

Internal distribution code:

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

**Datasheet for the decision
of 4 April 2023**

Case Number: T 2619/19 - 3.3.02

Application Number: 12705222.3

Publication Number: 2675876

IPC: C10M163/00

Language of the proceedings: EN

Title of invention:
LUBRICANTS WITH GOOD TBN RETENTION

Patent Proprietor:
The Lubrizol Corporation

Opponent:
Afton Chemical Corporation

Headword:

Relevant legal provisions:
EPC Art. 54, 56, 123(2)
RPBA 2020 Art. 13(2)

Keyword:

Amendments - allowable (yes)

Novelty - (yes)

Inventive step - (yes)

Decisions cited:

T 0169/20

Catchword:



Beschwerdekammern
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
Fax +49 (0)89 2399-4465

Case Number: T 2619/19 - 3.3.02

D E C I S I O N
of Technical Board of Appeal 3.3.02
of 4 April 2023

Appellant: Afton Chemical Corporation
(Opponent) 500 Spring Street
Richmond, Virginia 23219 (US)

Representative: J A Kemp LLP
80 Turnmill Street
London EC1M 5QU (GB)

Respondent: The Lubrizol Corporation
(Patent Proprietor) 29400 Lakeland Boulevard
Wickliffe, OH 44092-2298 (US)

Representative: D Young & Co LLP
120 Holborn
London EC1N 2DY (GB)

Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
2 July 2019 concerning maintenance of the
European Patent No. 2675876 in amended form.**

Composition of the Board:

Chairman M. O. Müller
Members: P. O'Sullivan
L. Bühler

Summary of Facts and Submissions

I. The appeal of the opponent (hereinafter appellant) lies from the decision of the opposition division according to which European patent 2 675 876 in amended form according to the then first auxiliary request, was found to meet the requirements of the EPC.

II. Among the documents submitted in opposition proceedings, the following documents *inter alia* were invoked by the parties in appeal proceedings:

D2 : EP 1 104 800 A2
D12: EP 1 213 341 A1
D14: US 2008/0146473 A1
D16: EP 1 605 034 A1
D17: EP 0 491 456 A1
D20: Standard test method ASTM D 974
D36: R. M. Mortier, M. F. Fox and S. T. Orszulik
(ed.), "*Chemistry and Technology of Lubricants*",
3rd edition, 2010
D44: WO 2010/115595 A1
D45: EP 1 624 045 A1
D45a: Excerpt from the application as filed in D45
D46: WO 2004/065430 A1
D48: US 6,500,786 B1

III. With the statement of grounds of appeal, the appellant submitted the following additional documents:

D50: Declaration of Dr David Edwards dated
12 March 2019
D51: EP 0 094 814 A2
D52: US 3,714,042
D53: EP 0 271 262 A2

- D54: WO 96/39478
- D55: ATC Doc 49, December 2007, "*Lubricant Additives and The Environment*"
- D56: SAE Technical paper 972950 - van Dam *et al.*, October 1997
- D57: Abstract details for ASTM D664-09a

IV. With the reply to the statement of grounds of appeal, the patent proprietor (hereinafter respondent) submitted the following additional documents:

- D58: Declaration by Dr Patrick Mosier dated 27 March 2020
- D59: Affidavit of Dr Stephen J. Cook dated 16 February 2016

V. With the letter dated 3 March 2023 the appellant submitted the following document:

- D60: Declaration of Dr David Edwards dated 3 March 2023.

VI. In preparation for oral proceedings, scheduled according to the appellant's request, the board issued a communication pursuant to Article 15(1) RPBA 2020.

VII. Oral proceedings before the board took place as scheduled on 4 April 2023 in the presence of both parties. During oral proceedings, the appellant submitted further documents, denoted in the following as:

- D61: IUPAC Compendium of Chemical Terminology (the "Gold Book"), online version, "olefins", 1997; source for definition: PAC, 1995, 67, 1307
- D62: Wikipedia entry, "polyolefin", Wayback Machine

snapshot, 7 August 2010

D63: Britannica, online version, "polyolefin",
undated.

VIII. Requests relevant to the present decision

The appellant requested that the decision under appeal be set aside, and that the patent be revoked in its entirety. The appellant further requested that *inter alia* D56 be admitted into the proceedings.

Further procedural requests of the appellant are addressed in the reasons for the decision below.

The respondent requested that the appeal be dismissed, implying maintenance of the patent in the form found allowable by the opposition division.

The respondent also requested that document D56 not be admitted into the proceedings.

IX. For the text of claim 1 of the main request, reference is made to the reasons for the decision, below.

X. For the parties' submissions relevant to the present decision, reference is made to the reasons for the decision provided below.

Reasons for the Decision

Main request

1. Article 123(2) EPC

The set of claims of the main request is identical to the set of claims found allowable according to the contested decision (then first auxiliary request).

Independent claim 1 of this request reads as follows:

"A lubricant composition comprising:

(a) an oil of lubricating viscosity;

(b) at least one metal-containing detergent in an amount to provide at least ~~about~~ 2 mg KOH/g TBN to the lubricant;

*(c) a dispersant comprising an oleophilic portion comprising at least ~~about~~ 40 carbon atoms and an acid-bearing portion, **wherein said dispersant is a polyolefin-substituted succinic acid, characterized in having wherein the dispersant has** a TAN:TBN ratio of at least ~~about~~ 0.8, wherein said dispersant is present in an amount of at least ~~about~~ 0.1 percent by weight and wherein said dispersant provides at least ~~about~~ 0.025 mg KOH/g TAN to the lubricant composition; **wherein the TBN and the TAN are measured by ASTM D 974; and wherein the lubricant has a sulfated ash value of up to 1.1 percent, wherein the sulfated ash value is measured by ASTM D-874."***

(text in bold and strike through denoting addition and deletion, respectively, compared to claim 1 of the application as filed)

1.1 The contested decision

Compliance of claim 1 of the (then) main request underlying the contested decision with Article 123(2) EPC was addressed at oral proceedings before the opposition division (minutes of the oral proceedings points 4 and 5). The objections concerned the features "the TBN and TAN are measured by ASTM D 974" and "said dispersant **is** a polyolefin succinic acid" of claim 1 of that request (contested decision, point 3.1). The opposition division concluded that neither feature contravening Article 123(2) EPC (contested decision, point 3.2, final paragraph and point 3.2.1, first paragraph).

1.2 The appellant argued that contested claim 1 contravened Article 123(2) EPC in relation to two separate features, namely

- (a) the requirement in claim 1 that "*the TBN and the TAN are measured by ASTM D 974*", and
- (b) the stipulation in claim 1 that the dispersant "**is a polyolefin-substituted succinic acid**".

Each of these features will be addressed in turn in the following.

1.3 Feature (a) - introduction

1.3.1 According to contested claim 1, the **dispersant** has a TAN:TBN (Total Acid Number:Total Base Number) ratio of at least 0.8. Hence, feature (a) provides the method by which this ratio is to be calculated.

1.3.2 It is undisputed that feature (a) is not explicitly disclosed in the application as filed. The application

as filed (paragraph [0036]) discloses that the TAN of the **dispersant** is measured using the ASTM D 974 method (D20 in the present proceedings). Furthermore, it refers to the ASTM D 974 method in relation to the TBN of the **overall lubricant composition** (paragraph [0001]), and not the dispersant *per se*.

- 1.3.3 The appellant argued that since the application as filed did not disclose how the TBN of the dispersant was to be measured, feature (a), which specified that it was to be measured using ASTM D 974, added subject-matter.
- 1.3.4 In defence the respondent *inter alia* argued that the skilled person interpreting claim 1 would understand that the TBN of the dispersant stipulated in claim 1, namely "a polyolefin-substituted succinic acid", was necessarily zero, because the presence of basic groups in the molecule was excluded by the term "polyolefin". Hence, it was not necessary to measure the TBN by the method of ASTM D 974. Thus, feature (a) did not limit claim 1. Therefore, even if feature (a) were not directly and unambiguously disclosed in the application as filed, the requirements of Article 123(2) EPC were nevertheless met. While this line of argumentation was not contested by the appellant as such, it argued that a polyolefin-substituted succinic acid did not necessarily have a TBN value of zero.
- 1.3.5 In a first step therefore, it must be established whether the term "polyolefin-substituted succinic acid" necessarily implies a TBN value of zero.
- 1.3.6 To support its position, the respondent submitted documents D61, D62 and D63 during oral proceedings before the board. These documents disclosed a

definition of the term "polyolefin", and demonstrated that there was no ambiguity in claim 1 with regard to whether the term "polyolefin-substituted succinic acid" could include basic groups, and therefore no need to consult the description for an interpretation thereof.

1.4 Admittance of the respondent's defence

During oral proceedings, the appellant requested not to admit:

- the respondent's new defence that there was no ambiguity as regards the TBN of the dispersant in claim 1, such that no need arose to consult the description, and
- the allegation of fact based on the definition from the IUPAC Gold book D61 and associated documents D62 and D63 that the term "polyolefin" excluded further groups with basic functionality, and the documents themselves.

1.4.1 With regard to the first of the above issues, the appellant submitted that in its letter dated 4 March 2023, the respondent had argued that the skilled person, when assessing the meaning of the TAN:TBN feature in claim 1 for a polyolefin-substituted succinic acid, would consult the description of the patent in order to make technical sense of the claim, and thereby would arrive at the conclusion that the TBN of the polyolefin-substituted succinic acid of claim 1 was necessarily zero (e.g. letter of 4 March 2023, point 35). Hence, the respondent's submission at oral proceedings that claim 1 was clear in itself, such that there was no need to consult the description, departed from the line of defence submitted in writing. Said defence was late filed, and thus not to be admitted into the proceedings.

- 1.4.2 The board notes that although no legal basis for not admitting the respondent's defence was invoked by the appellant, the provisions of Article 13(2) RPBA 2020 apply.
- 1.4.3 According to this provision, any amendment to a party's appeal case made after notification of a summons to oral proceedings shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned.
- 1.4.4 The board however does not consider the respondent's defence as an amendment of its case, with the consequence that Article 13(2) RPBA 2020 does not apply. More specifically, as submitted by the respondent, it did not state in the letter of 4 March 2023 that claim 1 was unclear. Rather, the board understands the relevant section of said letter (points 31 - 61) as a response to its communication pursuant to Article 15(1) RPBA in which the board set out a negative preliminary opinion with regard to compliance with Article 123(2) EPC. It is implicit in the respondent's arguments that although reference to the description would confirm the correct interpretation of claim 1 if required, this was in fact not necessary, since it was common general knowledge, supported by document D36, that the term "polyolefin-substituted succinic acid" necessarily excluded the presence of basic groups (letter of 4 March 2023, point 55). Furthermore, this issue was not raised for the first time with said letter, but was also addressed in the respondent's reply to the statement of grounds of appeal (point 55), albeit in a less detailed manner, in

which it was argued that a polyolefin-substituted succinic acid will inevitably have a TBN of zero.

1.4.5 With regard to the second of the above issues, the same applies. Specifically, the allegation of fact based on the definition from the IUPAC Goldbook D61 and associated documents D62 and D63 that the term "polyolefin", even without consultation of the description of the opposed patent, excluded further groups with basic functionality, was not submitted for the first time in oral proceedings before the board. Rather, as set out above, it was submitted both with the letter 4 March 2023 as well as in the reply to the statement of grounds of appeal. Hence, the allegation is not new, and does not constitute an amendment of the respondent's case. Similarly, documents D61 to D63 were filed as further evidence of the common general knowledge regarding the interpretation of the term "polyolefin". Specifically, document D36 was already cited with the letter dated 4 March 2023 as such evidence. Hence documents D61 to D63 merely compliment the evidence of the common general knowledge already on file, and hence do not represent an amendment to the appellant's case.

1.4.6 In conclusion, since neither the respondent's allegations referred to above, nor documents D61 to D63 represent amendments to the appellant's case, they are part of the present appeal proceedings, and hence admitted.

1.5 The TBN of "polyolefin-substituted succinic acid"

1.5.1 A polyolefin is formed from olefins by way of polymerisation. It contains the polymerised olefins linked via carbon-carbon bonds. An olefin contains only

carbon and hydrogen atoms. Hence, it is unambiguous that the term "polyolefin" defines a polymer chain which comprises only hydrogen and carbon atoms, to the exclusion of any further functionality, including basic groups.

- 1.5.2 This is confirmed by document D36 as set out above, and supported by D61 and D62 as evidence of the common general knowledge relevant to the interpretation of the term "polyolefin" in claim 1 (D63 is undated).
- 1.5.3 Document D36 teaches on page 226, third paragraph that dispersants can contain "a long hydrocarbon chain which gives oil solubility". Figure 7.3 thereof (reproduced in the respondent's letter of 4 March 2023, point 58) explicitly refers to a "non-polar hydrocarbon" chain as part of the dispersant molecule. Hence, the skilled person would also not expect the polyolefin in "polyolefin-substituted succinic acid dispersants" to comprise basic groups.
- 1.5.4 D61 provides the IUPAC definition of the term "olefins" inter alia as "[a]cyclic and cyclic hydrocarbons having one or more carbon-carbon double bonds ... and subsumes ... the corresponding polyenes". Wikipedia document D62 defines a polyolefin as a polymer produced from a simple olefin (an alkene with the general formula C_nH_{2n}) as a monomer.
- 1.5.5 In view of the above, the "polyolefin-substituted succinic acid" of claim 1 must be understood to exclude any basic functionality. Logically, this also implies that the TBN of this compound must necessarily be zero, since TBN is by definition a measure of basicity. This correlation was also not challenged by the appellant, and indeed the appellant explicitly stated that a

specific polyolefin-substituted succinic acid, namely polyisobutylene (PIB) succinic acid, had a TBN of zero (statement of grounds of appeal, pages 21 and 22, third and fourth bullet points, respectively).

- 1.5.6 The appellant referred to patent document D46 as evidence that the term "polyolefin" did not exclude basic groups. Specifically, D46 disclosed a "succinic acid substituted polyolefin" which was said to be a "hydrocarbyl-substituted succinic acid". Despite this definition, the hydrocarbyl, and hence the polyolefin groups, were defined as including substitution by heteroatoms, in particular heteroatoms capable of imparting basicity (D46, page 5, lines 12-28). Patent document D17 was also referred to in the same context.
- 1.5.7 As stated by the respondent however, both D46 and D17 are patent documents. Hence neither document is representative of the common general knowledge of the skilled person, and these documents are irrelevant to the skilled person's interpretation of the term "polyolefin".
- 1.5.8 Consequently, it would be clear to the skilled person that the term "polyolefin-substituted succinic acid" in contested claim 1 excludes the possible presence of basic groups in the polyolefin, and therefore that it has a TBN of zero. The term "polyolefin" is hence clear from the wording of claim 1 itself, and there is no need for the description to be consulted to aid in its interpretation. This is also in line with decision T 169/20, first cited by the appellant with the letter dated 23 March 2023, and invoked in oral proceedings by the respondent in support of its position. According to this decision, when the wording of a claim is clear for the skilled person, recourse to the description for its

interpretation is neither necessary nor justified (reasons for the decision, 1.2.5, second paragraph).

- 1.5.9 The appellant further argued at oral proceedings that the term "polyolefin" in claim 1 did not exclude basic groups on the basis that example 2 of the patent itself disclosed a succinic acid dispersant substituted with a polyolefin chain displaying both acid and basic functionality, and having a TBN of 7.3. Hence, even in the patent itself, the term "polyolefin" included polyolefins substituted with basic groups.
- 1.5.10 Example 2 (patent, table on page 10, second entry) discloses the preparation and testing of a detergent/dispersant solution in which the dispersant is "polyisobutene succinic anhydride condensate with polyethylene amine and pentaerythritol".
- 1.5.11 Since as concluded above, the interpretation of the term "polyolefin" is clear from the wording of claim 1 itself, there is no need to consult the description or more specifically example 2 for an interpretation thereof.
- 1.5.12 Nevertheless, even if example 2 were to be consulted, the respondent submitted at oral proceedings, and the board has no reason to doubt (see point 1.5.13 below), that the product condensate obtained from the reaction of polyisobutene succinic acid, polyethylene amine and pentaerythritol in example 2 of the patent was a compound in which the amine formed a bridge between succinimide moieties, and was therefore not incorporated into the polyolefin chain. Hence, example 2 did not provide a basis for interpreting the term "polyolefin" in claim 1 differently.

- 1.5.13 Furthermore, the appellant did not provide any credible rebuttal of the respondent's proposed reaction mechanism for the reaction disclosed in example 2. The board also sees no reason to disagree. Firstly, it is for the appellant to credibly prove its assertion. Furthermore, it is unclear to the board how a "condensate" could describe the incorporation of an amine into a saturated hydrocarbon chain (the polyisobutenyl moiety), nor is it clear to the board how such a reaction would be mechanistically feasible in the context of example 2.
- 1.6 Whether a TBN of zero is nonsensical in the context of claim 1
- 1.6.1 The appellant further argued that the "polyolefin" of claim 1 must necessarily be interpreted such that it can comprise basic groups and hence have a TBN of greater than 0, because a TBN of zero would be nonsensical to the skilled person in the context of claim 1.
- 1.6.2 In submitting this argument, the appellant endorsed the board's preliminary view expressed in its communication pursuant to Article 15(1) RPBA.
- 1.6.3 In section 2.2.2 of this communication, the board expressed the view that if the TBN of the dispersant was zero as submitted by the respondent, a TAN:TBN ratio in claim 1 would result which could only be characterised as undefinable, and therefore nonsensical. This view was expressed by the board in an attempt to construe claim 1 for the purpose of assessing compliance with Article 123(2) EPC, despite

it not having been submitted by the appellant in written proceedings.

- 1.6.4 Specifically, the board reasoned that any value (the TAN) divided by zero (the alleged TBN) could not be calculated mathematically, and hence did not and could not meet the criterion in claim 1 that the TAN:TBN ratio is at least 0.8. Since the skilled person would exclude such nonsensical interpretations of the claim, the dispersant necessarily must have a technically meaningful non-zero TBN value, and thus a well-defined TAN:TBN ratio. Hence, the polyolefin-substituted succinic acid of claim 1 **must** have comprised basic functionality sufficient to provide it with non-zero TBN, with the consequence that the term "polyolefin-substituted succinic acid" could not exclude the presence of basic groups.
- 1.6.5 In particular during oral proceedings before the board, the respondent argued that contrary to the board's preliminary view set out in the communication pursuant to Article 15(1) RPBA, a dispersant having a TBN of zero made technical sense in the context of claim 1 and the technical field of lubricants.
- 1.6.6 The board accepts the respondent's explanation. Specifically, as set out by the respondent during oral proceedings, the skilled person in the lubricant field is not a mathematician, and would understand the TAN:TBN ratio in claim 1 as a correlation, and not in fractional terms as set out by the board in its communication. For the same reason, the skilled person would not understand said ratio to tend toward infinity (i.e. a singularity) as set out by the appellant, for example in the statements of grounds of appeal (page 13, point 4.18 and accompanying graph). Rather than

being a mathematical fraction, said ratio is to be understood as expressing a **relationship** between two properties of a specific compound, namely the TAN and TBN. Hence, the skilled person would understand from the claimed ratio of at least 0.8 simply that the TAN must be 80% of the TBN, or more.

- 1.6.7 To further illustrate this distinction, the respondent provided a hypothetical example in which the claimed ratio of at least 0.8 related not to the ratio of TAN and TBN values (TAN:TBN) as claimed, but to the ratio of boys to girls in a classroom of children (i.e., boys:girls). In this example, if there were zero girls present in the classroom, any one boy or more would satisfy the claimed ratio. Specifically, the criterion that the number of boys is at least 80% of the number of girls would be fulfilled. Crucially in this example, the ratio would make technical sense despite the number of girls in the classroom being zero. Hence, the same would apply to the TAN:TBN ratio in claim 1 in which the TBN was zero.
- 1.6.8 The board therefore accepts the interpretation of the numerical value of 0.8 (a fraction) in claim 1 as a ratio, i.e. reflecting a correlation between the TAN and the TBN of the dispersant, since in the context of the patent, the TAN:TBN ratio is about the presence or absence of acid and basic groups in the polyolefin constituting the dispersant. Hence the claimed ratio is not a fraction for which the value zero in the denominator would be nonsensical.
- 1.6.9 Consequently, the board's preliminary view expressed in the communication pursuant to Article 15(1) RPBA and supported by the appellant is erroneous. Therefore, for the reasons set out above, a polyolefin-substituted

succinic acid dispersant having a TBN of zero makes technical sense in the context of claim 1.

1.7 The only remaining issue was the question of whether the specific instruction in claim 1 according to which the "TBN and TAN are measured by ASTM D 974" required the skilled person to measure the TBN of the dispersant using the specified method.

1.7.1 As stated by the respondent at oral proceedings however, the skilled person would know from common general knowledge as set out above that the TBN of a polyolefin-substituted succinic acid dispersant was zero, and hence that measuring the TBN specifically of the dispersant using the ASTM method would not be necessary. The fact that the method is stipulated in the claim for measurement of the TBN is not contradictory, because the TBN of the lubricant composition as a whole still needs to be measured to determine the amount of TBN provided by the detergent according to claim 1, (b).

1.7.2 In conclusion, it is recalled that the appellant's objection under Article 123(2) EPC for feature (a) relied on the argument that the application as filed did not disclose how the TBN of the dispersant was to be measured. Hence the specification in claim 1 that it was to be measured using ASTM D 974 added subject-matter.

1.7.3 Since the board concluded above that the TBN of the polyolefin-substituted succinic acid of claim 1 is inevitably zero, and a TBN value for the dispersant of zero makes technical sense in the context of claim 1, there would have been no need for the skilled person to

measure the TBN of the dispersant using the ASTM D 974 method.

It is thus inconsequential that the application as filed is silent regarding the use of this method to measure the TBN of the dispersant, since the method is not required for this purpose.

1.7.4 Hence, feature (a) does not contravene Article 123(2) EPC.

1.8 Feature (b)

1.8.1 Claim 1 refers to a dispersant comprising at least 40 carbon atoms in component (c) (hereinafter "oleophilic dispersant"). The appellant submitted that there was no basis in the application as filed for the requirement in contested claim 1 that this dispersant **is a polyolefin-substituted succinic acid** as claimed. Specifically, the application as filed only provided basis for the oleophilic dispersant **comprising one or more** of a list of dispersants, which included polyolefin-substituted succinic acid (e.g. claim 10 of the application as filed).

1.8.2 The board disagrees. Claim 1 of the application as filed is directed to a lubricant composition comprising *inter alia* a dispersant (c), defined as

"a dispersant comprising an oleophilic portion comprising at least about 40 carbon atoms and an acid-bearing portion, characterized in having a TAN:TBN ratio of at least about 0.8, wherein said dispersant is present in an amount of at least about 0.1 percent by weight and wherein said dispersant provides at least about 0.025 TAN to the lubricant composition."

Claim 10 of the application as filed is dependent on claim 1, and is directed to a lubricant composition wherein said dispersant "comprises **a** polyolefin-substituted succinic acid, ester, amide **or** imide" (emphasis added). Hence, it indicates that the oleophilic dispersant may be **one** of the options listed, and does not state "one or more" as argued by the appellant.

1.8.3 Furthermore, as stated by the respondent, the application as filed as a whole is directed to the use in component (c) of "a dispersant". Thus while claim 1 of the application as filed by virtue of its "comprising" language does not exclude further dispersants not defined by component (c), mixtures of oleophilic dispersants falling within the definition of component (c) are not envisaged. Thus, paragraph [0001] of the application as filed describes "a defined dispersant"; paragraph [0003] refers to the selection "of a suitable dispersant"; paragraph [0030] discusses "a dispersant" and "the dispersant"; and the examples in table 21 examine the effects of individual dispersants on TBN retention.

1.8.4 In particular however, paragraph [0038] discloses that:

"In one embodiment **the** dispersant has a TBN of zero. Such could be the case if no amine nitrogen is present on the dispersant. **An example of a non-basic dispersant would be a long-chain hydrocarbyl-substituted succinic acid**" (emphasis added).

1.8.5 Hence in relation to component (c) of claims 1 and 10, the application as filed consistently refers to a single dispersant. Furthermore, a polyolefin-substituted succinic acid is the only compound in claim 10 of the application as filed which corresponds to the long-chain hydrocarbyl-substituted succinic acid mentioned in paragraph [0038]. Hence there is explicit basis in the application as filed for stating that component (c) **is** a polyolefin-substituted succinic acid.

1.8.6 As noted by the appellant in the "engine test" in paragraph [0056], a "conventional succinimide dispersant" is employed in addition to PIB succinic acid. However, both claim 1 of the application as filed, as well as claim 1 of the present main request define a lubricant composition "comprising" certain components. Hence, although only a single dispersant (c) may be employed, both claims exclude further dispersants only to the extent that they fall within the definition of component (c). Since it is not stated in the engine test that the "conventional succinimide dispersant" is a polyolefin-substituted succinimide as listed in claim 1 of the application as filed, this example also appears to only employ a single dispersant as defined in claim 10.

1.8.7 However, even if the conventional dispersant in the engine oil test were also a dispersant within the meaning of claim 1 of the application as filed, this would still not lead to the conclusion that the limitation to a single dispersant chosen from claim 10 is not disclosed, since as set out above, at least paragraph [0038] provides explicit basis for the selection of a polyolefin-substituted succinic acid as **the** dispersant of component (c) according to present claim 1.

Hence feature (b) in contested claim 1 fulfills the requirements of Article 123(2) EPC.

2. Novelty - Article 54 EPC

According to the appellant, the subject-matter of contested claim 1 lacked novelty in view of documents D12, D14, D16, D44, D45, and D51-D54. In written proceedings, as well as at oral proceedings, these documents were addressed in two separate batches as to their relevance to novelty, namely on the one hand documents D12, D14, D16, D44 and D45 collectively, and on the other hand documents D51, D52, D53 and D54 collectively. The same approach will be taken in the following.

2.1 Novelty vis à vis documents D12, D14, D16, D44 and D45

2.1.1 All of these patent documents concern lubricating compositions. It was common ground between the parties that none of said documents explicitly disclosed compositions comprising a polyolefin-substituted succinic **acid** dispersant as required by contested claim 1, component (c), but rather disclosed a specific

polyolefin-substituted succinic **anhydride**, namely PIBSA.

- 2.1.2 The appellant submitted that the presence of PIBSA in the compositions of D12, D14, D16, D44 and D45 represented an implicit disclosure of PIB succinic acid. This was disputed by the respondent.
- 2.1.3 D16 (paragraph [0049]) discloses a set of five lubricating formulations all of which comprised PIBSA in an amount of 0.17%.
- 2.1.4 On the basis of declarations D50 and D60, the appellant argued that a lubricant composition made using PIBSA (such as those disclosed in paragraph [0049] of D16) would be essentially indistinguishable from a composition made using PIB succinic acid (the latter falling within the scope of contested claim 1). This was due to a complex dynamic equilibrium between those compounds, and further compounds such as salts, formed with the metal from the detergent. It was established case law that a claim defining a product lacked novelty if it covered a product defined in the prior art in different terms. Hence, the appellant argued that in order to conclude a lack of novelty over D16, it was not necessary for the latter to disclose the addition of PIB succinic acid to a composition in an amount of greater than 0.1 wt.% as claimed. Rather, it only needed to be established that the composition made with PIBSA in D16 is identical, i.e. indistinguishable from a composition made from PIB succinic acid.
- 2.1.5 In D50 the expert was asked to consider the relevant allegedly novelty destroying compositions of the prior art, including D16 (D50, point 2) and to comment on whether it would be possible to determine whether the

fluids concerned were prepared using PIBSA or PIB succinic acid.

- 2.1.6 In the expert's view, this would not be possible because PIBSA, in the presence of water, would always be in equilibrium with the corresponding acid, PIB succinic acid, recited in contested claim 1. Specifically, lubricating oil compositions generally contained water, with the water typically residing at the surface of the detergent core, and said water led to the conversion of the anhydride PIBSA to the acid. Furthermore, PIBSA/PIB succinic acid could interact with other components present such as with amines to form imides. Such compounds would form regardless of whether PIBSA or PIB succinic acid were added to the composition initially. If there was any difference between a composition prepared using PIB succinic acid instead of PIBSA, it was that the former would comprise a small amount of additional water. Therefore, the compositions of *inter alia* D16 were covered by contested claim 1.
- 2.1.7 In D60, the expert essentially reiterated and confirmed what had been stated in D50, in particular that it would be impossible to analyse the compositions of *inter alia* D16 to determine whether it was prepared with using PIB succinic acid or PIBSA. Specifically, PIBSA hydrolysis to PIB succinic acid would be rapid and could not be avoided, and hence compositions prepared with PIBSA would be indistinguishable from the same composition prepared with PIB succinic acid.
- 2.1.8 The board is of the following view. To conclude that the prior art implicitly discloses a certain feature, in this case a composition comprising a PIB succinic acid in the amount recited in contested claim 1, a

direct and unambiguous disclosure is required. In this respect, as argued by the respondent, the cited documents do not appear to meet this standard. In particular, D50 represents an opinion that PIB succinic acid is present in the prior art compositions, but offers no evidence in this regard, in particular that 0.17% PIBSA added to the compositions of D16 will inevitably result in greater than 0.1 wt.% PIB succinic acid. It is not credible that an equilibrium or flux between PIBSA and PIB succinic acid occurs to a sufficient extent that it **inevitably, i.e directly and unambiguously** leads to the presence of PIB succinic acid **in the amount claimed** in the compositions of D16.

2.1.9 In this context the appellant referred to further evidence that PIBSA in D16 disclosed PIB succinic acid as required by claim 1, namely:

- Annex A of opinion D50 (document entitled "Lubricant Additives", page 161, second full paragraph), which addressed the reactivity of dispersants toward water, in particular the hydrolysis thereof,
- Annex B of opinion D50 (document entitled "Effect of water on overbased sulfonates engine oil additives", page 3807, right hand column, first full paragraph) which stated that the presence of water in engine oils was well known, and that the water resided on the surface of the detergent component, and
- Annex A of opinion D60, which stated that anhydrides usually contain some free acid due to water absorption from the atmosphere (page 10, left hand column, "Introduction"). This document also disclosed a succinic acid anhydride with a free acid content of 3.99% (page 12, table II, first entry).

2.1.10 The board is not convinced by these arguments and annexes. Specifically:

- as stated by the respondent, Annex A to D50 merely highlights the reactivity of anhydrides to water, but does not provide unambiguous evidence that the compositions of D16 will comprise sufficient water available to hydrolyse PIBSA to PIB succinic acid in an amount required to satisfy claim 1.
- as stated by the respondent, Annex B of D50 addresses the specific situation where water present in engines oils results from the combustion process (e.g. page 3807). Hence, while it can be accepted that engine oils may contain water, this does not necessarily apply to the compositions of D16, which upon preparation are not present in an engine.
- even if, as stated in Annex A of D60, anhydrides absorb water from the atmosphere, the same does not necessarily apply to anhydrides present in relatively low amounts in a lubricant oil. Furthermore, that a single succinic acid anhydride may have an acid content of 3.99% is not evidence that commercially available *polyolefin*-substituted succinic anhydrides would contain a similar level of acid.

2.1.11 The appellant also argued that the patent itself taught that anhydrides provided the dispersant with acid functionality. Furthermore, a number of documents on file such as D12 and D14 mentioned both acid and anhydrides as interchangeable alternatives.

2.1.12 Although not referred to directly by the appellant, the board notes that the relevant paragraph [0040] of the patent states the following:

"... dispersants may contain anhydride functionality in place of the corresponding acid functionality. During the TAN measurement procedure, anhydride groups are typically hydrolyzed and titrate as TAN, so anhydride-containing dispersants are likewise to be considered as acid-containing dispersants".

2.1.13 Of note is that neither the expression "in place of", nor "to be considered as" in this paragraph mean that the anhydrides are identical to the acids, but rather mean they are interchangeable. Furthermore, the fact that anhydride groups are "typically hydrolysed" during the TAN measurement procedure does not have any bearing on what happens to PIBSA when included in the lubricant composition of D16. In this regard, the board notes that the ASTM D974 method (document D20, point 4) requires that the sample is dissolved in a mixture containing a small amount of water. Hence, it is not surprising that hydrolysis of the anhydride would be expected under such conditions, as set out in paragraph [0040] of the patent.

2.1.14 Furthermore, as stated by the respondent, that acids and anhydrides may be known from D12 or D14 as alternatives to each other, as argued by the appellant, is irrelevant to novelty, since alternatives by definition are not identical.

2.1.15 Hence, in view of the above, the board concludes that although the compositions of D16 will undoubtedly comprise some PIB succinic acid, there is insufficient evidence to conclude that D16 directly and

unambiguously discloses a composition as required by claim 1 which inevitably comprises at least 0.1% by weight of a polyolefin-substituted succinic acid. Hence, the appellant's argument that the lubricant composition of D16 made using PIBSA would be essentially indistinguishable from a composition made using PIB succinic acid is not convincing.

2.1.16 Consequently, the subject-matter of claim 1 is novel over D16.

2.1.17 The appellant did not dispute that if the claimed subject-matter were found to be novel over D16, then at least for the same reason the same conclusion would apply to D12, D14, D44 and D45.

2.1.18 Hence, the subject-matter of claim 1 is also novel vis à vis D12, D14, D44 and D45.

2.2 Novelty vis à vis documents D51, D52, D53 and D54

2.2.1 D51

D51 is a patent document and relates to an additive concentrate for incorporation in a lubricating oil composition (claim 1). The appellant argued that the subject-matter of contested claim 1 lacked novelty over the second comparative example in table 1 on page 16 (statement of grounds of appeal, point 7.2).

In particular, the appellant calculated that the composition of this example comprised PIB succinic acid in a calculated amount of 0.05% by weight. It then argued that the claimed lower limit of 0.1 wt%, in the light of "standard rounding practice", covered values

as low as 0.05% (see appellant's letter of 3 March 2023, page 4, second full paragraph).

The board disagrees. The application of the rounding convention depends on the specific circumstances of the case. As is apparent from a summary of case law concerning the rounding convention (see Case of the Boards of Appeal, 10th Edition, I.C.5.2.2), a one-size-fits-all approach is not appropriate. In the present case, it is explicitly stated in claim 1 that the dispersant must be present in an amount of **at least** 0.1 percent by weight. Under the circumstances of the case, in the absence of any convincing arguments to the contrary, the board sees no reason to round down this explicit lower limit to include a calculated amount of 0.05% derived from D51. Indeed, doing so would effectively lead to broadening of the claim range of at least 0.1 percent by weight. Irrespective of this, what matters is how the person skilled in the field of lubricants, rather than a mathematician, would understand the claimed lower limit and the disclosure in the prior art. Such a skilled person would consider a measured dispersant quantity of at least 0.1 percent by weight to be clearly distinguishable from the value of 0.05 percent by weight disclosed in D51.

Hence, the subject-matter of contested claim 1 is novel over D51.

2.3 D52

2.3.1 D52 is a patent document and relates to a composition prepared by mixing a basic sulfonate, sulfonate/ carboxylate or carboxylate metal complex with a high molecular weight aliphatic carboxylic acid (such as a polybutene substituted-succinic acid (claims 1 and 4)).

- 2.3.2 In example 10 of D52 a mixture of a basic carbonated calcium complex of a petrosulfonic acid (a detergent) and a polyisobutenyl succinic acid (a dispersant according to claim 1) are heated to 150°C until a homogeneous mass is obtained.
- 2.3.3 The appellant submitted, though a series of calculations (statement of grounds of appeal, point 7.4 and associated footnotes), that the composition of example 10 of D52 (an additive concentrate), when used in an amount of 1-20% to make a diesel lubricant (as disclosed in D52, column 7, lines 31-32), fell within the scope of contested claim 1.
- 2.3.4 The board disagrees. A finding of lack of novelty requires the prior art to directly and unambiguously disclose the claimed subject-matter.
- 2.3.5 As argued by the respondent, D52 discloses the production in example 10 of a product prepared from the substances mentioned. Hence, it does not disclose a mixture of a detergent and a dispersant as required by claim 1, and hence cannot meet the requirement set out therein with regard to those components.
- 2.3.6 More specifically, example 10 states that said components are "heated at 150°C until a homogeneous mass is obtained". This is also consistent with the remainder of the disclosure of D52 which indicates that a reaction takes place. For example, in column 1, lines 7-12 it is stated that the invention relates to the treatment of basic metal complexes with high molecular weight carboxylic acids and the products resulting from said treatment.

2.3.7 Furthermore, claim 1 of D52 is formulated as a product defined by the process by which it is obtained - thus implying that a reaction takes place. Hence, even if the product of example 10 were to be used as lubricating additive in concentration ranges of from 1 to about 20 percent, the resulting product does not directly and unambiguously disclose a composition meeting the requirements of claim 1. In particular, since the process of example 10 of D52 alters the chemistry of the two compounds, the product would no longer comprise a discrete detergent and dispersant, nor would it display the TBN and TAN for the detergents and dispersant respectively as required by contested claim 1.

2.3.8 The appellant's further arguments failed to convince the board.

The appellant submitted that the process of example 10 could be carried out from as low as 25°C (see for example claim 1). Hence, the product of example 10 was a mixture of the components and not a reaction product.

As stated by the respondent however, the fact that 25°C is cited in D52 as the lower temperature limit at which the process of claim 1 can be carried out does not indicate that the product of example 10 is a mere mixture, and not a reaction product. Rather, in patent documents it is common to have a generally disclosed broad range. What matters however is how the specific example 10 was carried out, namely at 150°C. Indeed, all examples of D52 are carried out with the application of an elevated temperature.

It was also argued on the basis of opinion D60 that heat may have been applied in example 10 of D52 to aid

the proper mixing of the components so as to form the desired homogeneous mass, and that the PIB succinic acid dispersant would bind to the detergent independently of whether added to a lubricant composition as separate components, or in the form of the concentrate according to example 10 of D52. In this regard, D60 (point 6) disclosed an experiment in which titration of 1% solution of an overbased calcium sulfonate detergent in isooctane with PIB succinic acid led to instantaneous binding to yield a complex of both compounds.

However, as stated by the respondent, the experiment carried out in point 6 of D60 employs isooctane as a solvent, and is not representative of a lubricating composition comprising an oil of lubricating viscosity. Furthermore, this experiment provides no evidence of the nature of the product prepared according to example 10 of D52.

The appellant also argued that D52 itself, by stating that the process of example 10 could be carried out "to the decomposition temperature" indicated that no reaction took place.

However, in the view of the board, the absence of "decomposition" is not synonymous with the absence of a reaction, but rather indicates the absence of any further reaction to undesirable by-products.

The appellant further referred to D45a, an excerpt from the documents as filed in patent document D45, in which concentrates comprising a calcium sulfonate detergent and PIBSA were blended, e.g. for 0.5 hours at 100°C (page 7, final table), thus demonstrating that such

mixing did not lead to different products, but rather mere blends.

However, as noted by the respondent, said blends were prepared at a temperature lower than that disclosed in example 10 of D52, and hence do not serve as unambiguous evidence that the products of the example 10 were mere blends, and not chemically altered reaction products.

- 2.3.9 The subject-matter of claim 1 is also novel over D52 for a further reason. Specifically, the appellant argued that the product of example 10, when combined in an amount of 1 to 20% as an additive in a diesel lubricant (according to D52, column 7, lines 31-32) would give rise to a lubricant composition having the features of claim 1 (see statement of grounds of appeal, point 7.4).

Apart from this range, D52 does not disclose a specific embodiment in which the additive of example 10 is combined with a lubricant oil as set out in the description (D52, column 7, lines 23-31). As stated by the respondent, the skilled person must make a series of selections from within the percentage ranges disclosed in D52 to arrive at the claimed subject matter. In particular, D52 discloses that the additive may be added in an amount of **0.1** to 20%, not **1%** to 20% which formed the basis for the appellant's calculations. Second, further more limited ranges are disclosed, such as **0.0001** to about 2 wt% (D52, column 7, lines 32-33). Furthermore, even taking the range of 1 to 20% disclosed in D52 on the basis of which the appellant carried out its calculations, in particular the amount of sulfated ash present in the composition was calculated to be within the range of 0.24 to 4.8%

(statement of grounds, page 20, third bullet point), only a narrow portion of which falls within the claimed range of up to 1.1%. Hence, even working within an additive concentration within the appellant's calculated range of 1 to 20% disclosed in D52 does not inevitably lead to a composition falling within the scope of claim 1.

Hence, for these reasons, the subject-matter of claim 1 is novel over D52.

2.4 D53

2.4.1 D53 is a patent document and concerns an additive concentrate suitable for incorporation into a finished lubricating oil, comprising (a) a lubricating oil and (b) an alkaline earth metal hydrocarbyl phenate modified with a particular acid (i) or (ii) (D53, claim 1). In particular because polyisobutene succinic acid could be selected as the acid (ii) (e.g. claim 13), the appellant submitted, by way of various calculations, that all of the features of contested claim 1 were disclosed in D53.

2.4.2 The board disagrees. As stated by the respondent (reply, point 114), rather than referring to a specific embodiment in D53, the appellant referenced multiple passages disclosed throughout the document (statement of grounds of appeal, point 7.6), and combined them to arrive at the subject-matter of claim 1. Specifically, the appellant arrived at a composition allegedly disclosed in D53 by selecting *inter alia*:

- PIB succinic acid as one of two preferred options for the di/poly carboxylic acid disclosed (e.g. claim 13), and

- taking the lowest possible value for the TAN of the PIB succinic acid (having 100C atoms) calculated as 74 mgKOH/g, when used in the preferred amount of 16% according to the description (page 8, line 20),
- and combined with an alkaline earth metal-containing detergent (e.g. claim 1), the amount of alkaline earth metal provided being the preferable amount of 10-20% (page 8, line 25), thus providing a calculated TBN range, when the metal is calcium chosen from the list of metals on page 7, lines 8-10, of 280 (for 10% Ca) to 560 (for 20% Ca), and
- when the aforementioned additive composition (i.e. PIB succinic acid and detergent) is used to make an engine oil lubricant in a amount that provides the lubricant with the TBN of 4, disclosed as the lower end of the range of 4 to 20 (page 13, lines 12-14), thus indicating that it should be used in a lubricating composition in a calculated amount of 0.7-1.4%.

2.4.3 Selecting and combining the features listed above from the description of D53 as the appellant has done does not amount to a direct and unambiguous disclosure of the subject-matter of claim 1. For example, although polyisobutene succinic acid is mentioned as a preferable acid of type (ii) (page 8, lines 15-16; claim 13), none of the examples employ this compound.

2.4.4 In this context the board agrees with the appellant, as argued in the letter dated 3 March 2023, that there are situations in which the identification of features as preferred may act as a pointer. In D53 however, although polyisobutene succinic acid is mentioned as a preferable acid of type (ii) (page 8, lines 15-16; claim 13), none of the examples employ this compound, and therefore it cannot be seen as the preferred

dispersant. Furthermore, the sheer extent and number of the above-described selections, calculations and assumptions from within D53 - for example that the 10-20% alkaline metal refers to the preferred Ca as alkaline earth metal - in the view of the board cannot amount to a direct and unambiguous disclosure of each of the features of contested claim 1 in combination.

Hence, the subject-matter of claim 1 is novel over D53.

2.5 D54

2.5.1 Patent document D54 concerns a synthetic lubricating oil which comprises, in addition to a basestock oil, an additive package comprising a hydrocarbyl substituted dicarboxylic acid or anhydride (claim 1).

2.5.2 The appellant argued that D54 disclosed all of the features of contested claim 1. In particular, PIB succinic acid was a preferred option for the acid (page 5, line 34), and the composition could include a metal detergent (D54, claim 8), e.g. in a preferred amount of 0.2 to 9% (e.g. table, page 14). D54 did not disclose the amount of TBN provided by the detergent to the lubricant, nor the sulfated ash value of the lubricant as required by contested claim 1. Nevertheless, the claimed amounts were not suitable for establishing novelty, because they were meaningless in the sense that they covered virtually all conventional values for engine oils. Thus the skilled person would seriously contemplate working within the values recited in contested claim 1.

2.5.3 The board disagrees. In particular, D54 fails to disclose the features of claim 1 in combination, i.e. in one specific embodiment. More specifically:

- the examples of D54 employ polyisobutenyl succinic acid anhydride, not the corresponding acid,
- the presence of a detergent, let alone a metal-containing detergent as required by claim 1 is optional and must be chosen from a list of optional additives in claim 8, and
- the TBN for the detergent and the sulfated ash value are not disclosed. The allegation that the skilled person would inherently, and thus directly and unambiguously end up within the claimed values is not based on any evidence.

2.5.4 Hence, at least for these reasons, the subject-matter of claim 1 is novel over D54.

3. Admittance - document D56

3.1 *Inter alia* technical paper D56 was filed by the appellant for the first time with the statement of grounds of appeal. It was submitted in the context of inventive step as a secondary document to be combined with D2 as closest prior art.

3.2 The respondent requested that *inter alia* D56 not be admitted into appeal proceedings.

3.3 Pursuant to Article 12(4) RPBA 2007, which applies to the present case in view of Article 25(2) RPBA 2020, the board has the discretion to hold inadmissible evidence which could have been presented in opposition proceedings.

3.4 The contested decision is relevant in determining whether D56 could and should have been presented in

opposition proceedings. According to the contested decision, in the assessment of inventive step starting from D2 as the closest prior art, the opposition division accepted the objective technical problem as proposed by the appellant, namely as the provision of an alternative dispersant for improving TBN retention (contested decision, point 4.2.1, third paragraph).

3.5 Basing its arguments on D56, the appellant essentially argued for the first time with the statement of grounds of appeal that the achievement of TBN retention alone was meaningless, since it did not by itself indicate that a useful effect was achieved by the claimed compositions (statement of grounds of appeal, point 8.2). Specifically, D56 reported the testing of a range of detergents and showed that TBN retention did not correlate with good lubricant performance. Therefore, in view of D56, the objective technical problem set out in the contested decision was incorrect, and was to be defined less ambitiously as the provision of *"an alternative composition wherein TBN from the detergent is retained longer, regardless of any impact this may [sic] on the effectiveness of the detergent"* (statement of grounds of appeal, point 8.6).

3.6 In view of this newly formulated problem, and as stated by the respondent (reply to the statement of grounds, 15), D56 is relied upon as part of a new inventive step attack. This results in a newly proposed objective technical problem which is different from the problem formulated by the appellant before the opposition division and accepted by it in the contested decision. There is nothing in the contested decision that could justify the submission of D56 with the statement of grounds of appeal, and no justification was submitted by the appellant. In particular, as set out by the

respondent (reply to the statement of grounds, point 146), TBN retention is an aim in the patent (paragraph [0001]), it is the subject-matter of the data provided in the examples of the patent, and it was addressed from the beginning of opposition proceedings.

3.7 Hence, the objection starting from D2 in combination with D56 represents a completely new line of attack which was entirely absent from opposition proceedings. In line with the respondent's arguments, the board sees no reason justifying the submission of D56 in response to the contested decision, and hence why it could not have been submitted during opposition proceedings.

3.8 In view of these considerations, the board decided not to admit D56 into the proceedings.

4. Inventive step - Article 56 EPC

4.1 Background

4.1.1 The patent (paragraphs [0001] - [0003]) relates to a lubricant composition suitable for use in a combustion engine, containing a metal-containing detergent which provides basicity to the lubricant. Lubricant formulations must address limits placed on sulfated ash, phosphorus, and sulfur content ("SAP") in lubricants, and restrictions in these components places upper limits on the amount of said detergent that can be used. Said detergents provide basicity to the lubricant, measurable as the TBN, for various functions, including neutralization of acidic by-products of combustion. Since some engine tests specify a minimum TBN level remaining at the end of the test, "TBN retention" has become an important parameter. Good TBN retention is associated with the ability of a

lubricant to protect the engine from corrosive wear and maintaining that protection over an extended period of time. The patent concerns the selection of a specific dispersant which provides the lubricant with superior TBN retention during use of the lubricant.

4.1.2 Contested claim 1 in summary (see above for the full text thereof) concerns a lubricant composition having a sulfated ash value of up to 1.1 percent, comprising:

- (a) an oil of lubricating viscosity;
- (b) at least one metal-containing detergent in an amount to provide at least 2 mg KOH/g TBN to the lubricant;
- (c) a polyolefin-substituted succinic acid dispersant having a TAN:TBN ratio of at least 0.8, in an amount of at least 0.1 percent by weight, and providing at least 0.025 mg KOH/g TAN to the lubricant composition.

4.1.3 The appellant argued that the subject-matter of contested claim 1 lacked inventive step over each of D2, D45 or D52 as closest prior art. Each of these approaches will be addressed in turn the following.

4.2 D2 as closest prior art

The appellant submitted that the claimed subject-matter lacked inventive step in view of D2 in combination with D51, D52, D53, D54, D14 or D48.

Both parties agreed that D2 was a suitable starting point in the assessment of inventive step. D2 aims at providing a lubricating oil composition having good detergency and oxidation stability, while having levels

of metal containing detergents so as to prevent catalyst poisoning (paragraph [0013]).

4.2.1 Distinguishing features

According to the appellant, the subject-matter of contested claim 1 was distinguished from example 1 of D2 (table 1, page 6) by the presence in the former of a polyolefin-substituted succinic acid. This example comprised "Ashless dispersant-1", a dispersant which is a reaction product of a bis-type succinimide and boric acid (D2, paragraph [0046], lines 9-11).

The board agrees. As set out above in relation to Article 123(2) EPC, contested claim 1 is formulated with "comprising" language and therefore does not exclude the presence in the composition of claim 1 of a boron-containing succinimide such as that disclosed in example 1 of D2.

The distinguishing feature of claim 1 over example 1 of D2 is hence as stated by the appellant, namely the presence of a polyolefin-substituted succinic acid.

4.2.2 The objective technical problem

As set out above, although the appellant on the basis of document D56 submitted a new objective technical problem in appeal proceedings, this document was not admitted into the proceedings.

In view of the board's finding in relation to the admittance of D56, the appellant at oral proceedings argued that the objective technical problem underlying the subject-matter of claim 1 vis à vis D2 was the

provision of an alternative lubricant composition maintaining TBN retention.

The respondent conceded that there was no data in the patent directly comparing the claimed composition with a composition according to D2 comprising as dispersant a boron-containing succinimide.

However, as submitted by the respondent, although the patent does not comprise any data directly comparing the claimed compositions with that of example 1 of D2, it nevertheless demonstrates that PIB succinic acid provides effective TBN retention properties.

Specifically, in the examples of paragraph [0057] of the patent, the effect of various dispersants on the rate of neutralization (i.e. the depletion of TBN) of overbased detergents is examined, and an overall rate of acid neutralization is calculated. Lower rates of neutralisation therefore indicate a better TBN retention. In this test, the compositions of examples 4, 8, 12 and 16 comprise PIB succinic acid and display neutralisation rates which were either too slow to measure, or very low, compared to dispersants A (see example 2) and B (example 3) which fall outside the scope of claim 1. Furthermore, in the engine test (patent, paragraph [0058]) it was demonstrated in example 18 that when 0.29% of PIB succinic acid dispersant was added to a comparative composition comprising conventional succinimide dispersant, the "% TBN depletion" improved from 17.7% to 12.9% (paragraph [0058], table).

Hence, while there is no evidence that the composition of claim 1 is *improved* compared to the composition of example 1 of D1, it is credible that the addition of

PIB succinic acid, itself having TBN retention properties, will contribute to the TBN retaining properties of the composition of D2. Hence, this addition serves a purpose, namely that of maintaining TBN retention.

Hence, the appellant's formulation of the objective technical problem, i.e. the provision of an alternative lubricant composition maintaining TBN retention, is accepted by the board.

4.2.3 Obviousness

The appellant submitted that the skilled person seeking a solution to the above problem would simply add a small amount, i.e. at least 0.1% by weight as claimed, of a polyolefin-substituted succinic acid such as PIB succinic acid to the composition of example 1 of D2 as an arbitrary modification thereof, and thereby arrive at the subject-matter of claim 1. Specifically, PIB succinic acid was a well known additive in the lubricant field, as evidenced by D52 (e.g. column 3, lines 31-35), as well as D51, D53, D54, D14 and D48.

The board acknowledges that if the addition of PIB succinic acid was indeed arbitrary, it could not contribute to inventive step as argued by appellant.

However, as stated above, PIB succinic acid is a purposefully chosen alternative which maintains the TBN retention properties.

There is no hint in D2 that TBN can be maintained by the addition of PIB succinic acid in the claimed amount.

Similarly, none of the secondary documents D51, D52, D53, D54, D14 or D48 provide the skilled person with the motivation to include PIB succinic acid for the purpose of TBN retention. Specifically, D51 (comparative example 1, table on page 16), D53 (claim 13) and D54 (page 5, line 34) disclose PIB succinic acid as a lubricant additive, D52 discloses PIB succinic acid as a starting material in the preparation of a lubricant additive (D52, example 10), and D48 (column 10, lines 33-37) and D14 (paragraph [0015]) disclose PIBSA (i.e. the anhydride rather than the acid) as an additive. Crucially however, none of these documents address the problem of TBN retention at all, let alone the suitability of PIB succinic acid for this purpose.

Consequently, the subject-matter of claim 1 involves an inventive step starting from D2 as closest prior art in combination with any one of D51, D52, D53, D54, D14, or D48.

4.3 D45 as closest prior art

D45 relates to the provision of lubricating oil additive concentrates for use in crankcase engine oils and containing overbased metal detergents and high levels of organic friction modifiers, in which the components do not interact to form sediments (paragraphs [0002] and [0004]).

The respondent submitted that D45 was not a suitable closest prior art essentially because there was no evidence that the amount of sediment is in any way related to the problem of TBN retention, with which the patent was concerned.

To the appellant's advantage, the board saw no reason why D45 could not serve as a suitable starting point for the skilled person, at least since, similarly to the patent, it concerns lubricant compositions for use in engines.

4.3.1 Admittance of issues relevant to inventive step vis à vis D45

The appellant submitted that the subject-matter of claim 1 lacked inventive step starting from additive concentrate 3 in table 3. This example discloses an additive composition comprising a calcium sulfonate detergent having a TBN of 300 and a polyisobutenyl succinic anhydride. After the addition of further components as set out in paragraph [0049], the concentrates were formulated with a basestock to provide the formulated lubricant (D45, page 8, final table of paragraph [0049]).

The respondent submitted that in addition to the feature set out above in relation to novelty (also addressed below), D45 furthermore failed to disclose a sulfated ash value of up to 1.1 percent as required by claim 1.

Specifically, in an annex to the statement of grounds of appeal (page 3, final entry in the table), the appellant calculated the sulfated ash content of a composition comprising concentrate 3 of table 3 of D45 in the amounts shown (i.e. 1.6 wt.% calcium sulfonate detergent and 0.28 wt% PIBSA), in combination with a base oil, to arrive at the figure of 0.58 wt% sulfated ash. Nevertheless, the respondent argued that the composition did not meet the requirements of claim 1 of

having less than 1.1% sulfated ash, because it did not account for the additives mentioned in paragraph [0049] of D45, which included additional sulfated ash contributing components. In particular, the antioxidant (see second table on page 8 of D45, first entry) present in an amount of 1.30 wt% contributed an unknown amount of sulfated ash to the final sulfated ash content of the composition.

The appellant requested not to admit the respondent's defence as regards inventive step based on the sulfated ash content as distinguishing feature and also the submission regarding further metal-containing components in paragraph [0049] of D45 contributing to the sulfated ash content. It argued that in relation to inventive step, the respondent had only argued in writing that D45 was not an appropriate closest prior art for the skilled person. Since neither the defence based on the sulfated ash content nor the submission regarding further metal-containing components were submitted in relation to inventive step before the oral proceedings, there were no exceptional circumstances justifying their admittance pursuant to Article 13(2) RPBA 2020.

According to this provision, any amendment to a party's appeal case made after notification of a summons to oral proceedings shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned.

The board's view is as follows. While it is true that the respondent did not file these submissions specifically in the context of inventive step, they were on file in relation to novelty. Specifically, in

the reply to the statement of grounds, point 95.c, the respondent stated that D45 failed to disclose a sulfated ash value of up to 1.1%. Furthermore, in point 96.c, the respondent argued that the appellant's calculations for D45 were erroneously based on the additive concentration of table 3, rather than on the lubricating composition disclosed in paragraph [0049] of D45, which included additional sulfated ash-contributing components. Finally, the relevance of limits on sulfated ash levels and the resultant problems related to TBN retention were addressed by the respondent in the reply, points 131-133, thus indicating that these issues were not irrelevant for inventive step.

In view of these considerations, the board concludes that although not explicit, the implicit defence of inventive step based on the sulfated ash content as distinguishing feature, and on the submission regarding further metal-containing components in D45 contributing to the sulfated ash content, were submitted with the reply to the statement of grounds of appeal.

Therefore, these submissions do not represent an amendment to the respondent's case in the sense of Article 13(2) RPBA 2020, with the consequence that the board decided to admit them into the proceedings.

4.3.2 Distinguishing features

As established under novelty (above), the subject-matter of claim 1 is distinguished from D45 at least in that it comprises a polyolefin-substituted succinic acid, while the composition of D45 comprises PIBSA.

The board agrees with the respondent that the sulfated ash content of up to 1.1 percent in claim 1 is a further distinguishing feature of contested claim 1. Specifically, D45 does not disclose the nature of the antioxidant component listed on page 8 (table 2, first entry). As noted by the respondent however, this could be chosen from any antioxidant, and in particular, the antioxidant mentioned in paragraph [0049] may include the metal containing substances listed in paragraph [0042] of D45. As argued by the respondent, since the antioxidant could provide additional sulfated ash content to the composition, it cannot be concluded based on the information in the examples of D45 that the requirement in claim 1 that the sulfated ash value is up to 1.1 percent has been met.

Hence, the subject-matter of claim 1 is further distinguished from D45 in that the latter does not directly and unambiguously disclose a lubricant composition having a sulfated ash value of up to 1.1 are required by claim 1.

4.3.3 The objective technical problem

The respondent submitted that the objective technical problem vis à vis D45 was the provision of a low sulfated ash lubricant composition for TBN retention.

As set out above, the patent is concerned with providing lubricant compositions which can deal with the upper limits placed on the amount of sulfated ash, and hence on the amount of metal-containing detergent that can be present (paragraph [0002]). The metal-containing detergents provide basicity, which has various functions including neutralising acidic by-products of combustion. Nevertheless, some engine tests

require a minimum TBN level at the end of the test. The examples of the patent described in paragraph [0058] show (as stated above in relation to inventive step vis à vis D2) that the compositions of the invention have superior TBN retention when treated with an acid.

Hence, the problem proposed by the respondent, namely the provision of a low sulfated ash lubricant composition for TBN retention, has been solved by the subject-matter of claim 1.

The appellant disagreed with this formulation of the objective technical problem on the basis that D45 already implicitly disclosed the provision of a composition for TBN retention. Hence, TBN retention could not be included in the formulated of the objective technical problem. Specifically, D45 concerned the prevention of sedimentation of the concentrate upon storage, caused by organic friction modifiers which adversely affected the complex of the metal detergent, causing the formation of sediment in the concentrate upon storage (paragraph [0003]). The presence of even minor amounts of such sediment in the additive concentrates had become unacceptable to lubricant formulators (paragraph [0004]). Since sedimentation removed the acid detergent from the concentrate, the prevention of such removal by preventing sedimentation, was effectively the same as providing TBN retention.

The board does not agree with this view. As stated by the respondent, the problem of sedimentation in the concentrates of D45 and the problem of providing TBN retention in the lubricant composition in the patent are fundamentally different, not least because the sedimentation issue in D45 occurs upon storage of the

concentrates in D45, but also because D45 explicitly attributes the sedimentation problems to the concentrate, and not to the formulated lubricant compositions.

Hence the effect of TBN retention demonstrated for a lubricant composition subjected to treatment with acid according to the examples of the patent is fundamentally different from the effect of lower sedimentation demonstrated for concentrates in D45.

Hence, the board sees no reason to disagree with the respondent's formulation of the objective technical problem set out above.

4.3.4 Obviousness

The appellant argued that the skilled person seeking to provide a low sulfated ash composition for TBN retention would simply adjust the sulfated ash level in D45 in order to lower it below the upper limit of 1.1% in claim 1.

The board disagrees. As set out above, the rationale behind the patent originates from the standards mentioned in the patent requiring a lowering of the sulfated ash content of lubricant composition, i.e. a reduction in the level of sulfated ash present in the composition, and hence a limit of the amount of metal-containing detergent that can be present. As stated by the respondent, there is no incentive in D45 for the skilled person to specifically choose a low sulfated ash lubricant composition with a view to solving this objective technical problem.

Consequently, claim 1 involves an inventive step starting from D45 as closest prior art.

4.4 D52 as closest prior art

The appellant argued that the claimed subject-matter lacked inventive step starting from D52 as closest prior art.

As stated above in relation to novelty, D52 is a patent document and relates to a composition prepared by mixing a basic sulfonate, sulfonate/carboxylate or carboxylate metal complex with a high molecular weight aliphatic carboxylic acid (such as a polybutene substituted-succinic acid for use *inter alia* as lubricant additives (column 1, lines 15-16; claims 1 and 4).

The aim of D52 is to provide basic metal complexes having a reduced tendency to foam in lubricants (column 1, lines 30-32). Since D52 deals with lubricant compositions, the board is of the view that it represents a suitable starting point for the skilled person for the assessment of inventive step.

4.4.1 Distinguishing features

It was concluded above in relation to novelty that the subject-matter of claim 1 was distinguished from D52 in that

- the claim requires a detergent and a dispersant as separate components of a composition, whereas example 10 of D52 discloses a reaction product of a detergent and a dispersant, hence the lubricant

composition does not comprise PIB succinic acid, but rather a product prepared therefrom, and
- a selection is required to arrive within the appellant's calculated concentration range of 1 to 20% disclosed in general in the description of D52, in order to arrive a composition falling within the scope of claim 1.

4.4.2 Objective technical problem

There is no comparative data on file comparing the product of example 10 of D52 (or rather a lubricating composition prepared therefrom) with a composition according to contested claim 1.

However, as addressed above in relation to inventive step vis à vis D2, the data in the patent demonstrates that PIB succinic acid provides effective TBN retention properties.

Hence, similarly to the situation for D45, above, the objective technical problem may be formulated as the provision lubricant composition for TBN retention.

D52 neither addresses the current need for low sulfated ash additives, which according to the patent places limits on the amount of metal-containing detergent that can be present, nor does it address the problems of TBN retention associated with said low levels of sulfated ash, as outlined in the patent and addressed above.

Hence, as stated by the respondent, there is no incentive in D52 to adapt the disclosure thereof to prepare a composition according to contested claim 1 in order to solve the above-mentioned problem.

Hence, the subject-matter of claim 1 involves an inventive step starting from D52 as closest prior art.

5. Since there are no further issues to be addressed, it follows that the respondent's main request is allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



N. Maslin

M. O. Müller

Decision electronically authenticated