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Datasheet for the decision of 19 March 2010

Case Number: T 0925/07 - 3.3.06

Application Number: 98925600.3

Publication Number: 0981592

IPC: C10L 1/22

Language of the proceedings: EN

Title of invention:
Improved oil composition

Patentee:
Infineum USA L.P.

Opponent:
INNOSPEC LIMITED

Headword:
Oil composition/INFINEUM

Relevant legal provisions:
EPC Art. 56

Relevant legal provisions (EPC 1973):
-

Keyword:
"Inventive step (all requests): no"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0925/07 - 3.3.06

D E C I S I O N
of the Technical Board of Appeal 3.3.06
of 19 March 2010

Appellant: (Opponent)
INNOSPEC LIMITED
Innospec Manufacturing Park
Oil Sites Road
Ellesmere Port, Cheshire CH65 4EY (GB)

Representative:
Pidgeon, Robert John
Appleyard Lees
15 Clare Road
Halifax, HX1 2HY (GB)

Respondent: (Patent Proprietor)
Infineum USA L.P.
1900 East Linden Avenue
Linden, New Jersey 07036 (US)

Representative:
Hart, Richard Joseph
Infineum UK Ltd.
Law Department
Milton Hill
P.O. Box 1
Abingdon, Oxfordshire OX13 6BB (GB)

Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 26 March 2007 rejecting the opposition filed against European patent No. 0981592 pursuant to Article 101(2) EPC.

Composition of the Board:

Chairman: P.-P. Bracke
Members: G. Dischinger-Höppler
J. Geschwind

Summary of Facts and Submissions

I. European patent No. 0 981 592 was granted on the basis of a set of 10 claims containing independent Claim 1 which reads:

"1. A fuel oil composition comprising a fuel oil and a minor proportion of an additive, wherein the additive comprises the product obtainable by the reaction between:

(i) a hydrocarbyl-substituted succinic acylating agent, wherein the hydrocarbyl substituent has a number-average molecular weight (Mn) of 250 to 2500, and

(ii) one or more polyalkylene polyamines,

characterised in that the polyamine component (ii) contains greater than 35% by weight of polyamines having more than six nitrogen atoms per molecule, based on the total weight of polyamines, and in that (i) and (ii) are reacted in a molar ratio in the range of 1.4:1 to 1:1 ((i):(ii))."

II. A notice of opposition had been filed against the granted patent, wherein the Opponent sought revocation of the patent on the grounds of, inter alia, Article 100(a) EPC for lack of inventive step (Article 56 EPC) in the light of documents

D1 WO-A-96/01854 and

D2 GB-A-960 493.

During opposition proceedings, the proprietor filed inter alia document

D10 M.W. Vincent et al., "Diesel Fuel Detergent Additive Performance and Assessment", SAE paper No. 942010.

III. The Opposition Division rejected the opposition for the reason that the patent and the invention claimed fulfilled the requirements of the EPC. Concerning inventive step, it was found that the evidence provided by the Respondent during the examination proceedings under cover of a letter dated 21 January 2004 (herein after document D12) showed a technical effect for the claimed subject-matter which was not hinted at in either documents D1 or D2. Thus, a skilled person had no incentive to use the dispersants of document D1 with a molar ratio of polyisobutylene-succinic anhydride: polyamine (PIBSA:PAM) of 1:1 as disclosed in document D2 or to replace the tetraethylene pentamine (TEPA) used in document D2 by the heavy polyamine referred to in document D1 in order to achieve the technical effect.

IV. This decision was appealed by the Opponent, now Appellant.

The Patent Proprietor, now Respondent, maintained the claims as granted as its main request and filed amended sets of claims in three auxiliary requests (Sets A to C).

Claim 1 of the first and second auxiliary requests (Sets A and B) is identical with Claim 1 of the main request.

Claim 1 of the third auxiliary request differs there from only by the amended molar ratio of (i):(ii) of 1.35:1 to 1.05:1.

V. Upon request by both parties, oral proceedings before the Board of Appeal were held on 19 March 2010, however in the absence of the Appellant, as announced by letter dated 17 February 2010.

VI. The Appellant, in writing, submitted objections under Article 100 a) and b) EPC. Concerning inventive step, the Appellant held that the subject-matter claimed in the main request was not inventive in view of document D1 or D2 either alone or in combination. In particular, it was argued that in view of document D2, a skilled person would have good reasons to try heavy polyamines that were available at the priority date of the patent in suit or those of document D1. Likewise, starting from document D1, a skilled person had every incentive to use for the dispersant of document D1 the ratio of reactants disclosed in document D2, when attempting to provide either an alternative or an improved detergent additive.

VII. The Respondent, orally and in writing, disputed all the objections of the Appellant.

Concerning inventive step, the Respondent was of the opinion that document D2 did not suggest any other polyamide than TEPA to be useful. In the Respondent's experimental data provided in document D12, it was shown that the technical problem actually solved in view of document D2 was to provide superior fuel

detergency. Document D1 disclosed that the dispersant properties of heavy polyamine-derived succinimide products were good in lubricating oils but not that the same products provided also good fuel detergency. Furthermore, it was evident that high ratios of PIBSA:PAM of at least 1.6:1 were particularly beneficial in accordance with document D1. If a skilled person were to combine the teaching of documents D1 and D2, he would end up with a succinimide product of heavy polyamine at a high reaction ratio.

Therefore, the claimed subject-matter was not obvious in the light of documents D2 and D1.

VIII. The Appellant requested that the decision under appeal be set aside and that the patent be revoked.

The Respondent requested that the appeal be dismissed or that the decision under appeal be set aside and a patent be granted on the basis of one of the three auxiliary requests filed with the letter dated 15 October 2007.

Reasons for the Decision

Inventive Step

1. The patent in suit relates to improved detergent and lubricity additives for fuel oils. It is acknowledged in the description that additives derived from hydrocarbyl-substituted succinic acylating agents and polyalkylene polyamines, e.g. PIBSA-PAM products, are known in the art. Mention is made of PIPSA-PAM products

derived from polyethylene tetramine or pentamine at molar ratios of PIBSA:PAM of 1.5:1 and greater (paragraphs 1, 2 and 4 of the patent).

It is stated that by selecting a certain mole ratio of reactants and certain polyamine characteristics, products of improved application specifically in fuel oils are obtained (paragraph 6).

2. The Appellant considered documents D1 and D2 as possible starting points for the assessment of inventive step.

Document D1 relates to succinimide dispersants useful as additives in fuel and lubricating oils. According to this document it has been found that hydrocarbyl-substituted succinimides derived from polyalkylene PAM with more than six nitrogen atoms per molecule produce dispersants with improved dispersancy when compared with products derived from regular commercial PAM, such as TEPA, under similar conditions and the same polymer backbone. Such PAM is referred to in document D1 and hereinafter as heavy polyamine. It contains practically no TEPA, very small amounts of PEHA (pentaethylene hexamine) but primarily oligomers with more than 6 nitrogen atoms and is, therefore, identical with the PAM defined in Claim 1 of the patent in suit. An example given in document D1 is the commercially available polyamine "HA-2" with less than 1 wt.% TEPA, less than 25 wt.% PEHA, the balance being higher nitrogen content oligomers (page 3, line 6 to page 4, line 32).

Document D2 is concerned with additives useful as detergents in fuel oils (page 1, lines 6 to 10) and suggests for this purpose an additive obtained by reacting equimolar amounts of PIPSA and TEPA, wherein the polyisobutylene radical in the PIBSA has a molecular weight of about 1000 (page 3, lines 9 to 30 and example).

3. Considering that document D2 is conceived for the same purpose as the patent in suit, namely the provision of additives useful as detergents in fuels, the Board considers this document to be a more suitable starting point than document D1. This was not objected to by the Respondent, the more so as it was agreed that the fuel composition of document D2 differs from the claimed one only in that TEPA is used as the PAM instead of a heavy polyalkylene polyamine.

4. The experimental evidence filed in document D12 shows in Figure 2 a comparison between an additive according to the patent in suit derived from PIBSA and heavy polyamine at a ratio of 1.2:1 and an additive which is derived from TEPA as in document D2 or from a light PAM mixture instead of the heavy polyamine. It is apparent that the additive according to the invention gives superior detergency performance in terms of lower coke deposits formed on the injectors when measured according to a standard industry test.

5. Bearing in mind that the problem and solution approach applied by the Boards of Appeal for assessing inventive step requires that the technical problem solved by the claimed invention in view of the closest prior art is derived from the technical results actually obtained

over that prior art (Case Law of the Boards of Appeal of the European Patent Office, fifth edition 2006, chapter I.D.2.), the technical problem in view of document D2 can thus be seen in the provision of an additive providing improved detergency properties to fuel oils.

6. It remains to be decided whether, in view of the available prior art documents, it was obvious for someone skilled in the art to solve this technical problem by the means claimed, namely by using a hydrocarbyl-substituted succinimide additive derived from heavy polyalkylene polyamine instead of from TEPA as in document D2.

7. The Respondent argued that document D2 did not suggest any other polyamine species than TEPA or that changing that species could lead to any improvement.

Document D1, on the other hand, did not concern detergent additives for fuels but lubricating oil dispersants. Even if similar types of additives might be used as both, fuel detergents and lubricating oil dispersants, this did not mean that one particular additive performs in both circumstances equally beneficial. Hence, good lubricating oil dispersants were not necessarily good fuel oil detergents.

Moreover, high ratios of PIBSA:PAM were particularly preferred in document D1. Thus, if a skilled person were to combine documents D1 and D2, he would end up with a product obtained from a high reaction ratio. He would not arrive at the claimed subject-matter for which an improvement in the detergency properties has

been shown in Figure 1 of document D12 when compared with the high ratios of document D1.

8. The Board agrees with the Respondent insofar as document D2 does not give any specific instructions on how to further improve the detergency of fuel oils. However, it is noted that according to the general technical knowledge of those skilled in the art, dispersancy is an important property needed in fuel detergent additives (see e.g. document D10, page 13, right-hand column, last full paragraph). This was not contested by Respondent.

The Board is, therefore, convinced that a skilled person looking for additives providing better detergency to fuel oils than those disclosed in document D2 would also consider documents disclosing succinimide additives with respect to their dispersing property, irrespective of whether the mechanisms of an additive's function to prevent formation of deposits in automotive engines as dispersant or as detergent are different. Hence, he would consider document D1, the more so as this document recommends the succinimide dispersants disclosed therein also as additives in fuel oils (page 3, lines 16 to 23 and page 20, lines 11 to 18).

Consequently, the skilled person would learn from document D1 that hydrocarbyl-substituted succinimides derived from heavy polyamines improve the dispersing properties in comparison with products derived from TEPA when used as additives in lubricating oils as well as in fuel oils (point 2 above).

Thus, it was obvious for those skilled in the art to use the dispersant additives disclosed in document D1 instead of the detergent additives disclosed in document D2 in the expectation to improve the detergency of the fuel oil by way of improved dispersancy.

9. It may be true that a skilled person would have realised the preference given in document D1 to higher reaction ratios of at least 1.6 moles PIBSA per mole PAM (page 17, last paragraph in combination with page 18, line 10 to page 19, line 2 and examples). Nor does the Board doubt that the claimed subject-matter provides better detergency to the fuel oil than those preferred additives of document D1.

However, in the Board's opinion, it is apparent to those skilled in the art and also from the reaction equations given in document D2 (page 3, lines 25 to 30) that using PIBSA in such a large excess would change the overall composition of the additive since it would then not primarily consist of the mono-imide suggested in document D2 as detergent additive but contain considerable amounts of by-products and/or unreacted PIBSA which - as the Respondent argued - might be useful as dispersants but not necessarily as detergents.

10. The Board concludes, therefore, that for the purpose of improving the detergency of fuel oil a skilled person would have used hydrocarbyl-substituted succinimides derived from heavy polyamines as disclosed in document D1 instead of those derived from TEPA at the reaction ratios disclosed in document D2.

11. For these reasons, the Board finds that the subject-matter of Claim 1 of the Respondent's main, first and second auxiliary requests does not comply with the requirements of Articles 52(1) and 56 EPC.

12. The same applies to Claim 1 of the third auxiliary request which differs from Claim 1 of the main, first and second auxiliary requests only insofar as the reaction ratio is slightly higher, namely 1.05 to 1.35 moles PIBSA per mole PAM, since it is known from document D1 that free unreacted PAM is detrimental to diesel engines (page 17, lines 7 to 9). Hence, it is obvious for the skilled person to use PIBSA in an excess suitable to at least reduce the amount of PAM remaining in the product in unreacted form.

13. Consequently, the subject-matter of Claim 1 of none of the Respondent's requests complies with the requirements of Articles 52(1) and 56 EPC, so that the patent has 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:

S. Sánchez Chiquero P.-P. Bracke