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Datasheet for the decision of 17 February 2012

Case Number: T 0570/08 - 3.3.06

Application Number: 98202902.7

Publication Number: 890631

IPC: C10L 1/14, C10L 10/04

Language of the proceedings: EN

Title of invention:
Additives and fuel oil compositions

Patent Proprietor:
Infineum USA L.P.

Opponents:
Clariant Verwaltungsgesellschaft mbH
BP Oil International Limited
Afton Chemical Corporation
The Lubrizol Corporation
INNOSPEC LIMITED
BASF SE

Headword:
Soluble lubrifying diesel additive/INFINEUM

Relevant legal provisions:
EPC Art. 56

Keyword:
"Contradicting comparative tests - no effect shown"
"Inventive step - no, obvious alternative"

Decisions cited:
-

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0570/08 - 3.3.06

D E C I S I O N
of the Technical Board of Appeal 3.3.06
of 17 February 2012

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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 17 January 2008 concerning maintenance of European patent No. 890631 in amended form.**

Composition of the Board:

Chairman: P.-P. Bracke
Members: E. Bendl
J. Geschwind

Summary of Facts and Submissions

I. The appeals lie from the decision of the Opposition Division to maintain the European patent 0 890 631 in amended form.

II. The Appellants/Opponents 1-5, thereafter referred to as Opponents 1-5, filed appeals against the Opposition Division's decision.

III. Also the Appellant/Proprietor, thereafter referred to as Proprietor, filed an appeal against this decision and submitted an amended main request and two auxiliary requests.

Claim 1 of the main request reads as follows:

"1. A fuel composition comprising a major amount of a diesel fuel oil containing not more than 0.05% by weight of sulphur and having a 95% distillation point of not greater than 350°C, and from 150 to 500 ppm (active ingredient) by weight, per weight of fuel oil, of an additive composition comprising (a) an ashless dispersant comprising an acylated nitrogen compound and (b) a monocarboxylic acid of general formula

R’(COOH)

wherein R’ represents an alkyl group or alkenyl group having 10 to 30 carbon atoms; wherein the ratio of (a):(b), on a weight:weight basis, is in the range of from greater than 1:4 to 2 1; and wherein the acylated nitrogen compound comprises a hydrocarbyl-substituted succinimide or succinamide prepared by reacting a

poly(isobutylene)-substituted succinic anhydride acylating agent wherein the poly(isobutylene)-substituent has between 30 and 400 carbon atoms with a mixture of ethylene polyamines having 3 to 7 amino nitrogen atoms per ethylene polyamine and 1 to 6 ethylene groups."

Claim 1 of the first auxiliary request is identical with Claim 1 of the main request.

Claim 1 of the second auxiliary request reads as follows:

"1. The use of (a), an ashless dispersant comprising an acylated nitrogen compound made by reacting a poly(isobutylene)-substituted succinic anhydride acylating agent wherein the poly(isobutylene)-substituent has between 30 and 400 carbon atoms with a mixture of ethylene polyamines having 3 to 7 amino nitrogen atoms per ethylene polyamine and 1 to 6 ethylene groups in an additive composition comprising (a) and (b), a monocarboxylic acid of general formula

R’(COOH)

wherein R’ represents an alkyl group or alkenyl group having 10 to 30 carbon atoms; the use of (a) being to improve the solubility of said additive composition in a diesel fuel oil containing not more than 0.05% by weight of sulphur and having a 95% distillation point of not greater than 350°C and the additive composition being effective to improve the lubricity performance of the fuel oil, wherein the concentration of the additive composition in the fuel oil is in the range from 150 to

500 ppm (active ingredient) by weight, per weight of the fuel oil; and wherein the ratio of (a):(b) on a weight:weight basis, is in the range of from greater than 1:4 to 2:1."

IV. The Opponents inter alia considered Claim 1 of all requests submitted by the Proprietor in appeal procedure not to meet the requirement of inventive step and cited documents

D4 = EP-A-0 482 253
D5 = US-A-3 667 152
D31 = Fuel Additives and the Environment, Haycock R.F. et al., CEFIC, 1-39, 1994.

V. The main arguments of the **Opponents** were as follows:

– Either of D5 or D31 may be seen as the closest prior art.

– Lubricity problems associated with low sulphur diesel fuels are known from D31; lubricity additives are recommended to overcome this problem.

– Low temperature problems as well as deposition problems of diesel fuel are known. Ashless dispersants are proposed in D31 in this context.

– D31 furthermore states that the addition of multifunctional packages containing inter alia detergents and lubricity additives to diesel fuel is recommended; such packages are described in D4 and D5.

– The combination of D31 with D4 or D5 leads to the claimed subject-matter.

– The problem of improving lubricity and solubility has not been solved over the entire range claimed in the patent-in-suit, as can be derived from the comparative tests filed by the Opponents.

The main arguments of the **Proprietor** were as follows:

– D4 is the closest state of the art.

– The Proprietor's tests show the effects achieved with regard to lubricity and solubility.

– The burden of proof to demonstrate that the problems have not been solved is on the Opponents.

– The decrease of solubility after the addition of compound (a) according to the invention in Opponent 4's tests 9,10 dated 23 May 2008 represents an "abnormality".

– Nevertheless, the claimed subject-matter is considered to involve an inventive step.

VI. The Proprietor requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request or auxiliary requests 1 or 2, all filed with letter of 20 May 2008.

The Opponents 1-5 requested that the decision under appeal be set aside and that the European patent no. 890 631 be revoked.

Reasons for the Decision

1. Inventive step

According to the problem and solution approach, which is used by the Boards of Appeal of the European Patent Office in order to decide on the question of inventive step, it has to be determined which technical problem the object of a patent objectively solves vis-à-vis the closest prior art document. It also has to be determined whether or not the solution proposed to overcome this problem is obvious in the light of the available prior art disclosures.

1.1 Main request

1.1.1 The patent-in-suit concerns additive compositions "greatly improving the lubricity of fuel compositions containing less than 0,5 wt% of sulphur", which "has good solubility in fuel oils, particularly at low temperatures" (paragraph [0019]).

The parties mainly referred to documents D4,D5 or D31 as the closest state of the art.

D4 relates to additives which provide improved combustion characteristics and reduction of noxious emissions to diesel fuels, resulting in improvements in fuel economy.

D5 relates to wear inhibition in fuels for turbine or (low sulphur) diesel engines by means of tall oil fatty acids. The disclosure also refers to low-temperature solubility of tall oil fatty acids.

D31 teaches about the impact of fuel additives on the environment. It teaches that very low sulphur diesel fuels have a lubricity problem (page 5, left-hand column, third full paragraph). Under the heading "5.2.3 Lubricity improvers" cold flow problems of diesel fuel in winter are mentioned and chapter 5.1.5 suggests to use dispersants to suspend sediment particles. Finally, multifunctional additive packages are recommended to "improve certain qualities which cannot be adjusted by refinery processing" (chapter 5.2.3). As dispersants ashless succinimides and as lubricity improving agents long-chain polar compounds are mentioned.

D4 refers to an entirely different problem, whereas D5 and D31 refer to the same problems as the patent-in-suit. However, D31 additionally refers to specific dispersants and therefore has more features in common with Claim 1 of the patent-in-suit than D4. Thus, the Board considers D31 as the most promising starting point for the problem and solution approach.

1.1.2 The problem according to the patent-in-suit vis-à-vis D31 is the provision of a low sulphur fuel composition comprising an additive composition with improved low temperature solubility while exhibiting good lubricity performance.

1.1.3 The composition of Claim 1 represents the proposed solution to this problem.

1.1.4 The Opponents argued that the problem has not been solved over the entire range claimed.

OP4's comparative tests of 23 May 2008 show in test runs 9 and 10 that the addition of 250 ppm detergent 3 (a dispersant defined as compound (a) in Claim 1 of the patent-in-suit) to 250 ppm behenic acid (which corresponds to compound (b)) results in an increase of sediment level, i.e. a **decrease** of solubility. The Proprietor did not dispute the results but regarded them as an "abnormality".

Opponent 5's tests of 22 December 2008 show that the addition of a dispersant (a) to oleic acid does not lead to any improvement in wear scar after 28/29 days at -30°C and that the addition of dispersant (a) to TOFA b after 27 days at -30°C even leads to an **increase** in wear scar.

These results are in contrast to Proprietor's tests of 27 March 2002, 14 September 2007 and 20 May 2008. However in the latter tests the fuel has either not been defined as a low sulphur diesel containing not more than 0,05% by weight of sulphur or they do not specify the compounds (a) and (b) exactly as defined in Claim 1 of the main request. Even when assuming that these tests meet the requirements defined in Claim 1 of the main request, the Board would still be confronted with several sets of tests of the parties leading to contradicting results. Therefore it cannot be concluded that improved lubrification and solubility of the

additive is achieved in low sulphur diesel fuel, at least not for all combinations claimed.

Proprietor's argument that the burden of proof would still be on the Opponent's side is not valid, as results have been provided by the Opponents which cast doubts on the effect allegedly achieved by the present invention. However, the Proprietor could not convincingly eliminate these doubts.

Therefore, since an effect has not been proven, the objective problem has to be re-formulated as the provision of low sulphur diesel fuel compositions comprising an additive composition with alternative low temperature solubility while exhibiting good lubricity performance.

1.1.5 The remaining question to clarify is, whether the claimed subject-matter was obvious to a person skilled in the art, when starting from the closest state of the art.

D31 teaches that the properties of low sulphur diesel fuels may be improved by adding multifunctional additive packages.

Thus, a person skilled in the art would make use of such a known multifunctional diesel additive package, as is for instance described in document D4. The package according to D4 contains lubricity agents such as fatty acids and mentions as examples tall oil fatty acids, oleic acid and linoleic acid.

Ashless dispersants are also contained in the additive package. The example on page 10 discloses polyisobutenyl succinimide of tetraethylenepentamine in which the number average molecular weight of the polyisobutenyl group is about 950 in combination with a lubricity additive.

No effect has presently been shown with regard to any further features distinguishing the patent-in-suit from D4, like the ratio of compounds (a):(b).

Thus, the combination of the disclosures of D31 with D4 is considered to lead to the subject-matter of Claim 1 of the main request in an obvious way.

2. First and second auxiliary request

Since Claim 1 of the **first auxiliary request** is identical with Claim 1 of the main request, identical considerations apply.

Claim 1 of the **second auxiliary request** refers to the **use** of the additive composition to improve lubricity performance of the fuel oil and the use of the specific ashless dispersant to improve solubility of said additive in low sulphur diesel fuel composition.

The presence of the long-chain polar compounds to improve lubricity is known from D31; D4 even mentions specific fatty acids for this purpose. The suspending action of ashless succinimide compounds is also known from both disclosures and is even implicitly derivable from the term "dispersant".

Thus, in analogy to the argumentation given above, the combination of D31 with D4 leads to the claimed subject-matter in an obvious way.

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. Magliano P.-P. Bracke