegedly covers non-working embodiments. The fact that D15, which is not prior art, shows that a fuel composition according to the invention (figure 12) does not perform well when subjected to a test which involves passing the fuel over a surface heated at 260°C does not mean that the same fuel composition would not show an increased oxidation stability at 120°C in an HSDI engine. Finally, the objection based on the allegedly very broad scope of claim 1 can also not be followed since the Board's interpretation of the scope of claim 1 is more limited, see point 4.1 below.

3.7 It follows that the ground under Article 100(b) EPC does not prejudice the maintenance of the patent as granted.

4. Novelty (Article 54(2) and (3) EPC)

For the board, the claimed subject-matter of the patent as granted is novel for the following reasons.

4.1 Claim Interpretation

4.1.1 The Board does not share the respondent's opinion that the average molecular weight of the hydrocarbyl substituent of between 500 and 1500 is not a limiting feature of the nitrogen-containing dispersant of claim 1. It is true that in claim 1 the nitrogen-containing dispersant is partly described by its production process. It is also correct that the molecular weight of the hydrocarbon substituent is given for the acylation agent, i.e. for one of the starting materials of the reaction. However from the reading of the claim as a whole, it is clear that the substituent is also present in the nitrogen-containing dispersant. The Board notes that, according to the first alternative of the process, the dispersant is obtained by the reaction of an acylating agent being a hydrocarbyl-substituted carboxylic acid with an amine, the substituent on the acylating agent (i.e. on said acid) having an average molecular weight of between 500 and 1500. In the acylation reaction, this substituent remains in the acid moiety of the molecule so that the nitrogen-containing dispersant obtained comprises a hydrocarbyl substituent having an average molecular weight of between 500 and 1500. In the alternative process, a derivative "thereof" is used, i.e. a derivative of said acid. Irrespective of the nature of the derivative

(anhydride, ester, etc.), the acid moiety bears the substituent which remains in the molecule after the acylation reaction. Therefore the argument that any polyisobutylene succinimide (PIBSI) would fulfill the requirements of the product-by-process definition of claim 1 is not convincing; it follows that the feature "average molecular weight of between 500 and 1500" is clearly limiting the claimed subject-matter.

4.1.2 Further, the Board agrees with the respondent's interpretation that claim 1 does not specify any particular mechanism by which the oxidation stability of the fuel composition is improved. This interpretation follows from the wording of the claim and is also confirmed by e.g. D32-D34.

4.2 In view of the above interpretation of claim 1, the board notes that D1 and D5 at least do not disclose the average molecular weight of the polyisobutylene substituent of the PIBSIs used therein. The subject matter of claim 1 is therefore novel over each of these documents (Art. 54(2) EPC).

4.3 Concerning D2, D3 or D4, which are all state of the art under Article 54(3) EPC, it is undisputed that neither of them discloses the use of the dispersant in an HSDI-engine at temperatures above 120°C. The respondent argued that at the priority date of these documents, HSDI diesel engines were dominant on the market - which is undisputed - however this does not mean that the feature is implicitly disclosed since other types of diesel engines still existed. Therefore the subject matter of claim 1 is novel over either of D2, D3 and D4 (Art. 54(3) EPC).

4.4 The subject matter of claim 1 is also novel over the general use of diesel vehicles in Europe, although the Board agrees with the respondent that at that time, HSDI diesel engines had become predominant on the market. The Board also agrees with the respondent that at the priority date of the patent, the use of B10-biodiesel was widespread or even required by law, as shown by D46. However, the respondent has not shown that said B10-biodiesels indeed contained the nitrogen-detergent defined in claim 1. The respondent has filed a range of documents which show that PIBSIs have been used as diesel additives already many years before the priority date. For instance, it referred to D7 or D38 which discloses PIBSIs having all the features of claim 1. However, neither of these documents are novelty destroying as such, because they do not disclose the use of PIBSIs in HSDI engines at temperatures above 120°C. Turning back to the diesel vehicles in Europe, there is no evidence on file that shows that the specific PIBSIs disclosed in D7 or D38 were actually used in practice in blends of mineral diesel and biodiesel.

4.5 Therefore the Board concludes that the subject matter of claim 1 (and by the same token of claims 2 to 8, which depend thereon) is novel (Article 54(2) and (3) EPC).

5. Inventive step (Article 56 EPC)

The board came to the conclusion that the subject matter of claim 1 as granted involves an inventive step for the following reasons.

5.1 The present invention relates to the use of a specific nitrogen-containing dispersant in a High Speed Direct

Injection diesel engine at temperatures over 120°C to improve the oxidation stability of a fuel composition containing biodiesel.

5.2 As regards the closest prior art, the appellant argued that either D6 or D7 would represent the best starting point for assessing inventive step. For the board, D6 is closer to the invention because this document deals with the oxidation stability of fuels containing biodiesel in the specific conditions found in the new HSDI engines (see the abstract, par. 4.1 and 6). D7 on the other hand is concerned by improving the deposit preventing properties of PIBSIs in the older indirect injection engines. Furthermore, oxidation or increasing the oxidation stability of a diesel fuel is not mentioned in D7.

The Board has also considered D1 which was cited by the respondent as novelty-destroying document. In substance it is very similar to D6 and addresses the problem of improving the oxidation stability of biodiesel in the new HSDI engines (see D1: page 2, lines 20-25, page 7, line 4 to 5, example 2B). Both documents teach to add dispersants to the fuel composition. While D6 is silent regarding the nature of the dispersant used, D1 teaches to use a PIBSI dispersant, and is thus closer to the subject-matter of claim 1 and represents the closest prior art.

5.3 As to the problem to be solved the board notes that there is no evidence on file for any improvement of the oxidation stability. The examples of the patent show an improvement vis-à-vis fuel composition comprising known antioxidants but none of the comparative experiments is representative for the fuel compositions of D1. Hence the problem to be solved resides in the selection of an

appropriate alternative additive for improving oxidation in biodiesel-containing fuel compositions. The Board has no doubt that this problem is solved by the use of the nitrogen-containing additive defined in claim 1.

5.4 Obviousness of the proposed solution

The oxidation stability of the biodiesels of example 2B (B2A, B1A, B2B) of D1 is improved by the addition of a PIBSI dispersant and a metal activator. However, the skilled person learns from other samples (G2A, G2B, G2C, G2D) that the improvement is brought about by the metal deactivator and not by the dispersant. This is confirmed on page 13, line 2 to 3 of D1. Taken as a whole, D1 clearly teaches the skilled person to use a metal deactivator in order to improve the oxidation stability of diesel fuels under the high-temperature conditions of the new HSDI engines (page 2, line 20 to 25 and page 4, line 4 to 8).

Starting from D1, the skilled person would thus not have consulted D7 since this document is neither concerned with this problem, nor by the new HSDI engine and the high temperatures associated with this engine.

5.5 Even if, alternatively, D6 was considered as the closest prior art, the subject matter of claim 1 would not be obvious for the skilled person either. In this respect the Board disagrees with the respondent that D11 (page 27), D15 (abstract) or D16 (page 1, line 33 upwards) would render obvious the use of a dispersant of the type defined in claim 1 because D11 discloses succinimides in general but not as a dispersant for improving the oxidation stability of fuel compositions

containing biodiesel and having all the features required by claim 1.

The same applies to the cited passages of D15 (which is not prior art but can be seen as evidence for common general knowledge) and D16.

The Board concludes that, even when taking into account the teaching of D11 or D16 or common general knowledge (D15), the skilled person would not arrive at the subject-matter of claim 1.

5.6 Eventually, the Board is also not convinced by the attack starting from D7 that the respondent combined with D5, which document teaches the use of nitrogen-containing PIBSI dispersants in order to improve the oxidation stability of biodiesel in the new HSDI engines, however without disclosing the average molecular weight of the polyisobutylene substituent of the PIBSIs used therein. This further reinforces the conclusion that D7 is not the closest prior art, since this document discloses the prevention of deposits with PIBSIs in the older indirect injection engines. D7 furthermore neither mentions oxidation nor increasing the oxidation stability of a diesel fuel.

5.7 Hence the subject-matter of claim 1, and that of claims 2 to 8, which depend thereon, was not obvious for the skilled person in view of the known prior art. It follows that the ground of opposition under Article 100(a) EPC thus does not prejudice the maintenance of the patent as granted either.

Order

For these reasons it is decided that:

1. The appealed decision is set aside.

2. The patent is maintained as granted.

The Registrar: The Chairman:

A. Pinna J.-M. Schwaller

Decision electronically authenticated