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Datasheet for the decision of 21 November 2025

Case Number: T 1822/23 - 3.3.02

Application Number: 16741797.1

Publication Number: 3322783

IPC: C10M163/00

Language of the proceedings: EN

Title of invention:
METHODS AND USES OF LUBRICANTS WITH MOLYBDENUM FOR IMPROVING LOW SPEED PRE-IGNITION

Patent Proprietor:
Afton Chemical Corporation

Opponent:
Infineum International Limited

Relevant legal provisions:
EPC Art. 54, 56, 123(2)
RPBA 2020 Art. 12(6)

Keyword:
Novelty
Inventive step
Amendments
Late-filed facts - error in use of discretion at first instance (yes)

Decisions cited:
G 0002/21, T 0563/22, T 0740/91

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Boards of Appeal

Chambres de recours

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

Case Number: T 1822/23 - 3.3.02

D E C I S I O N
of Technical Board of Appeal 3.3.02
of 21 November 2025

Appellant: (Patent Proprietor)	Afton Chemical Corporation 500 Spring Street Richmond, Virginia 23219 (US)
Representative:	SSM Sandmair Patentanwälte Rechtsanwalt Partnerschaft mbB Joseph-Wild-Straße 20 81829 München (DE)
Appellant: (Opponent)	Infineum International Limited P.O. Box 1 Milton Hill Abingdon Oxfordshire OX13 6BB (GB)
Representative:	Eisenführ Speiser Patentanwälte Rechtsanwälte PartGmbB Johannes-Brahms-Platz 1 20355 Hamburg (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 11 August 2023 concerning maintenance of the European Patent No. 3322783 in amended form.**

Composition of the Board:

Chairman	M. Kollmannsberger
Members:	A. Lenzen
	L. Bühler

Summary of Facts and Submissions

I. Both the patent proprietor and the opponent lodged an appeal against the opposition division's decision (decision under appeal) that European patent No. 3 322 783 (patent) in amended form meets the requirements of the EPC.

Since both parties are simultaneously the appellant and the respondent, the board will continue to refer to them as the patent proprietor and the opponent for the sake of brevity.

II. Reference is made in the present decision to the following documents filed with the opposition division:

D1 Fletcher, K. A., SAE Int. J. Fuels Lubr. 9(3), 2016, pages 612 to 620
D2 EP 3 101 095 A1
D4 Automotive Lubricants Reference Book, 2nd edition, page 113
D5 Lubricant Additives, Leslie R. Rudnick, CRC Press, 2009, pages ix and 3 to 6
D6 WO 2006/110220 A1
D7 Model Calculation for Composition 3 of D2 (one page), filed by the patent proprietor during the oral proceedings on 1 February 2023 (one page)
D8 Experimental data filed with the patent proprietor's letter dated 3 May 2023 (three pages)

III. Apart from the statements of grounds of appeal and the replies to it, the parties filed further substantive submissions with their letters of 30 December 2024 (opponent) and 22 April 2025 (patent proprietor).

With its statement of grounds of appeal and its reply to the opponent's statement of grounds of appeal, the patent proprietor filed the sets of claims of auxiliary requests 1 to 10 and 11 to 14, respectively. With the letter dated 22 April 2025, it filed the following document:

D9 EP 3 415 589 A1

IV. In preparation for the oral proceedings, which had been arranged at the parties' request, the board issued a communication under Article 15(1) RPBA.

V. By letter dated 30 October 2025, the opponent filed a further substantive submission.

VI. Oral proceedings before the board were held by videoconference on 21 November 2025 in the presence of both parties. The board decided, *inter alia*, to admit auxiliary requests 6 and 12 as well as D8 into the proceedings. The board also decided to reject the opponent's request not to admit the patent proprietor's argument that the total base number (TBN) of the calcium-based detergents was not disclosed in D1. The patent proprietor revised the order of its requests as follows: the main request, followed by auxiliary requests 1, 6, 12 and 5, and then the remaining auxiliary requests. At the end of the oral proceedings, the chair announced the order of the present decision.

VII. The patent proprietor's and the opponent's final requests at the end of the oral proceedings, insofar as they are relevant to the present decision, were as follows.

The patent proprietor requested that the opposition be rejected and that the patent be maintained as granted (main request), or, in the alternative, that the patent be maintained in amended form based on one of the following sets of claims in the following order:

- auxiliary request 1 or 6, filed with the patent proprietor's statement of grounds of appeal
- auxiliary request 12, filed with patent proprietor's reply to the opponent's statement of grounds of appeal
- auxiliary request 5, filed with the patent proprietor's statement of grounds of appeal

The opponent requested that the decision under appeal be set aside and that the patent be revoked in its entirety.

VIII. Summaries of the parties' submissions, where relevant to the present decision, and key aspects of the decision under appeal are set out in the reasons for the decision below.

Reasons for the Decision

Prior art status

1. The parties agreed that the effective date for the subject-matter of the pending claim requests is the filing date of the patent (14 July 2016) and that, therefore, D2, published on 6 August 2015 as WO 2015/114920, is prior art under Articles 54(2) and 56 EPC and is relevant for the assessment of novelty and inventive step.

Main request (patent as granted) - Novelty (Article 54(2) EPC)

2. Claim 1 of the main request reads as follows (including the designation of the features as (preamble) and (i) to (x) used by the parties):

> "*(preamble) A method for reducing low-speed pre-ignition events in a boosted internal combustion engine comprising:*
>
> *(i) lubricating a boosted internal combustion engine with a lubricating oil composition comprising:*
>
> *(ii) greater than 50 wt.% of a base oil of lubricating viscosity, and*
>
> *(iii) an additive composition comprising:*
>
> *(iv) one or more overbased calcium-containing detergents having a total base number of greater than 225 mg KOH/gram, measured by the method of ASTM D-2896,*

(v) in an amount sufficient to provide greater than 1100 ppm by weight to less than 2400 ppm by weight of calcium to the lubricating oil composition, based on a total weight of the lubricating oil composition, and

(vi) one or more molybdenum-containing compounds

(vii) in an amount sufficient to provide at least 80 ppm by weight molybdenum to the lubricating oil composition, based on the total weight of the lubricating composition, and

(viii) wherein the lubricating oil composition contains not more than 150 ppm of sodium,

(ix) and a sulfated ash content of 0.05 wt.% to 0.9 wt.%, based on the total weight of the lubricating oil composition,

(x) and the lubricating oil composition has a weight ratio of sulfur provided to the lubricating oil composition by the additive composition, to a weight of the molybdenum in the lubricating oil composition of less than 18:1."

Low-speed pre-ignition events will be abbreviated below as "LSPI", and the sulfated ash content as "SASH".

3. The opponent argued that the subject-matter of claim 1 of the main request lacked novelty over the lubricating oil composition 3 in D2 (table 1) and its application.

4. The lubricating oil composition 3 in D2 consists of the following components (a) to (g):

(a) "Metal Cleaner 2" - this is a calcium salicylate (TBN: 350 mg KOH/g) incorporated such that the amount of calcium in the lubricating oil composition 3 is 0.17 wt.% or 1700 ppm by weight (D2, paragraph [0112]).

(b) "Wear Inhibitor 1" - this is a secondary alkyl-type zinc dithiophosphate incorporated such that the amount of phosphorus in the lubricating oil composition 3 is 0.08 wt.% (D2, paragraph [0113]).

(c) "Friction Modifier 1" - this is a molybdenum dithiocarbamate incorporated such that the amount of molybdenum in the lubricating oil composition 3 is 0.04 wt.% or 400 ppm by weight (D2, paragraph [0114]).

(d) "Ashless Dispersant 1" - this is a boron-modified polyisobutenyl succinic acid imide incorporated such that the amount of nitrogen in the lubricating oil composition 3 is 0.09 wt.% (D2, paragraph [0115]).

(e) "Viscosity Index Improver 1" - it contains an olefin copolymer (Mw = 200,000) incorporated such that the amount of said copolymer in the lubricating oil composition 3 is 1 wt.% (D2, paragraph [0116]).

(f) "Other Additives" - this is 2 wt.% of an additive package containing antioxidant, antifoaming agent and pour point depressant (D2, paragraph [0117]).

(g) "Base Oil 3" - this is a mixture of hydrocracked base oil (mineral oil) and poly-α-olefin in an undisclosed ratio and brings the total weight of the lubricating oil composition to 100 wt.%, i.e. it constitutes the balance.

The lubricating oil composition 3 in D2 is also assessed in terms of its LSPI performance (D2, paragraph [0119] and table 4).

5. It was common ground between the parties that the lubricating oil composition 3 and its application anticipate the (preamble) and features (i) to (viii) of claim 1 of the main request. The parties only disagreed on whether features (ix) and (x) of claim 1 of the main request are disclosed by this composition.

6. Feature (ix)

6.1 Feature (ix) provides for a SASH of 0.05 wt.% to 0.9 wt.%, based on the total weight of the lubricating oil composition.

6.2 It was undisputed that D2 does not explicitly disclose the SASH of the lubricating oil composition 3.

6.3 However, D2 (table 13) discloses the SASH of the lubricating oil composition 2 to be 0.6 wt.%.

As is evident from table 1 of D2, the lubricating oil composition 3 differs from the lubricating oil composition 2 only in its slightly higher content of the calcium source "Metal Cleaner 2". Specifically, the lubricating oil composition 3 contains 0.17 wt.% of calcium, whereas the lubricating oil composition 2 contains 0.12 wt.%. The lubricating oil composition 3 therefore contains 0.05 wt.% more calcium than the lubricating oil composition 2.

It was common ground between the parties that the contribution of "Metal Cleaner 2" to the SASH is

determined solely by the amount of calcium it contains and provides to the lubricating oil compositions.

The table shown in paragraph [0156] of the patent provides, for various metals, the conversion factors by which the amount of metal contained (in wt.%) must be multiplied in order to obtain the contribution of the metal in question to the SASH. For calcium, this conversion factor is 3.40. The same information is disclosed in D4 (table on page 113).

The amount by which the additional calcium content in the lubricating oil composition 3 compared with the lubricating oil composition 2 (0.05%) increases the SASH of the latter can therefore be calculated by multiplying this additional amount of calcium by the factor 3.40: 0.05 wt.% · 3.40 = 0.17 wt.%. Therefore, as correctly pointed out by the opponent and in line with the decision under appeal, the SASH of the lubricating oil composition 3 amounts to (0.6 + 0.17) wt.% = 0.77 wt.% and is in accordance with claim 1 of the main request.

6.4 The patent proprietor's counter-arguments did not convince the board for the reasons set out below.

6.4.1 In the patent proprietor's view, both lubricating oil compositions 2 and 3 contained component (f), "Other additives". D2 (paragraph [0117]) did not provide any information beyond the indication that these additives contained "*antioxidant, antifoaming agent and pour point depressant*". Therefore, the "Other additives" in the lubricating oil composition 3 could in fact differ from those in the lubricating oil composition 2. In particular, the lubricating oil composition 3 might include metal-based compounds that could increase the

SASH beyond 0.77 wt.%. Therefore, a SASH value of 0.77 wt.% could not be regarded as being implicitly disclosed for the lubricating oil composition 3.

However, as the opponent pointed out, D2 identifies the "Other Additives" as a "*[p]ackage containing antioxidant, antifoaming agent and pour point depressant*", i.e. a package referred to in the singular, making it clear that the same package is used as the "Other Additives" in all the lubricating oil compositions in D2. Moreover, the board agrees with the opponent that it would be unreasonable to assume that different packages containing different additives were used in the lubricating oil compositions 2 and 3, especially given that, *inter alia*, these two compositions are intended to be compared with one another.

6.4.2 The patent proprietor also pointed to several deviations between the SASH values actually measured in D2 and the corresponding calculated values. For example, in example 2 the measured value matched the calculated value (0.6 wt.%). In examples 1 and 5, the measured values were higher than the calculated values (example 1: 0.6 vs. 0.5 wt.%; example 5: 0.8 vs. 0.7 wt.%). In contrast, for example 11 the measured value was lower than the calculated value (0.9 vs. 1.0 wt.%). These deviations demonstrated that the calculated values were only approximations with an inherent error and that it was therefore entirely unreasonable to assume that the calculated SASH value for the lubricating oil composition 3 of 0.77 wt.%, i.e. 0.8 wt.% when rounded, necessarily fell within the claimed range of 0.05 to 0.9 wt.%.

However, as set out by the opponent, the deviations between the SASH values measured in D2 and those calculated amount to no more than 0.1 wt.% in all cases cited by the patent proprietor. Even with such a deviation, a calculated SASH value of 0.77 wt.% for the lubricating oil composition 3 still would not fall outside the claimed range, even if it were assumed, in the patent proprietor's favour, that this deviation applies only to calculated SASH values rounded to one decimal place (i.e. 0.8 wt.%).

Although not relevant to the decision, the board further notes that claim 1 of the main request does not specify how the SASH is to be determined, i.e. whether by actual measurement or by calculation. Moreover, the patent itself (paragraph [0156]) calculates the SASH of its lubricating oil compositions in the same manner as that applied by the opponent to D2. From this perspective as well, the board cannot find any flaws in the opponent's line of argument.

6.4.3 Therefore, the patent proprietor's counter-arguments do not change the above conclusion that feature (ix) of claim 1 of the main request is anticipated by the lubricating oil composition 3 in D2.

7. Feature (x)

7.1 The opposition division held that feature (x) was implicitly disclosed in the lubricating oil composition 3 in D2.

On appeal, the patent proprietor maintained the arguments previously raised before the opposition division. Specifically, according to D5, D6 and D9, sulfur-containing antioxidants were possible

constituents of lubricating oil compositions. The "Other Additives" in the lubricating oil composition 3 in D2 could include such sulfur-containing compounds as the antioxidant. Therefore, as demonstrated by the calculations in D7, the S:Mo ratio of the lubricating oil composition 3 in D2 could exceed the threshold defined in feature (x). The patent proprietor further submitted that the opposition division's finding of an implicit disclosure in the present case was inconsistent with its decision in a similar case (European patent No. 1 871 861).

However, as explained below, feature (x) of claim 1 is not a limiting feature. The patent proprietor's arguments are thus not relevant to the present decision.

7.2 Feature (x) concerns the sulfur to molybdenum ratio (S:Mo ratio) of the lubricating oil composition, which is intended to be lower than 18:1. The calculation of this ratio is based, on the one hand, on the total amount of molybdenum present in the lubricating oil composition and, on the other hand, as defined in the claim and confirmed by the patent proprietor during the oral proceedings, on the amount of sulfur introduced into the lubricating oil composition via the additive composition referred to earlier in claim 1.

However, as submitted by the opponent, it is ultimately no longer apparent from a finished lubricating oil composition via which of its components (additive composition, base oil, or possibly further components) the sulfur contained in it was introduced. In other words, a given final lubricating oil composition having a total sulfur content X can be obtained in different ways, in which X can be arbitrarily distributed among

the components contained in the lubricating oil composition.

Therefore, even if the amount of sulfur introduced via the additives of the lubricating oil composition 3 in D2 were so high that this lubricating oil composition would have an S:Mo ratio of 18:1 or higher and therefore would not meet the requirement of feature (x), such a lubricating oil composition would nevertheless be indistinguishable from one in which the sulfur fraction that increases the S:Mo ratio beyond the claimed limit is introduced via the base oil. Such a composition would, however, meet the requirement of feature (x).

Ultimately, therefore, and in line with the opponent's submission, the wording of feature (x) is not suitable for limiting the subject-matter of claim 1 and distinguishing it from the lubricating oil composition 3 in D2.

7.3 In view of this conclusion, there is no need to decide on the opponent's request not to admit the patent proprietor's submission that the "Other Additives" in the lubricating oil composition 3 in D2 might also contain molybdenum and thus influence the S:Mo ratio.

8. It follows that the subject-matter of claim 1 of the main request lacks novelty over the lubricating oil composition 3 in D2. The main request is not allowable.

9. Before the opposition division, the patent proprietor had initially defended the patent only in a limited form. It reverted to the patent as granted as its main request only at the oral proceedings, at which point

the opposition division decided not to admit this request into the proceedings.

In view of the above conclusion on lack of novelty, there is no need to decide on the patent proprietor's request that the opposition division's decision on the non-admittance of the main request be overturned.

Auxiliary request 1 - Novelty (Article 54(2) EPC)

10. Claim 1 of auxiliary request 1 differs from claim 1 of the main request only in that it specifies a higher lower threshold for calcium in feature (v) (in claim 1 of the main request: "*greater than 1100 ppm by weight*"; in claim 1 of auxiliary request 1: "*from 1400 ppm by weight*").

11. However, this higher lower threshold for calcium cannot confer novelty over the lubricating oil composition 3 in D2, which contains 1700 ppm by weight of calcium (see the discussion of claim 1 of the main request above). Consequently, claim 1 of auxiliary request 1 lacks novelty for the same reasons as the main request. Auxiliary request 1 is not allowable.

Auxiliary request 6 - Amendments (Article 123(2) EPC)

12. At the oral proceedings, the board decided to admit auxiliary request 6 into the proceedings. As this request is ultimately not allowable (see below), there is no need to give reasons for this decision.

13. Claim 1 of auxiliary request 6 reads as follows, with the features from (preamble) to (xi) indicated and emphases in bold added by the board:

"*(preamble) A method for reducing low-speed pre-ignition events in a boosted internal combustion engine comprising:*

(i) lubricating a boosted internal combustion engine with a lubricating oil composition comprising:

(ii) greater than 50 wt.% of a base oil of lubricating viscosity, and

(iii) an additive composition comprising:

(iv) one or more overbased calcium-containing detergents having a total base number of greater than 225 mg KOH/gram, measured by the method of ASTM D-2896,

(v) in an amount sufficient to provide from 1400 ppm by weight to less than 2400 ppm by weight of calcium to the lubricating oil composition, based on a total weight of the lubricating oil composition, and

(vi) one or more molybdenum-containing compounds

(vii) in an amount sufficient to provide at least 80 ppm by weight molybdenum to the lubricating oil composition, based on the total weight of the lubricating composition, and

(viii) wherein the lubricating oil composition contains not more than 150 ppm of sodium,

(ix) and a sulfated ash content of 0.05 wt.% to 0.9 wt.%, based on the total weight of the lubricating oil composition,

(x) and the lubricating oil composition has a weight ratio of sulfur provided to the lubricating oil composition by the additive composition, to a weight of the molybdenum in the lubricating oil composition of less than 18:1;

(xi) wherein the greater than 50 wt.% of base oil is selected from the group consisting of Group II, and Group III base oils, and a combination of two or more of the foregoing, and wherein the greater than 50 wt.% of base oil is other than diluent oils that arise from provision of additive components or viscosity index improvers to the lubricating oil composition."

14. The opponent submitted, and the patent proprietor acknowledged, that the specified range "*0.05 wt.% to 0.9 wt.%*" for the SASH in the lubricating oil composition (see feature (ix) above) results in selecting one particular range from those disclosed in paragraph [0035] of the application as filed.

15. The specified amount range "*from 1400 ppm by weight to less than 2400 ppm by weight*" for calcium in the lubricating oil composition (see feature (v) above) is the result of combining the higher limit of the broadest range ("*greater than 1100 ppm by weight to* ***less than 2400 ppm by weight***"; emphasis added) with the lower limit of the narrowest and hence most preferred range ("***from*** *about* ***1400*** *to less than about 1800* ***ppm by weight***") disclosed for calcium in the application as filed (see claims 1, 9 and 15). The board agrees with

the opponent that this amendment is the result of a selection of a narrower range from the broader range in question.

If it represents the only selection to be made, this combination of range limits for calcium, and the selection resulting from it, may not give rise to objections under Article 123(2) EPC; however, contrary to the patent proprietor's argument, this is irrelevant in the present case, as it is combined with a further selection, namely the SASH. According to established case law (see Case Law of the Boards of Appeal of the European Patent Office, 10th edition 2022, II.E.1.6), such multiple selections are only allowable if there are appropriate pointers to the claimed combination of selections.

16. The patent proprietor considered the examples in the application as filed, more specifically the compositions of the invention in table 4, to provide pointers to the combination of ranges for the SASH and calcium.

16.1 In table 4 of the application as filed, two reference compositions (R-1 and R-2) and one comparative composition (C-1) are compared with nine compositions of the invention (I-1 to I-9) in terms of their LSPI.

16.2 In this context, the opponent cast doubt on whether the examples of the application as filed could qualify as pointers at all. During the examination proceedings, the patent proprietor had conceded that a non-obvious error had been made in the examples regarding the amount of sulfur and the S:Mo ratio. Therefore, the examples in table 4 of the application as filed were wrong and did not correspond to reality.

However, this argument is unconvincing solely for the reason that the opponent did not assert that the skilled person would have recognised the examples of the application as filed as erroneous even without the patent proprietor's admission. The examples are thus credibly disclosed in the application as filed and can therefore be taken into account when assessing the allowability of the amendments (T 740/91, point 2.4 of the Reasons).

16.3 It is true that, as emphasised by the opponent, the SASH of the composition of the invention I-2 (0.95 wt.%) does not fall within the claimed range; however, the board does not consider there being only one discordant example to be sufficient, on that ground alone, to deny the compositions of the invention their suitability *per se* to serve as a pointer to the claimed range for the SASH, contrary to what was apparently assumed in T 563/22 (point 1.6.1 of the Reasons), as cited by the opponent. In view of the fact that the SASH of eight of the nine compositions of the invention (I-1 and I-3 to I-9) lies within the claimed range, the board agrees with the patent proprietor that, taken as a whole, the compositions of the invention point to the now claimed range as the preferred range among the ranges disclosed in paragraph [0035] of the application as filed.

16.4 However, the compositions of the invention contain either 1650 ppm of calcium (I-2) or 1600 ppm (all other compositions of the invention), i.e. only two very similar values which lie approximately in the middle of the preferred calcium range disclosed in the application as filed ("*from about 1400 to less than about 1800 ppm by weight*"). If anything, the

compositions of the invention may be understood as pointing to this preferred range, but not to the broader range defined in claim 1 of auxiliary request 6 ("*from 1400 ppm by weight to less than 2400 ppm by weight*"), which includes an additional section (from 1800 to less than 2400 ppm by weight) for which the application as filed does not disclose any compositions of the invention. The board agrees with the opponent that the compositions of the invention do not provide a pointer to the calcium range in claim 1 of auxiliary request 6.

17. Therefore, the subject-matter of claim 1 of auxiliary request 6 extends beyond the content of the application as filed, contrary to Article 123(2) EPC. Auxiliary request 6 is not allowable.

Auxiliary request 12 - Inventive step (Article 56 EPC)

18. At the oral proceedings, the board decided to admit auxiliary request 12 into the proceedings. As this request is ultimately not allowable (see below), there is no need to give reasons for this decision.

19. Claim 1 of auxiliary request 12 differs from claim 1 of the main request as follows:

- In feature (v), the range for the amount of calcium provided to the lubricating oil composition has been narrowed to:

  "*from 1400 ppm by weight to less than 1800 ppm by weight*"

- The following feature (xi) has been added:

"*wherein the greater than 50 wt.% of base oil is selected from the group consisting of Group II, and Group III base oils, and a combination of two or more of the foregoing, and wherein the greater than 50 wt.% of base oil is other than diluent oils that arise from provision of additive components or viscosity index improvers to the lubricating oil composition*"

It was undisputed between the parties that the groups cited for the base oil in claim 1 of auxiliary request 12 refer to the corresponding API classification.

20. The opponent argued that the subject-matter of claim 1 of auxiliary request 12 did not involve an inventive step over the lubricating oil composition 3 in D2.

21. Distinguishing feature

21.1 As established above, the features (preamble), (i) to (iv), and (vi) to (x) of claim 1 of the main request are anticipated by the lubricating oil composition 3 in D2. The same applies to these features in claim 1 of auxiliary request 12, because their wording is identical.

21.2 Because the lubricating oil composition 3 in D2 contains 1700 ppm of calcium (see above), it also anticipates the amended feature (v).

21.3 The lubricating oil composition 3 in D2 contains a mixture of hydrocracked base oil (mineral oil) and a poly-α-olefin, the mixing ratio of which is not disclosed. The parties agreed that the hydrocracked

base oil falls within API Group III and the poly-α-olefin within API Group IV. Accordingly, the lubricating oil composition 3 in D2 comprises a mixture of API Group III and API Group IV base oils in an undisclosed ratio.

The additional feature (xi) requires that at least half of the weight of the lubricating oil consist of API Group II and/or III base oils. Since claim 1 is drafted using open language ("comprising"), the presence of other types of base oils, such as of API Group IV, is not excluded, contrary to the patent proprietor's argument. Therefore, the absence of such other types of base oils is not a distinguishing feature over the composition 3 in D2. It follows that the additional feature (xi) renders the subject-matter of claim 1 of auxiliary request 12 novel over the lubricating oil composition 3 in D2, because claim 1 requires there to be at least 50 wt.% of an API Group III (and/or API Group II) base oil. By contrast, due to the undisclosed ratio in D2, the lubricating oil composition 3 in D2 may in fact contain less than 50 wt.% of API Group III base oil.

22. Technical effect and objective technical problem

22.1 The patent proprietor referred to the experimental data in D8 as evidence of a technical effect associated with the above distinguishing feature.

22.2 At the oral proceedings, in line with the patent proprietor's request, the board decided to set aside the opposition division's decision on the non-admittance of D8 and to admit this document into the proceedings. The reasons for this decision are set out below.

22.2.1 The opposition division's reasoning for its decision was essentially that the effects demonstrated in D8 for certain distinguishing features over D2 had not been made "plausible" in the application as filed with respect to those features.

22.2.2 According to Article 12(6) RPBA, a board shall not admit evidence which was not admitted in the proceedings leading to the decision under appeal, unless the decision not to admit it suffered from an error in the use of discretion or unless the circumstances of the appeal case justify its admittance.

22.2.3 With regard to the admittance of D8 the history of the case is important. Insofar as it is relevant to the present case, it can be summarised as follows:

- In the notice of opposition, the opponent identified D2 as prior art under Article 54(3) EPC. It raised novelty objections based on D2 (lubricating oil compositions 1, 2 and 9 and their application) as well as an inventive-step objection starting from D3 as the closest prior art.
- In the annex of the first summons dated 11 February 2022, the opposition division also considered D2 as prior art under Article 54(3) EPC.
- In its letter dated 1 December 2022, the opponent raised an additional novelty objection based on D2 (lubricating oil composition 3 and its application).
- During the first oral proceedings on 1 February 2023, it was concluded that D2 in fact constitutes prior art under Article 54(2) EPC. The oral proceedings were adjourned.

- In the annex of the second summons dated 14 February 2023, the opposition considered D2 to be a more suitable closest prior-art document than D3. The opposition division emphasised the lubricating oil composition 3 in D2 in particular.
- In its letter dated 3 May 2023, the opponent raised an inventive-step objection starting from the lubricating oil composition 3 in D2 and its application.
- With its letter dated 3 May 2023, the patent proprietor filed D8. According to the patent proprietor, D8 served as evidence of technical effects associated with distinguishing features over D2.
- During the second oral proceedings on 3 July 2023, the opposition division did not admit D8.

22.2.4 As is apparent from the history of the case summarised above, it only became clear at the first oral proceedings that D2 is prior art under Article 54(2) EPC and is thus suitable as the closest prior art for the assessment of inventive step under Article 56 EPC. Only then did the need arise for the patent proprietor to compare the compositions of the patent with D2. Such a comparison was submitted with D8 about three months after the first oral proceedings. Therefore, D8 was submitted in response to developments during the opposition proceedings and should have been admitted on that basis alone - a consideration not addressed in the decision under appeal.

22.3 In D8, four lubricating oil compositions A to D are compared with each other in terms of their LSPI, *inter alia*. Specifically, the lubricating oil compositions B and C, to which the patent proprietor referred, differ from each other only with regard to their base oil. The

lubricating oil composition B comprises a mixture of API Group III and IV base oils, and the lubricating oil composition C comprises only API Group III base oil. The lubricating oil composition B, which the patent proprietor considered to represent the lubricating oil composition 3 in D2, performs more poorly in terms of LSPI than the lubricating oil composition C.

The patent proprietor concluded that the distinguishing feature was associated with an improvement in LSPI.

22.4 However, as correctly noted by the opponent, D8 does not disclose the ratio between the API Group III and API Group IV base oils in the lubricating oil composition B, just as D2 fails to do for its lubricating oil composition 3. Consequently, it cannot be established that the lubricating oil composition B contains less than 50 wt.% of API Group III base oil and that the compositions B and C differ with respect to the distinguishing feature identified above. Accordingly, comparing them does not permit any conclusion to be drawn regarding the technical effect associated with that distinguishing feature, either.

22.5 It follows that the objective technical problem is that put forward by the opponent, namely to provide a method for reducing LSPI in a boosted internal combustion engine using an alternative lubricating oil composition.

23. Obviousness

In addition to the lubricating oil composition 3, D2 discloses further lubricating oil compositions in table 1 that perform equally well with respect to LSPI (see D2, table 4). Many of these additional

compositions, for example, the lubricating oil compositions 1 and 9, contain an API Group III oil as the sole base oil. Accordingly, when trying to solve the objective technical problem defined above, it would have been obvious for the skilled person to replace the mixture of API Group III and API Group IV base oils in the lubricating oil composition 3 with an API Group III base oil alone.

24. Therefore, the subject-matter of claim 1 of auxiliary request 12 does not involve an inventive step and auxiliary request 12 is not allowable.

Auxiliary request 5 - Amendments (Article 123(2) EPC)

25. Claim 1 of auxiliary request 5 reads as follows, with the features from (preamble) to (x) and (xii) indicated (note that claim 1 of auxiliary request 5 no longer contains feature (xi) of auxiliary requests 6 and 12, which relates to the base oil, but instead includes feature (xii), which concerns the overbased calcium-containing detergent):

> "*(preamble) A method for reducing low-speed pre-ignition events in a boosted internal combustion engine comprising:*
>
> *(i) lubricating a boosted internal combustion engine with a lubricating oil composition comprising:*
>
> *(ii) greater than 50 wt.% of a base oil of lubricating viscosity, and*
>
> *(iii) an additive composition comprising:*

(iv) one or more overbased calcium-containing detergents having a total base number of greater than 225 mg KOH/gram, measured by the method of ASTM D-2896,

(v) in an amount sufficient to provide from 1400 ppm by weight to less than 1800 ppm by weight of calcium to the lubricating oil composition, based on a total weight of the lubricating oil composition, and

(vi) one or more molybdenum-containing compounds

(vii) in an amount sufficient to provide at least 80 ppm by weight molybdenum to the lubricating oil composition, based on the total weight of the lubricating composition, and

(viii) wherein the lubricating oil composition contains not more than 150 ppm of sodium,

(ix) and a sulfated ash content of 0.05 wt.% to 0.9 wt.%, based on the total weight of the lubricating oil composition,

(x) and the lubricating oil composition has a weight ratio of sulfur provided to the lubricating oil composition by the additive composition, to a weight of the molybdenum in the lubricating oil composition of less than 18:1;

(xii) wherein the overbased calcium-containing detergent is an overbased calcium sulfonate detergent."

26. According to the opponent, the subject-matter of claim 1 of auxiliary request 5 extended beyond the content of the application as filed. More specifically, compared with paragraphs [0007] and [0029] of the application as filed (the latter setting out the method for determining the TBN), amendments were made of which the combination extended beyond the content of the application as filed.

27. Compared with paragraphs [0007] and [0029] of the application as filed, the amendments in question are as follows:

- The amount of calcium provided by the overbased calcium-containing detergent(s) to the lubricating oil composition has been restricted from "*greater than 1100 ppm by weight to less than 2400 ppm by weight*" in paragraph [0007] of the application as filed to "*from 1400 ppm by weight to less than 1800 ppm by weight*" in claim 1 of auxiliary request 5.
- Feature (ix) has been added, restricting the SASH of the lubricating oil composition to 0.05 to 0.9 wt.%.
- Feature (x) has been added, restricting the S:Mo ratio to less than 18:1.
- Feature (xii) has been added, specifying that the overbased calcium-containing detergent is an overbased calcium sulfonate detergent.

28. The board concurs with the patent proprietor that the subject-matter of claim 1 of auxiliary request 5 does not extend beyond the content of the application as filed for the following reasons.

- The range recited for calcium in claim 1 of auxiliary request 5 is disclosed in claim 9 as filed and constitutes the narrowest range disclosed in the claims as filed. This is clearly indicative of a preference for that range, i.e. a pointer to it.
- As set out above for claim 1 of auxiliary request 6, the compositions of the invention in the application as filed provide a pointer to the restriction concerning the SASH.
- Feature (x) is disclosed in claim 11 as filed. Here too, the fact that this feature is disclosed in the claims as filed is indicative of a preference for it.
- Paragraph [0074] ("*In certain embodiments, the overbased detergent is one or more calcium-containing detergents,* ***preferably the overbased detergent is a calcium sulfonate detergent.***", emphasis added) discloses a preference for calcium sulfonate, and thus constitutes a pointer. Contrary to the opponent's view, this is not altered by the fact that the cited sentence begins with "*[i]n certain embodiments*", as it is inherent in any statement of preference that it applies only to the preferred embodiments and not to all embodiments.

The opponent argued that claims 9 and 11, relied on as pointers above, refer back to claim 1 as filed, which does not relate to a method for reducing low-speed pre-ignition events in a boosted internal combustion engine; however, it is evident from the application as filed that claim 1 concerns precisely the lubricating oil composition that is used in the method described in paragraph [0007] of the application as filed. The skilled person would therefore understand the

preference expressed in claims 9 and 11 to apply equally to the method disclosed in paragraph [0007].

29. Since the application as filed discloses corresponding pointers to the amendments made, the subject-matter of claim 1 of auxiliary request 5 does not go beyond the content of the application as filed.

Auxiliary request 5 - Sufficiency (Article 83 EPC)

30. Article 83 EPC stipulates that the application shall disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. In the present case, the opponent essentially argued that the functional feature of method claim 1 and use claim 8 ("*for reducing low-speed pre-ignition events in a boosted internal combustion engine*") was not in fact achieved by the compositions recited in these claims.

31. More specifically, in its written submissions, the opponent referred to the patent proprietor's concession before the examining division that the data in table 4 of the application as filed, i.e. the amount of sulfur and the S:Mo ratio reported in this table, was incorrect (see above, point 16.2). In the opponent's view, this also affected the assessment of sufficiency. It argued that the application as filed did not clearly identify which lubricating oil compositions in fact met the requirement of an S:Mo weight ratio of less than 18:1, as stipulated in claim 1. Consequently, the application as filed did not demonstrate that the functional feature in claim 1 ("*for reducing low-speed pre-ignition events in a boosted internal combustion engine*") was actually achieved.

This argument is not persuasive. As the opponent itself submitted, if feature (x) is ultimately not limiting (see above, point 7.2), it is not apparent how an incorrect disclosure in this respect in the application as filed could give rise to a lack of sufficiency. Incidentally, the opponent did not pursue this line of argument at the oral proceedings before the board either.

32. The opponent also referred to D1.

32.1 D1 assesses lubricating oil compositions comprising, *inter alia*, an overbased calcium-containing detergent and a molybdenum-containing compound with regard to LSPI performance. Figure 4 shows that a lubricating oil composition comprising calcium sulfonate as the overbased detergent performs slightly more poorly in terms of LSPI than the corresponding composition in which calcium salicylate is used instead. Figure 8 further indicates that the (unidentified) molybdenum compound Mo-B is unable to reduce LSPI unless used in high amounts (1000 ppm).

32.2 The opponent submitted that D1 demonstrated that the technical effect recited in claim 1 and in the corresponding use claim 8 ("*for reducing low-speed pre-ignition events in a boosted internal combustion engine*") could not be achieved across the full scope of these claims, at least in the absence of a reference point against which the attainment of the effect could be assessed.

However, although D1 (table 2) reports the TBN values of the fully formulated lubricating oil compositions, it does not disclose the TBNs of the overbased calcium-containing detergents themselves, as the patent

proprietor noted. Consequently, the opponent, with whom the burden of proof lies, has not demonstrated that the lubricating oil compositions evaluated in D1 fall within the scope of the compositions defined in claims 1 and 8 of auxiliary request 5. In this respect, the board concurs with the opposition division and the patent proprietor.

At the oral proceedings, contrary to the opponent's request under Article 13(2) RPBA, the board decided to admit the patent proprietor's argument that D1 does not disclose the TBN of the overbased calcium-containing detergents used in this document. Given that the disclosure of D1 and the question of whether the lubricating oil compositions reported in D1 are in accordance with the lubricating oil compositions defined in the claims had been discussed before the opposition division and during the appeal proceedings, this argument merely constituted a refinement of the patent proprietor's existing line of reasoning on this issue, and therefore did not constitute an amendment to its appeal case.

Auxiliary request 5 - Inventive step (Article 56 EPC)

33. The opponent's only inventive-step objection started from the lubricating oil composition 3 in D2.

34. Distinguishing feature

The parties agreed that the subject-matter of claim 1 of auxiliary request 5 differs from lubricating oil composition 3 of D2 at least in that the lubricating oil composition comprises calcium sulfonate as the overbased calcium-containing detergent. By contrast,

the lubricating oil composition 3 in D2 comprises calcium salicylate (see above).

35. Technical effect and objective technical problem

35.1 The patent proprietor referred to the experimental data in D8 as evidence of a technical effect associated with the above distinguishing feature (for the admittance of D8, see point 22.2 above).

35.2 The lubricating oil compositions B and A in D8 differ from each other in the same manner as the subject-matter of claim 1 of auxiliary request 5 differs from the lubricating oil composition 3 in D2: the composition B comprises calcium sulfonate as the overbased calcium-containing detergent, whereas the composition A comprises calcium salicylate. D8 further demonstrates that the lubricating oil composition B, which is in accordance with the lubricating oil composition recited in claim 1 of auxiliary request 5, exhibits improved LSPI performance in comparison with composition A.

35.3 Therefore, D8 demonstrates an improvement in LSPI, which is the stated aim of the application as filed (see paragraph [0001]). More specifically, D8 demonstrates that the improvement over the closest prior art is associated with the distinguishing feature, namely the use of calcium sulfonate as the detergent instead of calcium salicylate.

The opponent argued that the patent proprietor should not be allowed to rely on this effect for the formulation of the objective technical problem. Nowhere in the application as filed was it disclosed that the improvement in LSPI was linked to the nature of the

detergent. Following headnote II of decision G 2/21, since this effect is neither encompassed by the technical teaching nor embodied by the same originally disclosed invention, it could not be relied on for inventive step.

However, according to the original disclosure in paragraph [0001], the improvement in LSPI performance is attributable to the lubricating oil composition as a whole, and not to any single component of it. The fact that this improvement may, depending on the choice of the reference point, be reflected in the presence, absence or specific amount of one or more constituents of the lubricating oil composition is immediately apparent and is merely a consequence of the problem-solution approach. Therefore, contrary to the opponent's view, when assessing inventive step the patent proprietor may rely on the effect demonstrated in D8 in accordance with G 2/21.

35.4 It follows that, starting from the lubricating oil composition 3 in D2, the objective technical problem is to provide an improved method for reducing LSPI in a boosted internal combustion engine.

35.5 The opponent's counter-arguments could not convince the board for the reasons set out below.

35.5.1 According to the opponent, a comparison of the examples in the application as filed demonstrated that the reported changes in LSPI were significantly smaller than the variability of the LSPI measurement method. In the opponent's view, the same conclusion applied to the experiments reported in D8.

At the oral proceedings, however, the opponent acknowledged that the LSPI test method used in D8 differs from that used in the application as filed and that the LSPI results are expressed differently, namely as absolute values in D8 and relative to a reference oil in the application as filed. Therefore, even assuming in the opponent's favour that its criticism of the data in the application as filed were justified, the board sees no basis for transposing this criticism to the data reported in D8.

35.5.2 The opponent further relied on figure 4 of D1, in which, *inter alia*, a lubricating oil composition comprising calcium sulfonate is compared with one comprising calcium salicylate. In contrast to the results reported in D8, figure 4 of D1 did not demonstrate an improvement for calcium sulfonate.

However, as already established above (see point 32.2), the opponent has not demonstrated that the compositions disclosed in D1 are in accordance with the lubricating oil composition defined in claim 1 of auxiliary request 5. The data in D1 therefore cannot cast doubt on the conclusions drawn from D8.

36. Obviousness

The opponent consistently argued only that the solution to a less ambitious problem, namely that of providing an alternative method, did not involve an inventive step; however, it did not contest that the solution to the present, more ambitious, objective technical problem was not obvious. In the absence of any submission explaining why the use of calcium sulfonate in composition 3 of D2 for reducing LSPI would have been obvious, the board agrees with the patent

proprietor that the subject-matter of claim 1 of auxiliary request 5 involves an inventive step. Auxiliary request 5 is therefore allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division with the order to maintain the patent in amended form based on claims 1 to 8 of auxiliary request 5, filed with the patent proprietor's statement of grounds of appeal and a description to be adapted, if necessary.

The Registrar: The Chairman:

U. Bultmann M. Kollmannsberger

Decision electronically authenticated