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**Datasheet for the decision
of 27 April 2009**

Case Number: T 0714/07 - 3.3.01

Application Number: 02257526.0

Publication Number: 1318188

IPC: C10M 133/56

Language of the proceedings: EN

Title of invention:

Dispersants and lubricating oil compositions containing same

Applicant:

Infineum International Limited

Opponent:

-

Headword:

Lubricating oil dispersants / INFINEUM

Relevant legal provisions:

EPC Art. 54(2)

Relevant legal provisions (EPC 1973):

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Keyword:

"Novelty (no) - due to the disclosure in an example combined with the general teaching of the same document"

Decisions cited:

-

Catchword:

-



Case Number: T 0714/07 - 3.3.01

D E C I S I O N
of the Technical Board of Appeal 3.3.01
of 27 April 2009

Appellant: Infineum International Limited
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 05 April 2007
refusing European application No. 02257526.0
pursuant to Article 97(1) EPC 1973.

Composition of the Board:

Chairman: P. Ranguis
Members: C. M. Radke
R. Menapace

Summary of Facts and Submissions

- I. The appeal lies from the decision of the examining division refusing European patent application no. 02 257 526.0.
- II. The following document was *inter alia* cited during the examination procedure:
- (D1) EP-A-0 976 814.
- III. The decision under appeal was based on the following claims:
- Claims 1-7 as originally filed;
 - claims 8-13 filed with the letter dated 14 January 2004, and
 - claims 14-19 filed with the letter dated 16 March 2005.

Claims 1 and 12 read as follows:

"1. A boron-containing dispersant composition comprising one or more dispersants that are the reaction product of a polyalkenyl-substituted mono- or dicarboxylic acid, anhydride or ester; and a polyamine, at least one of said dispersants having a polyalkenyl moiety with a number average molecular weight of at least 1800, and from greater than 1.3 to 1.7 mono- or di-carboxylic acid producing moieties per polyalkenyl moiety; a ratio of wt.% of boron to wt.% of nitrogen (B/N) for said dispersant composition being from 0.05 to 0.24."

"12. The dispersant composition of any of claims 1 to 11, wherein the boron content of said composition is from 0.1 to 0.8 wt. %, based on the total weight of active dispersant."

- IV. The examining division decided that the subject-matter of claims 1 and 12 was not novel in view of document (D1).

In particular, it deemed that examples 19, 24 and 26 disclosed a succinylated polyisobutene having a number average molecular weight of 1845 and a B/N ratio of 0.16. Taking into account that document (D1) teaches in general functionalities of 1.3, 1.4, and 1.5 in paragraphs [0082] and [0091], the subject-matter of claims 1 and 12 lacks novelty.

- V. The present claims are claims 1 to 20 filed with the letter dated 17 April 2007, with the replacement of the number "0.70" by "0.07" in claim 2 as requested by the Appellant in its letter dated 21 April 2009.

Claim 1 is identical in wording with claim 1 as originally filed (see point III above).

Claim 2 reads as follows:

"2. The dispersant composition of claim 1, wherein said B/N ratio is from 0.07 to 0.20."

- VI. The Appellant argued that document (D1) did not disclose clearly and unambiguously the functionality of the polyalkenyl moiety of the dispersant in example A-26 (or in example 24 which it refers to). The reaction was not complete, so that the percentage of active

ingredient (A.I.) was less than 100 %. Using formula (1) depicted in the present application, it calculated functionalities of 1.98, 1.86 and 1.74 from the saponification number given in example A-19 of document (D1) assuming conversion rates of 80 %, 85 % and 90 %, respectively. These functionalities lie outside the range given in present claim 1.

VII. The Board summarised its preliminary and non binding opinion *inter alia* regarding novelty in the communication dated 29 January 2009 annexed to the summons to oral proceedings. As to novelty, the Board announced that it might be discussed whether or not the calculations of the functionality of the succinylated polyisobutene based on example A-19 made by the examining division were correct and applicable to example A-24 (see the communication of the examining division dated 22 December 2004).

If the Board came to the conclusion that examples A-24 and A-26 did not directly and unambiguously disclose a certain functionality of the polyalkenyl moiety of the dispersant, it might be discussed whether or not example A-26 if combined with the disclosure in paragraph [0091] of document (D1) deprived the subject-matter of the present claims of novelty.

VIII. The Appellant requested that the decision under appeal be set aside and that the application be allowed to proceed to grant on the basis of claims 1 to 20 filed with the letter dated 17 April 2007, it being understood that in claim 2 it reads "... B/N ratio is from 0.07 to 0.20.".

IX. At the end of the oral proceedings the decision of the Board was announced.

Reasons for the Decision

1. The appeal is admissible.

2. *Article 123(2) EPC*

Present claims 1, 3-17, 19 and 20 have their basis in original claims 1-16, 18 and 19, respectively. Claim 2 has its basis on page 14, lines 4-6 of the application as originally filed. Claim 18 has its basis on page 20, lines 2-6 of the application as originally filed.

3. *Novelty (Article 54(2) EPC)*

3.1 Document (D1) discloses in example A-26 a dispersant containing the acylated nitrogen-containing dispersant of example A-24 and having a boron content of 0.16 % and a nitrogen content of 0.98 % (i.e. a B/N ratio of 0.16) (see page 21, lines 18-23).

Said dispersant of example A-24 is a reaction product of polyamines with a polyisobutene substituted succinic acylating agent which in turn is the product of the reaction of a polyisobutene with maleic anhydride and chlorine (and subsequently with iodine), where the reaction follows essentially the same procedure as in example A-19 (see page 20, lines 29-38), where in said example A-19 the polyisobutene has a number average molecular weight of 1845.

Paragraph [0091] of document (D1) mentions that the minimum number of succinic groups for each equivalent weight of polyalkene substituent group is 1.3, preferably 1.4, where a range of from 1.5 to 2.5 is especially preferred.

- 3.2 It was undisputed that example A-26 thus discloses, partly by reference to examples A-24 and A-19, a dispersant that is the reaction product of a polyalkenyl-substituted dicarboxylic acid anhydride having
- a polyalkenyl moiety with a number average molecular weight of 1845, and
 - a ratio of wt.% of boron to wt.% of nitrogen (B/N) of 0.16.

(see present claim 1 which is cited under point III above).

- 3.3 Therefore it remains to be assessed whether or not document (D1) discloses **directly and unambiguously** to the person skilled in the art a dispersant composition having the following feature in combination with those mentioned under point 3.2 above:

"from greater than 1.3 to 1.7 mono- or di-carboxylic acid producing moieties per polyalkenyl moiety" (see present claim 1).

- 3.4 In example A-26 of document (D1), the polyalkenyl moiety is a polyisobutene moiety and the maleic anhydride (which is reacted with the polyisobutene) gives rise to a dicarboxylic acid producing moiety.

Hence, it has to be determined whether or not document (D1) discloses to prepare, in the course of the production of the dispersant of example A-26, a polyisobutene with more than 1.3 and up to 1.7 groups derived from its reaction with maleic anhydride per polyisobutene molecule.

In example A-26 of document (D1), the dispersant of example A-24 is used as a starting material. The first sentence of example A-24 reads as follows:

"Following essentially the same procedure of example A-19, 1000 grams of **the** polyisobutene is reacted with a total of 106 grams maleic anhydride and a total of 90 grams of chlorine." (emphasis added by the Board).

This clearly indicates that in example 24 the same polyisobutene as in example 19 is used as a starting material.

3.5 According to the calculation of the examining division (see point VII above) the saponification number of 87 indicated in example A-19 of (D1) corresponds to a functionality of 1.56. The Appellant argued that the reaction according to this example cannot be complete; he calculated a functionality of 1.98 assuming 80 % conversion of the polyisobutene with maleic anhydride.

3.6 Present claim 1 gives a range of "from greater than 1.3 to 1.7 mono- or di-carboxylic acid producing moieties per polyalkenyl moiety".

As is evident from the fact that the end points of this range are no integers, the respective product is a

mixture of polymer molecules of different functionalities including one, two and also zero. This is in line with the application as originally filed which states: "The resulting grafted polymer is characterized by having carboxylic acid (or ester or anhydride) moieties randomly attached along the polymer chains: it being understood, of course, that some of the polymer chains remain ungrafted." (see page 10, lines 8 to 11). By the same token, the reaction of the polyisobutene with the maleic anhydride according to examples A-19 and A-24 will always yield a mixture containing some polyisobutene having a functionality of zero, i.e. not having reacted with the maleic anhydride. It thus only makes sense to calculate an average functionality of the reaction mixture obtained in example A-19 of document (D1) comprising the fraction of the polyisobutene not having reacted with the maleic anhydride. The functionality of 1.56 calculated by the examining division can therefore be taken as the functionality of the succinylated polyisobutene obtained in example A-19 of document (D1). Hence, this succinylated polyisobutene falls within the definition of the polyalkenyl-substituted mono- or dicarboxylic acid, anhydride or ester defined in present claim 1.

The statement in example A-24 of document (D1) that "essentially the same procedure of Example A-19" was followed does not mean that exactly the same procedure was used. Due to the fact that the molar ratio of maleic anhydride to polyisobutene is slightly lower in example A-24 than in example A-19 (namely 2.0 in example A-24 vs. 2.2 in example A-19) the functionality

of the product of example A-24 will not exceed that of example A-19, namely will be 1.56 or lower.

The examples of the patent application (D1) as such do not indicate that the polyisobutene dispersants have functionalities of "greater than 1.3" as required in present claim 1. The examples are, however, considered to be preferred embodiments of the disclosure of a patent application. Therefore, the person skilled in the art will expect that they meet the requirements of the preferred embodiments set out in the description.

Paragraph [0091] of document (D1) mentions that the minimum number of succinic groups for each equivalent weight of polyalkenyl substituent group is 1.3 while all the preferred ranges require it to exceed 1.3.

The person skilled in the art thus will conclude that example A-24 discloses that the dispersant of example A-26 has a functionality of 1.56 or less while exceeding 1.3, so that example A-26 anticipates the subject-matter of claim 1.

3.7 Therefore, document (D1) discloses all the features of present claim 1 in combination and deprives the subject-matter of this claim of novelty.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

M. Schalow

P. Ranguis