

**Internal distribution code:**

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

**Datasheet for the decision  
of 6 March 2012**

**Case Number:** T 1942/08 - 3.3.01

**Application Number:** 02776225.1

**Publication Number:** 1442105

**IPC:** C10M 163/00

**Language of the proceedings:** EN

**Title of invention:**

Lubricating composition with improved fuel economy

**Patentee:**

The Lubrizol Corporation

**Opponent:**

Infineum International Ltd.

**Headword:**

Lubricating compositions/LUBRIZOL

**Relevant legal provisions:**

EPC Art. 114(2), 87(1), 54, 56  
RPBA Art. 13(1)(3), 15(6)

**Keyword:**

"Novelty (yes), combination of features not directly and unambiguously disclosed in the prior art"

"Inventive step (no), obvious combination of prior art teachings"

**Decisions cited:**

-

**Catchword:**

-



## Summary of Facts and Submissions

I. European patent No. 1 442 105, claiming priority from US application No. 337 720 of 5 November 2001, was granted on the basis of thirteen claims. Claim 1 as granted reads as follows:

"1. A composition suitable for lubricating an internal combustion engine, comprising:

(a) an oil of lubricating viscosity;

(b) an overbased detergent, wherein the detergent is exclusively or predominantly a linear alkylbenzenesulfonate detergent having a metal ratio of at least 8, wherein in said composition the amount of phenate detergent is less than 15% by weight of the total amount of detergents

(c) a combination of antioxidants comprising

(i) 0.1 to 2 weight percent hindered phenolic ester antioxidant and

(ii) 0.2 to 2 weight percent aromatic amine antioxidant; and

(d) at least one further component selected from the group consisting of dispersants, zinc dialkyl-dithiophosphates, and friction modifiers."

II. An opposition was filed and revocation of the patent in its entirety requested pursuant to Article 100(a) EPC, for lack of novelty and inventive step.

III. The following documents were cited *inter alia* during the opposition proceedings:

(12) EP-A-1 227 145

(13) EP-A-0 881 277

IV. The appeal lies from the decision of the opposition division revoking the patent. The decision was based on a main request, namely, the claims as granted, and a first auxiliary request filed during oral proceedings before the opposition division. The opposition division considered the subject-matter of both requests to be novel, but to lack an inventive step in view of the disclosure of document (12). In particular, the data filed by the patentee with letter of 20 June 2008 was found to provide insufficient evidence that the problem of providing a lubricating oil composition with improved fuel economy had been solved. The opposition division therefore reformulated the problem in a less ambitious manner, as lying in the provision of an alternative lubricating composition with fuel efficiency. A clear indication could be found in document (12) itself to use a linear alkylbenzene-sulfonate detergent as a solution to the problem posed.

V. The appellant (patentee) lodged an appeal against this decision, and filed additional experimental data and an auxiliary request 1 with its statement of grounds of appeal. Claim 1 of this request differed from claim 1 as granted in the insertion under item (b), after "wherein in said composition", of the following feature:

"the amount of detergents based on carboxylates, phenates, salicylates, saligenins or salixarates is less than 30% of the total amount of detergents and".

- VI. In reply to a communication sent as annex to the summons to oral proceedings, the appellant filed an auxiliary request 2 with letter of 6 February 2012. This request differed from auxiliary request 1 in that the inserted feature (cf. above point V) had been modified to read:

"the amount of detergents based on other acidic materials is less than 30% by weight of the total amount of detergents and".

In addition, a declaration by Dr Mosier was filed containing further experimental data.

- VII. Oral proceedings were held before the board on 6 March 2012.

- VIII. The appellant's arguments, insofar as they are relevant to the present decision, may be summarised as follows:

With respect to the question of admissibility of the declaration of Dr Mosier (cf. above point VI), the appellant argued that this had been submitted in response to the objections raised by the respondent (opponent) with respect to the earlier data filed with the statement of grounds of appeal, and merely confirmed that there was indeed a correlation between friction reduction and the improvement in fuel economy. The appellant further argued that, since no postponement of oral proceedings had been requested, it

could be assumed that the respondent had had sufficient time to adequately analyse the data. Finally, the appellant submitted that the declaration should be admitted, since the present proceedings might represent the last chance for the patentee to save something of the patent in suit.

The appellant denied that document (12) was relevant to the issue of novelty. In particular, there was no direct and unambiguous disclosure in Table 9 that the calcium sulfonate component used was a "linear alkylbenzenesulfonate detergent".

Turning to the issue of inventive step of the main request, the appellant started from document (12) as the closest prior art. The problem to be solved lay in the provision of a lubricating oil composition with improved fuel economy. The solution was to be found in the use of the specific detergent as defined in claim 1, namely, a "linear alkylbenzenesulfonate detergent having a metal ratio of at least 8".

With the statement of grounds of appeal, the results of friction measurements had been submitted, performed in a temperature range that was usual for internal combustion engines. This data clearly demonstrated that, in formulations representative of Examples 20 and 21 disclosed in Table 9 of document (12), the replacement of a branched alkylbenzenesulfonate detergent with its linear counterpart resulted in a substantial reduction in the coefficient of friction. In response to an enquiry by the respondent as to the specific structures used in these tests, the appellant stated that a detergent containing a highly branched C15-C35

polypropylene group had been compared with one containing a C20-C24 linear alkyl group. It was well known in the art that a reduction in engine frictional loss would be expected to result in a lower fuel consumption, as could, for example, be derived from document (13) (page 2, lines 13 to 16). Thus, the comparative data submitted with the statement of grounds of appeal rendered it plausible that a significant improvement in fuel economy could be achieved for the claimed compositions

Document (12) itself did not provide any hint leading towards the claimed solution since, of the three classes of metal detergents disclosed in document (12), namely, sulfonates, phenates and salicylates, a definite preference was given to the latter. Certainly, no clear pointer was provided that would have directed the skilled person to the specific detergent defined in claim 1 of the patent in suit, in the expectation of achieving the present improvement. Moreover, the emphasis in document (12) lay in the modification of the phosphorus-containing additives in order to optimise the properties of the lubricating oil composition. The metal detergent additives were disclosed as being merely optional, and the skilled person would therefore not have considered modifying them as a solution to the problem posed.

Similarly, since document (13) did not address the modification of phosphorus-containing additives, the skilled person would have no motivation to turn to this document, which was concerned with an unrelated solution to the technical problem. Moreover, had the skilled person focused on the detergent, he would have

rather sought to modify the preferred salicylate detergents of document (12). A further disincentive to combine documents (12) and (13) arose from the fact that the former taught the use of metal sulfonates as detergents and the latter as friction modifiers. Finally, although document (13) emphasised the importance of linearity of the alkyl groups in metal sulfonates, its teaching was very general and there was no clear pointer to the use of overbased alkylbenzene sulfonates.

With respect to the auxiliary requests, the appellant submitted that the newly introduced features further limited the amounts of the additional detergents that could be present and therefore promoted the importance of the sulfonate detergent. Thus, this amendment further distanced the compositions claimed from those disclosed in Examples 20 and 21 of document (12), since the latter each contained high amounts of calcium salicylate. It was therefore no longer a simple matter of starting from document (12) and combining with document (13). Reducing the amount of salicylate went against the teaching of document (12) as a whole, since this was a preferred detergent and sulfonates were never used on their own in the examples. This additional modification would therefore not have been obvious to the skilled person as a solution to the problem posed.

IX. The respondent's arguments, insofar as they are relevant to the present decision, may be summarised as follows:



The respondent raised an objection with respect to the admissibility of the declaration of Dr Mosier, in view of the fact that it had been filed only one month prior to oral proceedings, even though the lack of direct experimental evidence for an improvement of fuel economy had been an issue throughout the opposition and appeal proceedings. The respondent had thus been taken by surprise by the late submission of the fuel economy tests and had not been given sufficient time to adequately react to this evidence.

The respondent further submitted that the disclosure of document (12) destroyed the novelty of the subject-matter of claim 1 of the main request. In particular, in Table 9, all the features of the claimed composition were disclosed in combination, except for the specific structure of the calcium sulfonate component, which was not explicitly identified as being a linear alkyl-benzenesulfonate. However, the skilled person would complete the missing information by reference to paragraphs [0056] and [0057], in which linear alkyl-benzenesulfonates were specifically disclosed in a short list of alternatives.

In its assessment of inventive step, the respondent also started from document (12) as representing the closest prior art. The respondent contested that the friction data relied on by the appellant was sufficient to demonstrate that the problem of providing a lubricating oil composition with improved fuel economy had actually been solved, arguing, in particular, that friction reduction did not necessarily correlate with fuel economy. However, even were this question to be decided in favour of the appellant, the respondent

submitted that the claimed solution would have been obvious in view of document (13), which expressly taught that higher alkyl chain linearity in metal sulfonates would lead to friction reduction. Therefore, it would have been obvious to substitute branched for linear alkyl chains as a solution to the problem posed.

- X. The appellant (patentee) requested that the decision under appeal be set aside and that, as its main request, the patent be maintained as granted, or, alternatively, that the patent be maintained upon the basis of auxiliary request 1 filed with the statement of grounds of appeal, or auxiliary request 2, filed under cover of a letter dated 6 February 2012.

The respondent (opponent) requested that the appeal be dismissed, and that the declaration of Dr Mosier, filed under cover of a letter dated 6 February 2012, not be admitted into the proceedings.

- XI. At the end of the oral proceedings, the decision of the board was announced.

### **Reasons for the Decision**

1. The appeal is admissible.
2. *Admissibility of declaration by Dr Mosier, filed by the appellant under cover of letter dated 6 February 2012*

This declaration was filed only one month prior to oral proceedings before the board and contained, for the

first time in these opposition/appeal proceedings, comparative measurements of fuel consumption.

As with all late-filed evidence, admissibility is a matter for the discretion of the board, in accordance with Article 114(2) EPC and Article 13(1) of the Rules of Procedure of the Boards of Appeal (RPBA). Thus, contrary to the appellant's contention, a patentee does not have an absolute right to a "last chance" to save its patent, regardless of the relevant circumstances. Moreover, as will become clear under point 4.2.2 below, the "last chance" argument is not decisive in the present case.

The appellant argued that the submission of the latest comparative data had been occasioned by arguments presented in the respondent's reply of 30 April 2009 to the statement of the grounds of appeal. However, no reasons were advanced as to why almost three years had been allowed to elapse before the data had been provided. As a result of this delay, the respondent had a much shorter time of only one month for preparing its response to the new case submitted by the appellant.

Thus, based on the principle of equal treatment of the parties, the board cannot accept that the respondent had sufficient time prior to oral proceedings to fully evaluate the results set out in the declaration, and possibly to prepare counter-evidence. The admission of this new evidence into the proceedings would therefore have necessitated an adjournment of oral proceedings, contrary to Articles 13(3) and 15(6) RPBA.

Consequently, the board decided to exercise its discretion not to admit the declaration into the proceedings.

3. *Priority*

There is no disclosure in the priority document of a "linear alkylbenzenesulfonate detergent having a metal ratio of at least 8". The requests on file are therefore not entitled to the claimed priority date of 5 November 2001 (Article 87(1) EPC). Thus, the effective date for all requests is the filing date of 15 October 2002, which is later than the publication date of document (12) (31 July 2002). Consequently, document (12) is considered to belong to the state of the art pursuant to Article 54(2) EPC. This was not disputed by the appellant.

4. *Main request*

4.1 *Novelty (Articles 52(1), 54(2) EPC)*

The respondent's novelty attack was exclusively based on the novelty of the subject-matter of claim 1 with regard to document (12). Therefore, the analysis set out below has also been limited to this piece of prior art.

It is a general principle consistently applied by the boards of appeal that, for concluding lack of novelty, there must be a direct and unambiguous disclosure in the state of the art which would inevitably lead to subject-matter falling within the scope of what is claimed.

In the present case, the respondent pointed to the compositions exemplified in Table 9 on page 22 of document (12) as destroying the novelty of claim 1 of the patent in suit. There was no dispute between the parties that the compositions disclosed in this table comprised all the features of present claim 1, apart from the fact that the exact structure of the calcium sulfonate component (C) was not specified. For the sake of completeness, the board notes that an analogous composition is disclosed in the penultimate column of Table 2 on page 15 of document (12) (cf. footnotes 11 and 13). However, since the same arguments apply, the board will confine itself here to an analysis of the disclosure of Table 9, which was the focus of the discussions during the opposition and appeal proceedings.

In Table 9 of document (12), three specific compositions are disclosed, each containing a metal detergent component (C) designated as "Ca Sulfonate <sup>5)</sup>". The corresponding footnote 5 specifies the following: "5) Ca content: 12.0 mass %, metal ratio: 10.0, total base number: 300 mgKOH/g, sulfur content: 1.2 mass %".

Thus, it can be seen from the previous paragraph that the characterising feature of present claim 1, namely, that said detergent component is "a linear alkyl-benzenesulfonate" is not explicitly disclosed in the examples of Table 9.

It also cannot be accepted that said feature is implicitly disclosed. The respondent argued in this context that the skilled person would complete the

missing information in Table 9 by reference to paragraphs [0056] and [0057] of document (12). However, it is noted that Table 9 discloses specific compositions, including a specific calcium sulfonate component (C), which has simply not been completely defined. The fact that its exact structure is not known cannot be equated with a disclosure of calcium sulfonates as a general class of compounds, which can be combined with other parts of the description to complete "missing information".

Moreover, the respondent was not able to demonstrate that it could be directly and unambiguously identified, based on the information explicitly disclosed in Table 9, which of the alkyl aromatic compounds disclosed in paragraphs [0056] and [0057] had actually been employed in producing the specific component designated as "Ca Sulfonate <sup>5)</sup>" in Table 9. The most specific structural disclosure is given in paragraph [0057] and refers to "**mahogany acid** obtained by sulfonating an alkyl aromatic compound contained in the lubricant fraction of mineral oil or by-produced upon production of white oil" and "synthetic sulfonic acid ... obtained by sulfonating an **alkyl benzene having a straight-chain or branched alkyl group**, ... or sulfonating **dinonylnaphthalene**" (emphasis added). Therefore, in order to arrive at subject-matter falling within present claim 1, assumptions must be made amongst the choices offered concerning the exact structure of the sulfonate salt in Table 9. Since this information does not directly and unambiguously emerge from the disclosure of document (12), it follows that the subject-matter of claim 1 of the patent in suit is novel in the light of this document.

Moreover, the board is satisfied that the subject-matter claimed in the patent in suit is not disclosed in any of the further prior art documents cited during the appeal proceedings. Since this was not in dispute between the parties, it is not necessary to give detailed reasons in this respect.

Consequently, it is concluded that the subject-matter claimed in the patent in suit is novel.

#### 4.2 *Inventive step (Articles 52(1), 56 EPC)*

4.2.1 The board considers, in agreement with the appellant, the respondent and the opposition division, that document (12) represents the closest state of the art.

Document (12) relates to lubricating oil compositions for use in internal combustion engines (see paragraph [0105] and claim 11), which contain at least one thiophosphate or phosphate salt as component (A) (see paragraph [0001] and claim 1). These are said to promote an excellent balance of properties, including maintenance of base number, anti-wear properties, high-temperature detergency and fuel efficiency (see paragraphs [0006] and [0134]).

The compositions may contain a further component (B), such as, zinc dialkyldithiophosphate (ZDTP) (see paragraphs [0041] to [0052] and claim 2). In addition, at least one additive selected from the group consisting of (C) a metal detergent, (D) an ashless dispersant, and (E) an oxidation inhibitor may be present (see paragraph [0053] and claim 4).

Eligible metal detergents are any ones which are usually used in a lubricating oil (see paragraphs [0054] to [0071] and claims 5 to 10), such as alkali metal or alkaline earth metal salicylates and/or sulfonates (see, in particular, paragraph [0067]). In paragraph [0068], alkali metal or alkaline earth metal sulfonates having a total base number of preferably 150 to 400 mgKOH/g are disclosed as being one of six preferred detergent classes, and as having excellent properties in maintaining base number, acid number and viscosity in the presence of NO<sub>x</sub>, and excellent anti-wear properties (see item (5) of paragraph [0068]). The structures of the sulfonate salts envisaged are described in more detail in paragraphs [0056] and [0057], including "synthetic sulfonic acid ... obtained by sulfonating an alkyl benzene having a straight-chain or branched alkyl group".

Eligible oxidation inhibitors are phenol- and amine-based oxidation inhibitors (see paragraphs [0086] to [0090]). Specific examples of the former include a number of 3-(3,5-di-tert-butyl-4-hydroxyphenyl)-propionate esters, and of the latter a number of phenyl- and naphthylamines (see page 12, lines 38 to 42).

Finally, in Table 2, penultimate column, and in Table 9, specific lubricating oil compositions comprising a calcium sulfonate component (C) having a metal ratio of 10.0, and 2 mass% of an oxidation inhibitor (E) consisting of a 1:1 mixture of octyl-3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionate and alkyldiphenylamine are disclosed.



4.2.2 The appellant defined the problem to be solved in view of this prior art as being the provision of a lubricating oil composition with improved fuel economy (see also patent in suit, paragraph [0002]).

The solution as defined in claim 1 of the patent in suit relates to a composition characterised by the use of "a linear alkylbenzenesulfonate detergent".

The parties were divided on the question of whether or not the evidence submitted with the statement of grounds of appeal convincingly demonstrated that this problem has been solved. However, this issue need not to be discussed in any great detail, in view of the conclusion as set out under point 4.2.3 below. Suffice it to say that the board is satisfied that the comparative tests filed by the appellant with the statement of grounds of appeal render it plausible that a statistically significant reduction in the coefficient of friction is attributable to the distinguishing feature of the invention, that is, to the linearity of alkyl group in the alkylbenzenesulfonate detergent. These tests were conducted in a temperature range that is relevant for internal combustion engines, and it has also been rendered plausible by reference, for example, to document (13) (page 2, lines 13 to 16) that, under normal circumstances, a reduction in friction would be expected to correlate with an improvement in fuel economy. Therefore, the board considers that the appellant has discharged its burden of proof to render it plausible that the problem as defined above has been

successfully solved with respect to the closest prior art.

- 4.2.3 It remains to be investigated whether the proposed solution would have been obvious to the skilled person in the light of the prior art.

As becomes evident from the analysis under point 4.2.1 above, document (12) already envisages the use of linear and branched alkylbenzenesulfonate detergents. However, no preference is given to the former. Therefore, this document on its own cannot provide an incentive towards the present solution to the problem posed.

However, the skilled person, starting from the formulations disclosed in document (12), would have been aware of document (13), which also relates to lubricating oil compositions for use in internal combustion engines (see page 7, lines 15 to 17; page 8, lines 34 to 36) and envisages a similar array of potential additives (see claims 5 and 9, and page 7, lines 24 to 44).

Document (13) specifically discloses the desirability of "reductions in friction and wear through improvements in lubricating oils ... with a view to lowering fuel consumption rates" (page 2, lines 13 to 15). Document (13) further teaches that, in metal sulfonates having an alkyl group, the friction reducing ability increases with increasing alkyl chain linearity (page 3, lines 39 to 42), which is defined as "the ratio of **the number of carbon atoms in a linear portion** located 5 or more atoms apart from an end of the alkyl

group or 4 or more atoms apart from a branched site of the alkyl group to the total number of carbon atoms in the alkyl group", as measured by  $^{13}\text{C}$ -NMR techniques (see page 3, lines 24 to 38, emphasis added). In other words, document (13) teaches that the greater the number of carbon atoms in a linear portion of the alkyl group, the better will be the friction reducing properties and the lower the fuel consumption rates.

In the tests relied on by the appellant to demonstrate an inventive step, a reduction in friction coefficient has been demonstrated from replacing a highly branched alkyl group in a benzenesulfonate detergent with a linear alkyl group (cf. above point VIII). In view of the teaching of document (13) as outlined in the previous paragraph, the board concludes that the skilled person would have a clear expectation that such a modification would provide friction reduction and an improvement in fuel economy. In other words, document (13) provides the skilled person with a concrete incentive to solve the problem underlying the patent in suit by increasing the alkyl chain linearity, thereby arriving at the solution proposed by the patent in suit without the exercise of inventive skill.

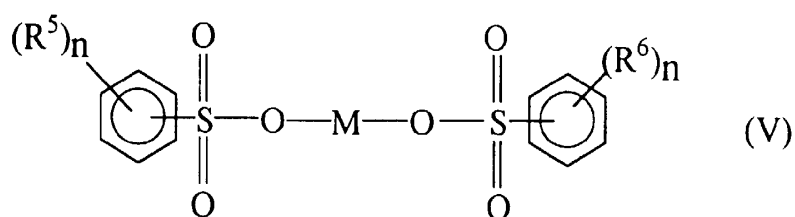
- 4.2.4 The board cannot accept the appellant's contention that, starting from document (12), the skilled person would not have looked to document (13) because of their differences in emphasis with respect to the additives to be modified. Indeed, it can be derived from document (12) that each of the mandatory and optional additives have the potential to modify the balance of properties of the resulting lubricating oil composition (see, e.g., paragraph [0068], item (5)). Therefore, the

skilled person would consider modifications to each of the additives disclosed as a potential source of further improvement.

It is also not convincing to suggest that the skilled person would be led away from modifying the sulfonate detergent disclosed in document (12) owing to the emphasis therein on salicylate detergents. As is explained above under point 4.2.1, the use of alkali metal or alkaline earth metal salicylates and/or sulfonates are disclosed as being preferred in paragraph [0067], and the use of sulfonate metal detergents is more specifically exemplified in paragraph [0068], item (5), and in Tables 2 and 9. There therefore appears to be no reason why the skilled person would be dissuaded from looking to modify the sulfonate detergents.

Moreover, the skilled person would be aware of the fact that additives often display a number of different functions simultaneously (see, e.g., document (12), paragraph [0068], item (5)). Therefore, different functions emphasised for the metal sulfonates in documents (12) and (13) cannot be seen as a disincentive to combine these documents.

Finally, the appellant's argument that there was no clear pointer to the use of overbased alkylbenzene sulfonates in document (13) does not hold, in view of the fact that overbased salts are specifically envisaged in this document (page 6, line 44), as are alkylbenzenesulfonates, in the form of the following formula (V) (see page 5, line 45 to 55, and page 6, lines 26 to 34):



4.2.5 In view of the above analysis, the subject-matter of claim 1 of the main request is therefore found to represent an obvious solution to the problem posed and does not involve an inventive step.

Since a decision can only be taken on a request as a whole, none of the further claims need be examined.

Consequently, the appellant's main request is rejected for lack of inventive step of claim 1.

## 5. *Auxiliary requests 1 and 2*

### 5.1 *Amendments*

In the auxiliary requests, an upper limit has been introduced in claims 1 and 13 for the amounts of certain additional detergents (cf. above points V and VI).

In view of the outcome of these appeal proceedings on the question of inventive step (see point 5.3 below), it is not necessary to discuss whether these amendments give rise to objections under Articles 123 or 84 EPC.

5.2 *Novelty (Articles 52(1), 54(2) EPC)*

In view of the analysis with regard to the main request set out under point 4.1 above, the board also considers that the requirements of novelty are satisfied for the subject-matter of the auxiliary requests. The respondent did not raise any objections in this respect.

5.3 *Inventive step (Articles 52(1), 56 EPC)*

In claim 1 of the auxiliary request, the amount of certain additional detergents has been specified to be "less than 30% (by weight) of the total amount of detergents".

The appellant submitted that this amendment further distanced the compositions claimed from those disclosed in Examples 20 and 21 of document (12), since the latter each contained greater amounts of calcium salicylate than was now specified. However, the teaching of document (12) is not restricted to these examples. As explained above under point 4.2.4, the disclosure of document (12) is not limited to the use of sulfonates in combination with salicylates. Although such combinations are disclosed as being a preferred embodiment, so also is the use of "alkali metal or alkaline earth metal sulfonates" as the sole detergent (see use of "and/or" in paragraph [0067]; as well as paragraph [0068], item (5) vs. items (4) and (6); and Table 2, penultimate column vs. Table 9).

Therefore, the considerations concerning inventive step set out above under point 4.2 with respect to the main request are not affected by an indication of an upper

limit as to the amounts of additional detergents in claim 1 of the auxiliary requests.

Hence, the auxiliary requests are also rejected for lack of inventive step of claim 1.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

M. Schalow

P. Ranguis