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D E C I S I O N
of 6 March 2006

Case Number: T 0008/05 - 3.3.06

Application Number: 97931117.2

Publication Number: 0907711

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Language of the proceedings: EN

Title of invention:
Nonaqueous detergent compositions containing specific alkylbenzene sulfonate surfactant

Patentee:
THE PROCTER & GAMBLE COMPANY

Opponents:
Reckitt Benckiser PLC
HENKEL KGaA
Unilever PLC

Headword:
2-phenyl LAS/PROCTER

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0008/05 - 3.3.06

D E C I S I O N
of the Technical Board of Appeal 3.3.06
of 6 March 2006

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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 15 October 2004 concerning maintenance of European patent No. 0907711 in amended form.**

Composition of the Board:

Chairman: P. Krasa
Members: G. Raths
J. Van Moer

Summary of Facts and Submissions

I. This appeal is from the interlocutory decision of the Opposition Division concerning maintenance in amended form of European patent No. 0 907 711 relating to nonaqueous detergent compositions containing specific alkyl benzene sulfonate surfactant.

II. Three notices of opposition were filed against the granted patent and based, inter alia, on the following documents:

(1) US-A-3 914 185;
(2) WO-A-95-06 104;
(3) EP-A-0 361 646;
(5) M.K.L. Matheson and T.P. Matson, "Effect of Carbon Chain and Phenyl Isomer Distribution on Use Properties of Linear Alkylbenzene Sulfonate; A Comparison of "High" and "Low" 2-Phenyl LAS Homologs", JAOCS, vol. 60, no. 9 (September 1983);
(12) Joseph C. Drozd and Wilma Gorman, "Formulating Characteristics of High and Low 2-Phenyl Linear Alkylbenzene Sulfonates in Liquid Detergents", JAOCS, Vol. 65, no. 3 (March 1988), pages 398-404;
(16) T.A. Bleasdale and G.J.T. Tiddy "Organized Solutions", Surfactant Science Series, vol. 44, 1992, page 137 and
(17) M. Sjöberg and T. Warnheim, "Liquid Detergents", Nonaqueous Surfactant Systems, Surfactants Science Series, vol. 67, 1997; page 199.

During the opposition proceedings also document

(18) WO-A-92 09 678

was cited.

The opponents sought revocation of the patent on the grounds of Article 100(a) EPC for lack of novelty and inventive step (Articles 52(1), 54 and 56 EPC); in addition, opponent 3 sought revocation of the patent on the grounds of Article 100(b) EPC for lack of sufficiency of disclosure (Article 83 EPC).

III. The decision of the Opposition Division was based on a set of six claims of the main request, Claim 1 of the main request reading as follows:

"1. A nonaqueous liquid detergent containing a surfactant selected from the alkali metal salts of C_{10}-C_{16} alkylbenzene sulfonic acid having a 2-phenyl isomer content lower than 22%, wherein said surfactant comprises from 10% to 60% by weight of the composition."

IV. In its decision the Opposition Division held that the subject-matter of the claims of the then pending main request (see hereinabove point III) fulfilled the requirements of the EPC.

In particular, in respect of inventive step, starting from document (12) as closest state of the art, the problem underlying the patent in suit was defined as to provide non-aqueous liquid detergent compositions having good physical characteristics such as long term

stability of viscosity. This problem was regarded as having been solved by the subject-matter of the above quoted Claim 1.

The Opposition Division further found that whereas the detergent solutions according to document (12) were aqueous and those according to the patent in suit were non-aqueous, and even if according to document (17) the general behaviour of surfactants in non-aqueous polar solvents was similar to that in water, the experimental data according to the invention examples showed an effect which was not mentioned in documents (12) or (17), namely viscosity stability over time. Therefore, the claimed subject-matter involved an inventive step.

Comparative examples submitted by opponent 3 showing that the problem was also solved outside the claimed range would not oppose the recognition of inventive step.

V. This decision was appealed by opponent 3 (hereinafter the appellant) who argued as follows:

Document (12) taught that linear alkyl benzene sulfonic acid (abbreviated by LAS) having a content of 14% 2-phenyl isomer had a different influence on viscosity of aqueous detergent compositions than LAS having a content of 29.4% 2-phenyl isomer. With reference to document (17) this teaching could be extrapolated to non-aqueous compositions, since the surfactant's behaviour in non-aqueous polar solvents was similar to that in water (document (17). It was further known from document (16) that the viscosity behaviour of a surfactant having a low 2-phenyl isomer content would

be predictable since mesophase behaviour of a particular surfactant in a range of polar solvents was remarkably similar to that in water (page 137, IV, general comments, first sentence).

The skilled person was aware that document (1) disclosed linear alkylbenzene sulfonates (commonly also abbreviated by LAS) as suitable anionic detergents (column 5, lines 44 to 65) and that two types of LAS were available: LAS having a low content of 2-phenyl isomer and LAS having a high content of 2-phenyl isomer (document (5), column 1, introduction, lines 8 to 12). The skilled person, when formulating detergent compositions, would try the low 2-phenyl LAS because of their known benefits e.g. with respect to biodegradability and toxicity.

Further, although the liquid built detergent compositions according to the examples of document (18) contained the surfactant, i.e. LAS, in the **acid** form, the skilled person would know from page 5 of this document as well as from documents (2) and (3) that alkali metal salts of LAS might be used and, particularly, at low concentrations (document (2), page 10, lines 10 to 14; document (3), table III on page 8).

Thus, by routine experimentation one would arrive at the claimed level of anionic surfactant which gave acceptable detergency performance.

Further, the appellant maintained on the basis of comparative examples submitted by it that the problem of lack of long term stability (or constant viscosity

over a long time period) did not occur when LAS had a 2-phenyl isomer content greater than 22 % (see e.g. examples 2, 4, 6 and 10; here and in the following the appellant's examples will be referred to only by their numbers as such, whereas the respondent's examples will be marked with "n°"). Therefore, replacing in these compositions LAS having a high content of 2-phenyl isomer with LAS having a 2-phenyl isomer content of less than 22% did not solve any problem because there was no problem to be solved.

Moreover, the problem of long term stability of viscosity was not solved over the whole scope of Claim 1.

The appellant also submitted that the detergent compositions according to its examples 7, 8, 11, 12, 15 and 16 showed that all these compositions which comprised isostearic acid were thick and not pourable. Since the compositions according to examples 7, 11 and 15 comprised LAS having a 2-phenyl isomer content of lower than 22%, as required by Claim 1, these results were evidence that they did not solve the underlying technical problem.

Therefore, the claimed subject-matter lacked an inventive step.

VI. The patent proprietor (hereinafter the respondent) refuted the arguments of the appellant and argued in particular that only detergent compositions which were pourable fell within the scope of Claim 1. Non pourable compositions were of no interest.

The skilled person was able to modify the compositions if they were thick and non pourable. He knew that the isostearic acid was acting as a gelling agent, and therefore, he would not include the isostearic acid in such detergent formulations which became non pourable due to the addition of this acid.

Document (1) was not the most appropriate starting point for evaluating inventive step since it related to aqueous detergent compositions whereas the patent in suit concerned nonaqueous detergent compositions. Document (12) was silent on viscosity stability of aqueous systems; document (17) while mentioning phase diagrams exercising the interaction with water, did not teach how to select LAS for non-aqueous systems. Neither did document (16). Therefore these documents did not give any pointer to the skilled person how to solve the technical problem at stake.

Document (18) would be the most promising starting point for evaluating inventive step since it was related to **non**-aqueous liquid built detergent compositions comprising as anionic surfactants alkali metal salts of alkyl benzene sulphonic acid at concentrations up to 20% w/w or more, e.g. up to 25% w/w, i.e. concentrations overlapping with the range of 10 to 60 % by weight of the composition according to the patent in suit. But there was no pointer in this document to use the 2-phenyl isomer of alkyl benzene sulphonate in order to obtain viscosity stability over time. Therefore the claimed subject-matter would involve an inventive step.

VII. The appellant requested that the decision under appeal be set aside and the European patent be revoked.

The respondent requested that the appeal be dismissed or, in the alternative that the patent be maintained in amended form on the basis of the second or third auxiliary requests filed under cover of the letter dated 15 February 2006.

VIII. Oral proceedings before the Board, at which opponents 1 and 2 were not represented, took place on 6 March 2006.

Reasons for the Decision

1. *Inventive step*

1.1 The problem as stated in the patent in suit was the provision of liquid, anionic-containing detergent compositions in the form of **non**-aqueous liquid products that have a high degree of physical stability along with commercially acceptable pourability (page 2, lines 25 to 27).

The appellant argued that long term viscosity of the respective compositions at storage was not at stake but the increase of viscosity when LAS was added to the detergent compositions.

The Board does not agree with the appellant's interpretation of the point of time when viscosity increase should be taken into consideration.

Commercially acceptable pourability implies that the product is pourable at use; this presupposes that the product keeps the pourability characteristics over time i.e. after a certain period of storage. Another definition of "commercially acceptable pourability" does not make sense since the customer is not interested in a "non pourable" product. In other words, the viscosity should not increase over time.

1.2 Since the appellant took document (1) as the starting point for evaluating inventive step and the respondent document (18), the Board has first to select the most promising starting point.

1.3 Both documents disclose liquid detergent compositions comprising LAS and address their flowability (document (1), column 1, lines 55 to 60; document (18), page 5, lines 3 to 9).

Document (1) discloses as an example of a suitable anionic detergent a linear alkyl benzene sulfonate having a low content of 2-phenyl isomer, which content was defined as well below 50% (see column 5, lines 44 to 65); apart from the fact that a 2-phenyl content "below 50%" does not mean a content of "lower than 22%" (see Claim 1 of the patent in suit), document (1) relates to aqueous detergent compositions whereas the patent in suit concerns liquid, **non**-aqueous detergent compositions.

The aim of document (18) was to produce **non**-aqueous heavy duty built liquid detergent compositions with an anionic surfactant (page 3, lines 4 to 6) which may be an alkali metal salt of an anionic surfactant acid

(page 3, lines 21 and 22) e.g. alkyl sulphonic acids (page 5, line 34) present in the liquid built detergent composition at 20% w/w or more, i.e. up to 25% w/w (page 7, lines 27 to 30).

1.4 Since document (18) refers to **non**-aqueous detergent compositions, and mentioned also the adjustment of viscosity, the Board agrees with the respondent and takes this document as the starting point for evaluating inventive step rather than document (1) which refers to aqueous detergent compositions.

1.5 Document (18) did not address the viscosity stability over time. Therefore, in the light of this document, the problem underlying the patent in suit does not need to be reformulated and is therefore as indicated in the patent in suit, namely, the provision of liquid, anionic containing detergent compositions in the form of **non**-aqueous liquid products that have a high degree of physical stability along with commercially acceptable pourability (page 2, lines 26 and 27).

1.6 The question is whether this technical problem is credibly solved by a **non**-aqueous liquid detergent containing a surfactant selected from the alkali metal salts of C_{10}-C_{16} alkylbenzene sulfonic acid having a 2-phenyl isomer content lower than 22% as specified in Claim 1.

1.7 In order to prove that the compositions according to the invention keep their viscosity over time constant, the respondent had submitted a test report under cover of the letter dated 12 December 1999; the compositions according to examples n° 2 and n° 4 of this test report

containing a sodium salt of an alkylbenzene sulfonic acid having a 2-phenyl isomer content of 15.1% and 21.6% respectively (i.e. lower than 22% abbreviated in the following by low 2-phenyl LAS) showed constant viscosity behaviour over three weeks whereas the compositions according to comparative examples n° 1 and n° 3 containing a sodium salt of an alkylbenzene sulfonic acid having a 2-phenyl isomer content of 32.2% and 31,4%, respectively (i.e. higher than 22%, abbreviated in the following by high 2-phenyl LAS) showed an increase of viscosity over three weeks.

These findings are corroborated by the evidence provided by the appellant with its letter dated 24 July 2004. The appellant compared the viscosity of compositions having low 2-phenyl LAS (examples 1, 3, 5, 9, 13, 17, 19 and 21) with that of compositions having high 2-phenyl LAS (examples 2, 4, 6, 10, 14, 18, 20 and 22); the compositions having low 2-phenyl LAS showed all a viscosity which was constant over time whereas those having a high 2-phenyl content did not show this viscosity stability.

The products obtained according to examples 7, 11 and 15 illustrating the invention compositions (i.e. "2-phenyl isomer content < 22%") and according to examples 8, 12 and 16 (i.e. "2-phenyl isomer content > 22%") are all not pourable. The Appellant concluded from examples 7, 11 and 15 that the problem was not solved over the whole ambit of Claim 1.

The Board does not agree with the appellant's conclusion for the following reasons:

Claim 1 refers to a "liquid" detergent; "liquid" means for the skilled person, who is a practitioner familiar with the consumers' needs, that the composition is pourable and remains pourable until it is eventually used by the consumer. This interpretation of "liquid" in the given context is supported by the description of the patent in suit where it reads:

> "It is an object of the present invention to provide …liquid detergent products which have… outstanding pourability characteristics." (Page 2, lines 27 to 29).

Thus, in the Board's judgement, the scope of Claim 1 does not encompass detergent compositions which are not pourable (see also point 1.1). Therefore, examples 7, 8, 11, 12, 15 and 16 may be disregarded. The appellant's examples 1, 3, 5, 9, 13, 17, 19 and 21 representing all compositions having low 2-phenyl LAS prove that the viscosity is stable and, thus, corroborate the findings of the respondent.

Hence, the Board is satisfied that the subject-matter of Claim 1 plausibly solves the technical problem as defined under point 1.5.

1.8 It remains to be decided whether the claimed subject-matter involves an inventive step, in other words, whether there was a pointer to the skilled person in the prior art to use low 2-phenyl LAS for the purpose of keeping the viscosity stable over time.

1.8.1 Document (12) discusses the viscosity of sodium [1], triethanolammonium [2] and ammonium [3] LAS

(abbreviated by LAS 1, 2 and 3) as a function of active surfactant concentration and found that for both high and low 2-phenyl LAS, LAS 3 gave the highest viscosity, followed by LAS 1 and then LAS 2 (Figures 1A, 1B, 1C, page 400).

Tables 3, 4, 5 and 6 of document (12) (page 403) showed formulations of dish wash and liquid laundry detergent compositions and displayed the viscosities of the compositions containing either 14%, i.e. low, 2-phenyl LAS or 29.4%, i.e. high, 2-phenyl LAS (see table 1, page 399).

However, all the compositions contained water and the study did not examine long term viscosity behaviour.

Hence, this document did not give a pointer to the skilled person to use a 2-phenyl isomer of a LAS salt, let alone a low 2-phenyl LAS in **non**-aqueous detergent compositions in order to obtain viscosity stability over time.

1.8.2 The appellant had also based its arguments on document (17). However, since document (12) does not address long term viscosity stability, a discussion of document (17) on which the skilled person could have relied with the purpose of applying the teaching of document (12) on **non**-aqueous systems, is superfluous. Furthermore, document (17) does not allow such a transfer because there is no evidence that in this case the behaviour of **non**-aqueous systems is identical to aqueous systems.

It follows that none of the cited documents gave the skilled person a pointer how to keep the viscosity constant in **non**-aqueous detergent compositions.

1.9 The appellant had also based its arguments on documents (1), (2) and (3). It took document (1) as the starting point for evaluating step. Since document (1) concerned aqueous detergent compositions, the appellant referred to documents (2) and (3) which concerned **non**-aqueous detergent compositions. Whereas the object of document (2) was to provide **non**-aqueous liquid compositions when the **non**-aqueous liquid phase is a liquid nonionic surfactant (page 2, lines 6 to 9), document (3) taught that C_9-C_{18}, preferably C_{10}-C_{14} alkyl benzene sulphonates (page 5, lines 41 to 42) were suitable phase stabilizers having unexpected physical stabilizing properties in substantially **non**-aqueous liquid detergents (page 2, lines 34 to 36).

None of documents (2) and (3) gave a pointer to the skilled person which would have enabled him to select a 2-phenyl isomer of alkyl benzene sulphonate alkali metal salt in order to obtain viscosity stability over time since the 2-phenyl isomer was not disclosed in documents (2) and (3).

Therefore, the teaching of document (1) relating to aqueous detergent compositions cannot be applied to **non**-aqueous detergent compositions.

1.10 It follows from the above considerations that the subject-matter of Claim 1 involves an inventive step and, therefore, meets the requirements of Article 56 EPC.

The dependent claims 2 to 6 relate to particular embodiments of the compositions according to Claim 1 and, hence, derive their patentability from Claim 1.

In the light of the above findings, it is not necessary to consider the respondent's auxiliary requests.

Order

For these reasons it is decided that:

The appeal is dismissed

The Registrar: The Chairman:

G. Rauh P. Krasa