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**Datasheet for the decision  
of 23 October 2013**

**Case Number:** T 2322/10 - 3.3.06

**Application Number:** 98303110.5

**Publication Number:** 874039

**IPC:** C10L1/18, C10L10/04

**Language of the proceedings:** EN

**Title of invention:**

Diesel fuel compositions

**Patent Proprietor:**

The Lubrizol Corporation

**Opponent:**

Infineum International Limited

**Headword:**

Low-sulfur diesel fuel additives/LUBRIZOL

**Relevant legal provisions:**

EPC Art. 52(1), 56

**Keyword:**

Inventive step - main request (no) - obvious alternative  
Inventive step - auxiliary request (yes)  
- unexpected improvement made plausible by experimental data

**Decisions cited:**

T 0215/03

**Catchword:**



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Case Number: T 2322/10 - 3.3.06

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.06**  
**of 23 October 2013**

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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
22 September 2010 concerning maintenance of  
European Patent No. 874039 in amended form.**

**Composition of the Board:**

**Chairman:** B. Czech  
**Members:** P. Ammendola  
U. Lokys

## Summary of Facts and Submissions

I. This appeal of the Opponent is from the interlocutory decision of the opposition division concerning maintenance of European Patent No. 0 874 039 in amended form.

II. The Opponent had referred, *inter alia*, to documents:

D2 = EP 0 488 747 A1;

D5 = WO 94/17160 A1;

D6 = US 3,346,354 A

and

D7 = US 3,381,022 A.

During the opposition proceedings the Patent Proprietor had, *inter alia*, filed:

- experimental data (hereinafter referred to as the **opposition data**) with letter of 13 May 2009;
- a set of amended claims 1 to 8 labelled "Auxiliary Request 2" with letter of 9 June 2011;

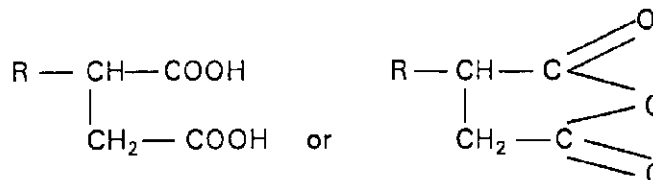
and

- description pages (adapted to the claims of said Auxiliary Request 2) at the oral proceedings.

III. Claim 1 of this Auxiliary Request 2 reads as follows:

"1. A diesel fuel composition, comprising a major amount of a diesel fuel having a 90% point distillation temperature in the range of 300°C to 390°C, and a minor amount of a combination of:

(A) at least one first oil soluble hydrocarbyl substituted carboxylic acid or anhydride or partial ester thereof, the hydrocarbyl substituent thereof having up to about 24 carbon atoms per molecule; and  
 (B) at least one second hydrocarbyl substituted carboxylic acid or anhydride or partial ester thereof, the hydrocarbyl substituent thereof having at least 30 carbon atoms per molecule wherein the component (B) has the formula



wherein R is a hydrocarbyl group;

and wherein the sulphur content of said diesel fuel is up to 0.05 % by weight and the concentration of the combination of (A) and (B) in said diesel fuel is from 10 to 1000 ppm and the weight ratio of component (A) to component (B) is in the range of from 1:99 to 99:1."

Dependent claims 2 to 8 of said Auxiliary Request 2 define preferred embodiments of the composition of claim 1.

IV. In the decision under appeal the Opposition Division found, *inter alia*, that the claims according to said

Auxiliary Request 2 met the requirements of Article 123(2) and (3) EPC, and that the subject-matter of claim 1 thereof was neither anticipated by the disclosure of document D2 nor obvious in the light of the prior art relied upon by the Opponent.

In particular, since the technical problem addressed in the patent-in-suit was to improve the lubricity and the engine oil compatibility of **compositions** based on **diesel fuels** that are low in sulphur (hereinafter these diesel fuels with a sulphur content of up to 0.05% and the corresponding compositions are referred to, respectively, as **LSD fuels** and **LSD fuel compositions**), the assessment of inventive step was made starting from the prior art disclosed in document D5, which disclosed LSD fuel compositions comprising, as lubricity improver, glycerol monooleate, i.e. a compound according to the definition of component (A) in claim 1 at issue.

The Opposition Division considered credible that the subject-matter of claim 1 as maintained solved the technical problem addressed in the patent in suit across the whole scope of the claim.

Moreover, considering that

- the claimed LSD fuel compositions differed from those of document D5 only in that the former additionally comprised component (B),

but

- neither document D5 *per se* nor its combination with the disclosure provided in documents D6 or D7 rendered obvious the addition of a component (B) in order to

improve compatibility of such a diesel fuel with engine oils,

the Opposition Division concluded that the subject-matter of claim 1 involved an inventive step.

V. On 19 November 2010 the Opponent (hereinafter **Appellant**) filed a notice of appeal and paid the appeal fee on the same day. With its statement of grounds of appeal received at the EPO on 25 January 2011, the Appellant filed an experimental report (hereinafter **Appellant's data**).

VI. The Patent Proprietor (hereinafter **Respondent**) replied with a letter dated 8 August 2011, enclosing thereto:

- a set of eight claims labelled "**Main Request**" identical to the claims of the Auxiliary Request 2 held allowable by the opposition division (see wording in above Section III);
- a set of eight claims labelled "Auxiliary Request";
- copies of the American Standard ASTM D 975-90 and D 975-91, respectively valid in 1990 and 1991;
- again a description of the opposition data (labelled "Annex E")

and

- a declaration of a technical expert (labelled "Annex F"), containing further experimental data (hereinafter the **declaration data**).

VII. Claim 1 of the **Auxiliary Request** differs from that of the Main Request only in that the final wording of the latter reading "*in the range of from 1:99 to 99:1*" is replaced by (emphasis added) "*in the range of from **30:70 to 70:30***".

VIII. The Appellant requested that the decision under appeal be set aside and that European patent No. 874 039 be revoked.

The Respondent requested that the appeal be dismissed or, alternatively, that the patent be maintained in amended form on the basis of the claims according to the Auxiliary Request submitted with the letter dated 8 August 2011

IX. The Parties' arguments of relevance here can be summarised as follows.

The **Appellant** argued that paragraph [0033] of the patent in suit (similarly to column 7, lines 28 to 29, of document D2) defined the useful diesel fuel grades by making reference to the same American Standard ASTM D 975. The copies of the ASTM D 975 of 1990 and 1991 provided by the Respondent proved that this American Standard did not require the defined diesel fuels to be LSD fuels. Hence, paragraph [0033] of the patent specification contradicted the definition of the LSD fuel given in claim 1 according to both requests at issue. Thus, the requirement in claim 1 as to the sulphur content of the diesel fuel had to be considered unclear and disregarded. Hence, document D2 disclosed compositions having all the clear features of claim 1 according to the main request. The latter was thus not novel.



The Appellant considered that the Opposition Division had erred in using the compositions disclosed in document D5 as starting point for the assessment of inventive step. The appropriate starting point was rather the prior art according to document D2 which also aimed at providing diesel fuels with an increased lubricity. Moreover, the compositions disclosed in document D2 contained both components (A) and (B). Hence, the claimed subject-matter was only a further LSD fuel compositions added with the same additives, which corresponded to the only reasonable way to carry out the teaching of document D2 at the priority or filing date of the patent in suit.

However, it additionally argued that the subject-matter of claim 1 was obvious also when starting from document D5. The fact that claim 1 (main request) allowed for a content of component (A) or (B) as low as 0.1 ppm would deprive of credibility any allegation in the patent in suit as to the achievement of technical advantages. The prediction of no observable effects for such negligible amounts of component (A) or of component (B) would be apparent from the common general knowledge reflected in the available prior art and from the disclosure the patent in suit, all confirming that amounts of fuel additives in the order of several tens of ppm were normally required in order to obtain any appreciable technical effect. Moreover, the available lubricity data proved that even larger amounts of lubricity additives were required to obtain an industrially acceptable lubricity in LSD fuels. The Appellant stressed that even though document D5 (see the last line of page 6) explicitly identified in 1 ppm the lowest possibly thinkable amount for a lubricity additive (such as component (A)), it also implicitly taught (see the table "Fuel II" on page 10)

that for amounts of a component (A) of 10 ppm or 50 ppm the observed "Wear Scar" results were within the error margin of the result measured for diesel fuel *per se* (i.e. without any component (A)).

Moreover, the minimum amounts of components (A) and (B) tested in the experiments reported in the patent in suit and in the opposition data were respectively about 50 ppm and 5 ppm. Similarly, documents D6 (see claim 1) and D7 (see column 11, lines 59 to 61) respectively disclosed for component (B) minimum amounts of 50 ppm and 0.01% (i.e. 100 ppm).

Additionally, Table 2 of the Appellant's data proved, on the one hand, that the addition of 45 ppm of component (A) used in Example 2 provided only a minimal, if any, lubricity enhancement and, on the other hand, that the combined presence in Example 7 of 90 ppm of component (B) with 10 ppm of component (A), i.e. in a composition well within the scope of claim 1 (main request), actually resulted in worsening the lubricity of the LSD fuel.

Further, the two results reported in Table 3 of the Appellant's data proved that a 50:50 weight % mixture of compounds (A) and (B) provided no improvement in engine oil compatibility.

The Appellant considered also that the declaration data (and, in particular, the results reported in Table 1 thereof, apparently contradicting those reported in Table 3 of the Appellant's data) were less credible than the Appellant's data, because the former did not indicate the sulphur content and the distillation profile of the diesel fuel used, whereas the latter indicated that the used diesel fuel had a sulphur content of 7.6 ppm and described in details the fuel distillation profile.

Finally, the conclusion that a lubricity additive amount of 10 ppm could not be assumed to be effective

had already been drawn by this Board in decision T 215/03 of 18 November 2005, point 2.2.5 of the Reasons. Accordingly, no technical advantage vis-à-vis the prior art could plausibly exist across the whole breadth of claim 1 as maintained.

Hence, also when starting from document D5, the sole possibly solved technical problem remained the provision of further diesel fuels added with lubricants. Since document D5 explicitly suggested the optional use of detergents in the diesel fuel compositions disclosed therein (see page 7, lines 19 to 20), no inventive step was required to solve the posed problem by adding to these compositions the esters that were disclosed in document D6 or in document D7 as detergent diesel fuel additives and which corresponded to component (B) as defined in claim 1 at issue.

The same novelty and inventive step objections applied to claim 1 of the Auxiliary Request, which simply set the lowest amount for each of ingredients (A) and (B) to 3 ppm. The Appellant conceded that Example 7 of the Appellant's data was no longer an example of the claimed subject-matter, but stressed that the same applied to any other available lubricity data.

The **Respondent** rebutted the Appellant's novelty objections in view of document D2, by stressing that the two filed versions of American Standard ASTM D 975 (which contained no reference to LSD fuels in which the level of sulphur was 0.05% by weight or less) were those valid at priority and filing dates of document D2. It argued that the definition of LSD fuel in the respective claims 1 was clear and unambiguous and observed that the versions of an American Standard valid in different years may be substantially different. Hence, the Appellant had not proved that the

definition of LSD fuel in claim 1 was in contradiction with the American Standard ASTM D 975 to which [0033] of the patent description referred, i.e. the versions of this standard valid at the priority or filing dates of the patent in suit.

The Respondent rebutted the Appellant's inventive step objection based on document D2 as unreasonable, since this citation did not address the specific lubricity problem that occurred in LSD fuels. It concurred instead with the finding in the decision under appeal that document D5 disclosed the closest prior art.

The Respondent argued also that a skilled reader of claim 1 as maintained would consider the "*partial ester*" option in the definition of ingredient (A) to only describe those compounds that were obtainable by esterifying polycarboxylic acids with a less than stoichiometric amount of alcohols and, thus, contained at least one unesterified carboxylic acid group per molecule. Hence, none of the two lubricity additives (A) and (B) was present e.g. in the examples of document D5.

At the oral proceedings the Respondent conceded that the definition of the technical advantage of the invention e.g. in paragraph [0006] of the patent in suit only implied that the compositions of the invention had achieved a level of lubricity superior to that observable in the LSD fuel *per se*. Hence, the problem solved by the claimed subject-matter vis-à-vis the prior art of document D5, was the provision of LSD fuel compositions whose lubricity was better than that of the LSD fuel on which they are based, but did not display a substantial worse compatibility towards the engine oil.

In the opinion of the Respondent, only Example 7 of the Appellant's data, despite apparently falling within the scope of claim 1 as maintained, reported a result possibly contradicting the expected lubricity effect. However, this could be explained as a consequence of the particular diesel fuel used by the Appellant and, thus, would not be considered as representative of the invention by the skilled person, who would know how to optimize the used additive(s) to the specific sort of LSD fuel used.

In respect of the compatibility with the engine oil, the single experimental comparison contained in table 3 of the Appellant's data was contradicted by the more abundant experimental evidence provided with the declaration data.

Hence, the available data confirmed more than denied that the technical problem addressed in the patent in suit had actually been solved across the whole ambit of claim 1 as maintained.

The Respondent additionally argued that the abundant evidence provided with the declaration data rendered credible the achievement across the whole scope of claim 1 of the main request of at least an enhanced compatibility with diesel engine oil. Hence the subject-matter of this claim provided a non-obvious solution to at least this part of the addressed technical problem.

This reasoning applied all the more to claim 1 of the Auxiliary Request which required a minimum amount of 3 ppm for each of the two products (A) and (B) and for which the Appellant's data could not possibly be relevant.

Hence, none of the Appellant's objections with respect to inventive step was cogent.

## Reasons for the Decision

### *Main Request*

1. Construction of claim 1
  - 1.1 Claim 1 (wording indicated in Section III of the Facts and Submissions) relates to a LSD fuel composition characterised *inter alia* in that it comprises components (A) and (B). Component (A) is an oil soluble hydrocarbyl substituted carboxylic acid or anhydride or **partial ester** thereof, and component (B) is a hydrocarbyl substituted carboxylic acid or anhydride or **partial ester** thereof. Claim 1 further specifies that the total amount of component (A) and (B) in said composition is in the range of from 10 to 1000 ppm and that the weight ratio of (A) to (B) is in the range of from 1:99 to 99:1.
  - 1.2 The Respondent has presented arguments based on a construction of this claim which is restrictive under two aspects:
    - 1.2.1 Firstly, the definition of component (A) as a "*partial ester*" would in the opinion of the Respondent imply the presence of unesterified carboxylic acid groups in the molecule. Esters carrying unesterified hydroxyl groups and no unesterified carboxylic acid group, such as the glycerol monooleate used in the compositions of document D5, would not be encompassed.

However, as correctly pointed out by the Appellant, the

expression "*partial ester*" may also be used to describe the reaction product of a polyol with an amount of a monocarboxylic acid which is such that only some of the hydroxyl groups of the polyol are esterified.

Furthermore, the Board observes that the patent in suit contains no express or implicit technical teaching justifying the restrictive construction of the expression "*partial ester*" proposed by Respondent.

Therefore, the Board comes to the conclusion that no unesterified carboxylic acid group need to be present in the partial esters falling under the definition of component (A).

- 1.2.2 Secondly, in the opinion of the Respondent, a skilled person would be aware that some routine optimisation of the amount and/or kind of the two components might possibly be needed in order to cope with the particular chemical composition and/or properties of some specific diesel fuels. Accordingly, the subject-matter of claim 1 at issue would not embrace LSD fuel compositions which, although having all the features mentioned in this claim, did not display any improvement in lubricity vis-à-vis the LSD fuel *per se*. Thus, the diesel fuel composition of Example 7 of the Appellant's data (although comprising 10 ppm of component A and 90 ppm of component B and, thus, being within the ranges prescribed by claim 1 at issue for the total concentration of these components as well as for their weight ratio) would not, for instance, represent an embodiment of the claimed subject-matter. In other words, the Respondent considered that claim 1 at issue implicitly required the presence of an effective amount of a lubricity additive.

The Board does not, however, accept this interpretation since claim 1 at issue does not mention lubricity at all and contains no other features possibly implying that LSD fuel compositions whose lubricity is not improved vis-à-vis that of the LSD fuel *per se* are excluded.

1.3 Thus, the Board rejects the restrictive construction of of claim 1 relied upon by the Respondent.

2. Novelty - Claim 1

2.1 The Appellant acknowledged that the copies of the American Standard ASTM D 975 provided by the Respondent prove that the reference to this American Standard in document D2 (stating at column 7, lines 28 to 29, that the diesel fuels mentioned were "typically described in ASTM Standard D-975") does not imply that said fuels had to be as low in sulphur as required by present claim 1, i.e. at most 0.05 % by weight. It is to be noted that ASTM D-975-90 (Table 1) and D-975-91 (Table 1) both refer to maximum sulfur contents of 0.50, 0.50 and 2.00 % mass, for grades 1-D, 2-D and 4-D, respectively.

2.2 The Appellant nevertheless disputed the novelty of the subject-matter of claim 1 at issue over D2 because, in its opinion, said two copies of the American Standard demonstrated that paragraph [0033] of the patent in suit (where it was stated that the diesel fuels to be used in the compositions of the patent in suit "*can be classified as any of Grade Nos. 1-D, 2-D or 4-D as specified in ASTM D 975*") deprived of clarity and, thus, of relevance, the features of claim 1 at issue defining the maximum amount of sulphur that may be



present in the diesel fuel (see wording in Section VIII of the Facts and Submissions).

- 2.3 The Board notes that relevant passage in paragraph [0033] of the patent in suit does not necessarily refer to the same sort of diesel fuels as described in the copies of the ASTM D 975 provided by the Respondent, i.e. those described in the versions of this American Standard to which D2 may be assumed to make reference because they were valid at the filing (in 1991) or priority (1990) date of this citation.
- 2.3.1 Indeed, as correctly observed by the Respondent and undisputed by the Appellant, the versions of an American Standard that are valid in different years may be substantially different.
- 2.3.2 The Appellant did not provide a copy of the ASTM D 975 in the version valid at the priority or at filing date of the patent in suit (i.e. the versions of 1997 and 1998). Nor has the Appellant presented any other evidence justifying the conclusion that ASTM D 975 version(s) of 1990 and 1991 were relevant as regards the disclosure of the patent in suit.
- 2.4 Hence, the Appellant has not convincingly shown that there was a contradiction between the LDS fuel definition according to claim 1 at issue and the one according to paragraph [0033] of the description of the patent in suit). Therefore, the Board sees no reasons for considering unclear and, thus, disregarding the requirement in claim 1 prescribing a maximum amount of sulphur of 0.05 % by weight.

If only for this reason the Board comes to the conclusion that the Appellant's reasoning as to the

lack of novelty of claim 1 as maintained is not convincing.

2.5 Hence, in the Board's judgement, the subject-matter of claim 1 and of claims 2 to 8 dependent thereon, is found to be novel over D2 (Articles 52(1) and 54(1) and (2) EPC 1973).

3. Inventive step (Article 56 EPC 1973)

3.1 The invention

3.1.1 The invention concerns a low-sulfur diesel fuel composition.

3.1.2 The Board notes that paragraph [0006] of the patent in suit vaguely addresses the technical advantage to be achieved by the invention as follows:

*"It would be advantageous to provide a diesel fuel composition that has enhanced lubricity characteristics and is compatible with engine oil. The present invention provides such an advantage."*

The Board also notes that the preceding paragraphs [0002] to [0005] remind the reader of the patent in suit of the particularly unsatisfactory lubricity characteristic of LSD fuels, and of the unacceptable worsening of the compatibility with the oil lubricating the engine observed in the prior art when adding lubricity additives to LSD fuels.

Hence, the Board concurs with the statement of the Respondent at the oral proceedings that the only reasonable interpretation of the cited passage of paragraph [0006] is as follows:

- the aimed and allegedly achieved "*enhanced*" level of lubricity has to be superior to the lubricity of the LSD fuel *per se* (i.e. in the absence of any of components (A) and (B))

and

- the aimed and allegedly achieved engine oil-compatibility has to be superior to the unsatisfactory level of engine oil-compatibility observed in the prior art when adding LSD with a conventional lubricity additive (i.e. the aimed and allegedly achieved engine oil-compatibility is at least comparable to that possessed by the LSD fuels *per se*, prior to the addition of conventional lubricants).

In the following, these two aspects of the allegedly provided advantage are individually referred to as **the lubricity enhancement** and **the oil-compatibility**.

3.1.3 Accordingly, it can be understood that the patent in suit addresses the need to provide a LSD fuel composition wherein the lubricity problems of LSD fuels are overcome without substantial worsening of their oil-compatibility.

3.2 Closest prior art

3.2.1 For the Board, document D5 is to be considered as the closest prior art for the assessment of inventive step.

3.2.2 Like the patent in suit, document D5 (see e.g. page 1, lines 3 to 4, and the paragraph bridging pages 1 and 2) deals with LSD fuels and with the issue of lubricity problems characteristic of these fuels. In the examples

of D5, glycerol monooleate, referred to as "additive D" is shown to be an effective lubricity enhancing additive (page 10, last line) for LSD fuels. The diesel fuels tested had a sulfur content of less than 0.01 % by weight (see page 8, section "Fuels)". Glycerol monooleate is a partial ester additive according to the definition of component A in claim 1 at issue as construed by the Board (see point 1.2.1 *supra*). Moreover, the LSD fuel compositions of document D5 are examples of the prior art fuels that the inventors of the patent in suit aimed at improving (see above point 3.1.2 and page 2, lines 25 to 28, of the published European patent application corresponding to the patent in suit). Thus, these prior art LSD fuel compositions were conceived for a similar purpose as the claimed subject-matter and have relevant structural features in common. Hence, they fulfil the criteria necessary for qualifying as most appropriate starting point for the assessment of inventive step.

3.2.3 The Appellant considered document D2 to be a more appropriate starting point for the assessment of inventive step since this document not only focused, like the patent in suit, on improving the lubricity of diesel fuels but also disclosed diesel fuels compositions comprising both components A and B.

i) From the above discussion at point 3.1 it is apparent that both aspects of the technical advantage that the invention is supposed to provide, are specifically related to the particularly unsatisfactory lubricity of LSD fuels, i.e. to disadvantages not necessarily occurring in diesel fuels which did not undergo a treatment reducing their sulphur content making it necessary to add lubricity improving additives which, in the prior art, appeared to also

inevitably produce a worsening in oil-compatibility. Hence, both aspects of the aimed technical advantage are only relevant in respect of LSD fuels.

ii) Therefore, considering that the compositions according to D2 have an unknown sulphur content and, thus, may not suffer at all from an unsatisfactory lubricity, and despite the fact the the fuel compositions according to D2 comprise both components A and B, the Board does not accept the argument of the Appellant that D2 rather than D5 represents the closest prior art for the assessment of inventive step

### 3.3 Technical problem according to the Respondent

According to the Respondent, starting from the closest prior art as disclosed by D5 the technical problem can be seen in the provision of a LSD fuel composition having both a satisfactory lubricity and a satisfactory oil-compatibility (see also points 3.1.2 and 3.1.3 *supra*).

### 3.4 Solution

As a solution to this technical problem, the patent in suit proposes the LSD fuel composition according to claim 1 at issue which is characterised in particular in that *"the sulphur content of said diesel fuel is up to 0.05 % by weight and the concentration of the combination of (A) and (B) in said diesel fuel is from 10 to 1000 ppm and the weight ratio of component (A) to component (B) is in the range of from 1:99 to 99:1"*.

### 3.5 Alleged success of the solution

#### 3.5.1 The Appellant stressed that the claimed subject-matter

allows for a minimum concentration of component A or of component B as low as 0.1 ppm. Thus, in the Appellant's opinion, the proposed solution to this stated technical problem cannot possibly be successful across the whole ambit of claim 1 at issue.

In particular, the Appellant relied on Example 7 of the Appellant's data to prove that even embodiments of the presently claimed subject-matter comprising 10 ppm of component A and 90 ppm of component B do not provide a better lubricity to the LSD fuel to which it is added (HFRR/ $\mu\text{m}$  value of 593), compared to the lubricity of the LSD fuel *per se* (HFRR/ $\mu\text{m}$  value of 601) .

3.5.2 The Board notes that the Respondent has refuted this argument exclusively on the basis of its interpretation of claim 1 (see point 1.2.2 *supra*), *i.e.* by stating that this Example 7 would not be regarded by the skilled person as an embodiment of the claimed subject-matter.

Since, however, the Board does not accept said restrictive construction of claim 1 for the reasons indicated under point 1.2.2, the Board has no reason to disregard Example 7 of the Appellant's data.

3.5.3 For the Board, this Example demonstrates that the stated technical problem is not solved across the whole ambit of claim 1.

3.6 Technical problem effectively solved

3.6.1 Since the technical problem stated above cannot be retained, it must be formulated in a less ambitious way.

3.6.2 The Respondent suggested at the oral proceedings that at least the aspect of the technical problem relating to the oil-compatibility was credibly solved across the whole ambit of claim 1 as maintained. Accordingly, it would be justified to reformulate the addressed technical problem taking into account this aspect only.

The Board finds, however, that this approach is not appropriate since it does not take into account that the worsening of oil-compatibility that the claimed subject-matter allegedly avoids is only that occurring after the addition of an effective lubricity additive, i.e. once that the lubricity of LSD fuels is already enhanced to an acceptable level. In view of this logical/hierarchical link between these two aspects, it is questionable whether a technical problem addressing the oil-compatibility in isolation makes any technical sense. Since such a technical problem is, moreover, not even foreshadowed in the patent in suit, it cannot be used in the application of the problem-solution-approach to the case at issue.

3.6.3 In view of the above, the Board finds that starting from the closest prior art D5 (examples) the technical problem solved by the subject-matter of claim 1 at issue credibly solves across its whole ambit can merely be seen is the provision of a further LSD fuel composition containing component A.

### 3.7 Obviousness

3.7.1 It remains to be assessed whether in the light of the prior art and common general knowledge the skilled person would obviously consider solving this less ambitious technical problem by providing a LSD fuel composition according to claim 1 at issue.

3.7.2 It was stressed by the Appellant, and not disputed by the Respondent, that document D5 (page 7, lines 16 to 20) suggests the inclusion of "detergents" as "coadditives" in LSD fuel compositions. The definition component B in claim 1 at issue embraces the detergents such as the polyisobutenyl succinic acids or anhydrides, which are disclosed in document D6 as preferred "fuel detergent" additives for diesel fuels, to be used in concentrations of from 50 to 1000, preferably 500, ppm (see document D6, column 2, lines 38 to 43; column 5, Tables I and II; column 7, lines 31 to 33; claim 2).

3.7.3 Hence, the skilled person faced with the technical problem posed is thus induced to consider the inclusion of the polyisobutenyl succinic acid or anhydride disclosed in document D6, in an concentration in the preferred range indicated in document D6 (i.e. from 50 to 500 ppm), in a low sulfur diesel fuel comprising a concentration of 10 to 1000 ppm glycerol monooleate as described in the examples of D5 (Table "Fuel II" on page 10). Putting into practice this available option leads in an obvious manner to a fuel composition falling within the terms of claim 1 at issue.

3.8 The Board concludes therefore that the subject-matter of claim 1 according to the Respondent's Main Request does not involve an inventive step (Articles 52(1) and 56 EPC 1973).

3.9 The Main Request is, thus, not allowable.

#### *Auxiliary Request*

4. Claim 1 of the Auxiliary Request differs from claim 1 of the Main Request only in that the range for the



weight ratio of component A to component B is narrowed down to the range "*from 30:70 to 70:30*". Read in combination with the feature "*10 to 1000 ppm*" of A + B, the minimum amount of each of these components is by implication set to to at least 3 ppm.

5. The Board is satisfied that the amended claims at issue are not objectionable under Article 123(2) and (3) EPC or Article 84 EPC 1973. Since the Appellant raised no objections in this respect, further details need not be given.
6. Said amendment made to claim 1 has no bearing on the Board's considerations under points 1 and 2 *supra* which apply *mutatis mutandis* to claim 1 of the Auxiliary Request.
7. Inventive step
  - 7.1 The considerations under points 3.1 to 3.3 above also apply to the subject-matter of claim 1 at issue. Thus, the Board considers the LSD fuel compositions exemplified in document D5 to be the most suitable starting point for the assessment of inventive step for claim 1 of the Auxiliary Request as well.
  - 7.2 The technical problem to be considered is the one stated by the Respondent in accordance with the indications in the patent in suit (see point 3.1.2, 3.1.3 and 3.3 *supra*), i.e. the provision of a LSD fuel composition having both a satisfactory lubricity and a satisfactory oil-compatibility.
  - 7.3 The proposed solution is the LSD fuel composition defined in claim 1 at issue, which is narrower than and differs from claim 1 according to the main request in

that the minimum concentration of component A and of component B is, by implication, 3 ppm, and wherein both components must be present in concentrations of the same order of magnitude, i.e. in a weight ratio of from 7:3 to 3:7.

7.4 As regards the success of this solution, the Appellant argued that the claimed subject-matter remained nevertheless too broad and, thus, that the proposed solution was not effectively successful across the whole claimed ambit.

7.4.1 In support of this objection the Appellant no longer relied on Example 7 of the Appellant's data (as this example does not fall under the scope of claim 1 of the Auxiliary Request, due to its A:B ratio of 1:9) but on the following arguments (resumed more extensively above at Section IX of the Facts and Submissions):

- a) the patent in suit and, as well as, the opposition data provided by the Respondent, prove no or only some minor lubricity improvement for concentrations of component A of at least 50 ppm combined with smaller concentrations of component B, but none of the examples reporting measured lubricity values was in accordance with claim 1 of the Auxiliary Request;
- b) as also previously acknowledged at point 2.2.5 of the reasons of the decision T 215/03 of this Board and as reflected in all available prior art, the concentration of a lubricity additive required for reaching an industrially acceptable level of lubricity of LSD fuels, is normally well above 10 ppm and a significant lubricity increase cannot

reasonably be expected at levels of 10 ppm or less;

and

- c) the oil-compatibility results reported in Table 3 of the Appellant's data were more reliable than those in the declaration data, because only the former data also specified the sulfur content and the distillation temperature profile of the used diesel fuel; thus they rendered credible that the oil-compatibility was, under certain conditions falling within the ambit of claim 1, actually worsened by the addition of component B.

7.4.2 The Board is not convinced by these arguments.

i) As to the issue of lubricity enhancement, the Board notes that lubricity enhancements at a few tens of ppm of component A are reported in the Table in paragraph [0042] of the patent in suit, in the opposition data and in the Appellant's data, even though only for compositions at A:B amount ratios of 9:1 or more. The only experimental result indicative of a worsening of lubricity is instead that observed at an A:B amount ratio as low as 1:9 (i.e. in the now comparative Example 7 of the Appellant's data).

Hence, the lubricity results reported in the patent in suit, in the opposition data and in the Appellant's data are consistent with the statement in paragraph [0006] of the patent in suit as to the provided enhanced lubricity, in as far the A:B amount ratio is more than about 1:9.

The Board notes further that the example corresponding to the second line of the table referring to "Fuel II" at page 10 of document D5 shows that even a small concentration of 10 ppm of component A improves appreciably the lubricity of LSD fuels (the indicative "Wear Scar Diameter" being lowered from 630 to 570  $\mu\text{m}$ ).

The Appellant's allegation that said increase in lubricity was either within the error margin of the lubricity value reported for the LSD fuel *per se*, or in any case too low to be industrially acceptable, is unsupported by any evidence and has been disputed by the Respondent. Thus, it amounts to an unsupported allegation deprived of credibility. Document D5 itself contains no teaching depriving of credibility its own statement at the last line of page 6, according to which an (appreciable) lubricity enhancement is even possible at lower concentrations down to 1 ppm of a lubricity additive.

Hence, in the opinion of the Board, the available evidence and prior art render plausible, rather than unplausible, the achievement of the desired increase in lubricity across the whole A:B ratio range "*from 30:70 to 70:30*" according to claim 1 at issue. Moreover, the criticality of such restricted range is also accepted considering that such an increase is not obtained when the A:B ratio is instead about 1:9, as shown by Example 7 of the Appellant's data.

Finally, considering this evidence and prior art, the Board finds that the reasons indicated at point 2.2.5 of decision T 215/03 denying the credibility of an effect when adding 10 ppm "or less" of a lubricity additive, are not relevant for the present case, even more so since the claim under consideration in said

earlier decision provided no lower limit at all for the concentration of lubricity additive.

ii) As to the oil-compatibility, the Board notes that the declaration data contain not only Examples 1-1 and 1-2 as an attempt to reproduce and contradict the two examples reported in Table 3 of the Appellant's data. They contain also several other examples all confirming the beneficial effect of this component on the compatibility with engine oil (expressed in terms of "time to filter", see examples 2-3, 2-4, 2-5, 3-3, 4-4, 4-5 and 4-6, all having an A:B ratio in the range according to claim 1 at issue). Hence, for the Board, although the declaration data are somewhat less precise than the declaration data in that the former do not specify the exact sulphur content and distillation profile of the LSD fuel used, the totality of the experimental evidence contained in the declaration data outweighs the single experimental comparison provided in Table 3 of the Appellant's data.

Hence, the Board comes to the conclusion that the available evidence confirms, rather than contradicts, that the aimed for oil-compatibility is indeed obtained by including component B as prescribed by claim 1 at issue.

7.4.3 Accordingly, the Board accepts as plausible that the claimed solution successfully solves the technical problem posed across the whole ambit of claim 1 at issue.

7.5 As regards the obviousness of the proposed solution, it has to be assessed whether starting from the LSD fuel composition as disclosed in document D5, comprising component A as lubricity enhancing additive, a skilled

person trying to provide a LSD fuel composition wherein the lubricity problems of LSD fuels are overcome without unacceptable worsening of the oil-compatibility - would or would not have expected that the addition of a further ingredient falling under the definition of component B in a concentration as prescribed by claim 1 at issue would allow to at least retain the oil-compatibility of the LSD fuel *per se* despite the presence of the lubricity enhancer A.

7.6 The Board notes that the available documents (including D2, D6 and D7) do not even mention the issue of oil-compatibility, let alone teach that the components B disclosed therein as diesel fuel additives favour such compatibility when added in a concentration and at an A:B ratio as required by claim 1 at issue. Hence, the available prior art cannot possibly suggest modifying a composition according to the closest prior art D5 (examples) so as to arrive at a composition falling within the terms of claim 1 at issue.

7.7 Hence, the Board comes to the conclusion that the subject-matter of claim 1, and consequently also the subject-matter of claims 2 to 8 dependent thereon, involves an inventive step (Articles 52(1) and 56 EPC 1973).

## Order

### For these reasons it is decided that:

The case is remitted to the department of first instance with the order to maintain the patent on the basis of the claims of the Auxiliary Request submitted with letter dated 8 August 2011.

The Registrar:

The Chairman:



D. Magliano

B. Czech

Decision electronically authenticated