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**Datasheet for the decision
of 15 September 2011**

Case Number: T 1841/09 - 3.3.03

Application Number: 99918117.5

Publication Number: 1080127

IPC: C08G 63/91

Language of the proceedings: EN

Title of invention:

Amine Dispersants

Patentee:

The Lubrizol Corporation

Opponent:

BYK-Chemie GmbH

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56

Relevant legal provisions (EPC 1973):

-

Keyword:

"Novelty: yes"

"Inventive step: yes"

Decisions cited:

T 0012/81, T 0332/87

Catchword:

-



Case Number: T 1841/09 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 15 September 2011

Appellant: BYK-Chemie GmbH
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 7 July 2009
rejecting the opposition filed against European
patent No. 1080127 pursuant to Article 102(2)
EPC 1973.

Composition of the Board:

Chairman: B. ter Laan
Members: O. Dury
C.-P. Brandt

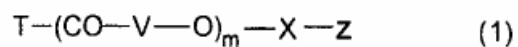
Summary of Facts and Submissions

I. The appeal by the opponent lies against the decision of the opposition division announced on 28 May 2009 and posted on 7 July 2009 to reject the opposition filed against European patent No. EP 1 080 127 B1, based on application No. 99 918 117.5.

II. The granted patent was based on 18 claims of which claims 1, 4, 11, 12, 13 and 15 to 18 read:

"1. An amine dispersant containing one or more amino and/or imino groups, a poly(oxy-C₁₋₆-alkylene carbonyl) chain (POAC chain) obtainable from two or more different linear hydroxycarboxylic acids or lactones thereof and a residue of an ethylenically unsaturated group wherein the amino and/or imino group is attached via the ethylenically unsaturated group, including salts thereof.

4. An amine dispersant as claimed in any one of claims 1 to 3 which is a compound of formula 1



wherein

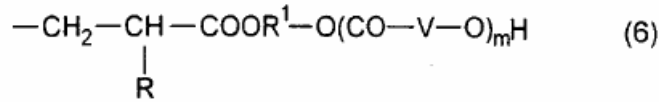
T is hydrogen or a polymerisation terminating group;
(CO-V-O) represents a POAC chain obtainable from two or more different linear hydroxy-C₁₋₆-alkylene carboxylic acids or lactones thereof;

X is a bridging group which contains a residue of an ethylenically unsaturated group;

Z is an amino or imino group or a moiety containing an amino or imino group attached to X via the ethylenically unsaturated group; and

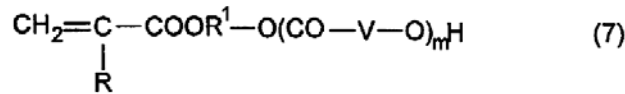
m is from 2 to 200.

11. An amine dispersant as claimed in any one of claims 4 to 10 containing one or more groups of formula 6 attached to Z



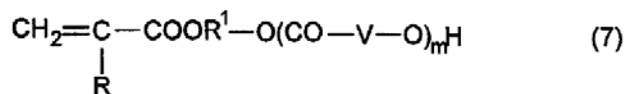
wherein (CO-V-O) and m are as defined in claim 4; R is C₁₋₄-alkyl; and R¹ is an aliphatic or aromatic residue containing up to 10 carbon atoms.

12. A process for making a dispersant as claimed in claim 11 which comprises reacting a compound of formula 7



with an amine, imine, polyamine or polyimine, wherein (CO-V-O) represents a POAC chain obtainable from two or more different linear hydroxy-C₁₋₆-alkylene carboxylic acids or lactones thereof; R is C₁₋₄-alkyl; R¹ is an aliphatic or aromatic residue containing up to 10 carbon atoms; and m is from 2 to 200.

13. A compound useful in the process of claim 12 of formula 7



wherein

(CO-V-O) represents a POAC chain obtainable from two or more different linear hydroxy-C₁₋₆-alkylene carboxylic acids or lactones thereof;

R is C₁₋₄-alkyl; and

R¹ is an aliphatic or aromatic residue containing up to 10 carbon atoms.

15. A composition comprising a particulate solid and an amine dispersant as claimed in any one of claims 1 to 11.

16. A dispersion comprising a particulate solid, an organic medium and an amine dispersant as claimed in any one of claims 1 to 11.

17. A mill-base comprising a particulate solid, film-forming resin and an amine dispersant as claimed in any one of claims 1 to 11.

18. A paint or printing ink comprising a particulate solid, film-forming resin, organic medium and an amine dispersant as claimed in any one of claims 1 to 11."

III. A notice of opposition against the patent was filed on 18 October 2006, in which the revocation of the patent in its entirety was requested on the grounds of Art. 100(a) EPC (lack of novelty as well as lack of an inventive step). The opposition was supported, *inter alia*, by the following document:

D1: EP-A-0 713 894

On 27 April 2009, the opponent further filed a test report "Test 1" (examples A-0, A-1 and A-2).

On 27 April 2009, the patent proprietor filed three test reports D7, D8 and D10 as well as a polyethyleneimine product list.

- IV. The decision under appeal was based on claims 1 to 18 as granted. In its decision announced at the end of the oral proceedings held on 28 May 2009 and issued in writing on 7 July 2009, the opposition division rejected the opposition. The opposition division held that D1 did not destroy the novelty because it failed to disclose dispersants comprising a POAC chain derivable from two or more different and linear hydroxycarboxylic acids or lactones thereof as defined in claim 1. An inventive step was acknowledged considering that the claimed dispersants exhibited greater gloss and lower haze as compared to those of the closest prior art represented by example 16 of D1, as shown in D7 and D8.
- V. On 3 September 2009, the opponent (appellant) lodged an appeal against the above decision. The prescribed fee was paid on the same day. The statement of grounds of appeal was received on 5 November 2001 and was supported *inter alia* by documents D1, D7, D8 and Test 1. By letter dated 3 August 2011, in response to the summons for oral proceedings with accompanying letter, the appellant withdrew the request for oral proceedings and announced that they would not attend the oral proceedings.
- VI. By letter of 8 March 2010, the respondent (patent proprietor) filed comments on the statement of grounds of appeal and requested the dismissal of the appeal

(main request) or, alternatively, the maintenance of the patent in amended form according to one of auxiliary requests 1 to 3. A further test report (D12) was submitted simultaneously. With a letter dated 26 July 2011, a further test report (D14) was filed and by letter of 12 August 2011, a new auxiliary request 2 in replacement of former auxiliary request 2, as well as additional auxiliary requests 1', 2', 3', 4 and 5 were submitted.

VII. Oral proceedings were held on 15 September 2011 in the absence of the appellant, as announced, and in the presence of the respondent.

VIII. The appellant's arguments given in writing may be summarised as follows:

(a) Novelty

a1) The subject-matter of granted claim 1 differed in only one feature from each of examples 14 and 16 of D1: the alkyl rest of the second acids or lactones thereof used to prepare the POAC chain should be

- linear and not branched as in example 14,
- a C₁₋₆ alkylene and not C₁₈ as in example 16.

a2) The substitution of the differing feature by one mentioned in the list of equivalent alternatives given in the description of D1 automatically resulted in the claimed subject-matter. According to T 332/87 (not published in OJ EPO) and pages 82, 86 and 111 of the Case Law of the Boards of Appeal of the EPO, 5th edition, 2006, (without indication of the language version referred to), it was not necessary for a

document explicitly to mention a claimed combination to be novelty damaging. Therefore D1 took away the novelty of the claimed subject-matter.

a3) The claimed subject-matter also could not be regarded as a selection invention since the features replacing the ones in examples 14 and 16 were explicitly disclosed in D1 and were chosen from only one list of alternative possibilities. Reference was made to part C, Chapter IV, paragraph 9.8 of the Guidelines for examination in the EPO.

(b) Inventive step

Applying the problem-solution approach: D1, in particular either of examples 14 or 16, was the closest prior art. From the evidence on file it could not be concluded that an improvement or technical effect vis-à-vis D1 could be attributed to any of the distinguishing features. In that respect, test reports D7, D8 and Test 1 did not represent a fair comparison with the closest prior art. The problem effectively solved should, thus, be defined as the provision of further, alternative dispersants to those of D1. Since the subject-matter of claim 1 of the patent in suit represented a routine variation within the ambit of D1, merely following the teaching of D1 would solve that problem, which solution was therefore obvious.

IX. The respondent essentially argued as follows:

(a) Novelty

a1) None of the examples of D1 fell within the scope of the claims.

a2) In order to arrive at a dispersant as claimed in the patent in suit the skilled person, starting from D1, had to substitute either the branched lactone (4-methylcaprolactone) of example 14 or the long chain acid (12-hydroxy-stearic acid) of example 16 by a linear hydroxycarboxylic acid or lactone thereof as defined in present claim 1. It was not disputed that D1 disclosed that such acids or lactones thereof could also be used for the preparation of dispersants. However, D1 did not provide any hint to modify specifically examples 14 and 16 in that particular way. On the contrary, the general teaching of D1 was that branched alkyl rests were preferred so that D1 did not provide the skilled person with a reason for such a substitution. Therefore the subject-matter claimed was novel over D1.

(b) Inventive step

b1) It was agreed that either example 14 or example 16 of D1 represented the closest prior art and that the distinguishing features of the claims of the main request were those identified by the appellant.

b2) The problem solved as compared to D1 was to provide dispersants having improved optical properties (i.e. gloss, haze and colour strength) and storage stability, in particular at low temperature (4°C). An improvement in optical properties as compared to example 16 of D1 had been shown in D7, D8, D10 and D12. An improvement in storage stability as compared to example 14 of D1

had been shown in D14. The structure of the dispersants and the resin systems as claimed would lead to improvements in terms of both optical properties and storage stability as compared to both examples 14 and 16 of D1. Hence, the above-defined problem was effectively solved.

b3) Test report Test 1 provided by the appellant, in particular regarding the polymerisation temperature, was not according to the teaching of D1.

b4) D1 contained no hint that would have motivated the skilled person to improve the properties of the dispersants prepared therein by using at least two linear hydroxycarboxylic acids or lactones thereof. On the contrary, D1 disclosed that the use of branched hydroxycarboxylic acids or lactones thereof was preferred, in particular in order to improve the compatibility/solubility properties of the dispersants, thereby teaching away from the solution provided by the patent in suit.

b5) Therefore, it was not obvious to solve the above-defined problem by using dispersants as defined in claim 1, so that the subject-matter claimed was inventive.

X. The appellant (opponent) requested that the decision under appeal be set aside and that the patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed or, in the alternative, that the patent be maintained on the basis of one of the

auxiliary requests 1 and 3 as filed with letter dated 8 March 2010 or on the basis of the auxiliary requests 1', 2, 2', 3', 4 and 5 as filed with the letter dated 12 August 2011.

XI. The Board announced its decision at the end of the oral proceedings.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. Novelty

2.1 Modification of examples 14 or 16 of D1

2.1.1 D1 discloses dispersants comprising amino groups and a poly(oxy-alkylene carbonyl) chain wherein the amino groups are attached to said chain via the residue of an ethylenically unsaturated group (see claims 1, 2; formulae (1) to (4); page 6, line 32 to page 9, line 9).

2.1.2 Example 14 of D1 discloses the preparation of a dispersant obtained by reacting a polyethyleneimine having a molecular weight of 10,000 (SP200, manufactured by Nihon Shokubai Kagaku Co. Ltd.) and a polyester prepared from ϵ -caprolactone and 4-methylcaprolactone according to Preparation Example 5. The dispersant thus obtained comprises a POAC chain obtained from two different lactones of C₁₋₆

hydroxycarboxylic acids, the one derived from 4-methylcaprolactone being non-linear.

Example 16 of D1 discloses the preparation of a dispersant obtained by reacting polyethyleneimine SP200 and a polyester prepared from ϵ -caprolactone and 12-hydroxy-stearic acid according to Preparation Example 7. The dispersant thus obtained comprises a POAC chain obtained from a lactone of a C_{1-6} hydroxycarboxylic acid and from a C_{18} linear hydroxycarboxylic acid, which is not a poly(oxy- C_{1-6} -alkylene carbonyl) chain as required by claim 1 of the patent in suit.

Hence, neither example 14 nor example 16 of D1 discloses a dispersant according to claim 1 of the patent in suit.

- 2.1.3 D1, page 6, lines 37-40, further describes a list of lactones that may be also employed in the addition reaction used to prepare the POAC chain in example 14, said list including lactones of linear C_{1-6} hydroxycarboxylic acids (e.g. ϵ -caprolactone, δ -valerolactone, β -propiolactone, γ -butyrolactone) or of branched C_{1-6} hydroxycarboxylic acids (e.g. β -methyl- δ -valerolactone, 4-methylcaprolactone, 2-methylcaprolactone).

A similar list is given on page 7, lines 41-43, of D1 regarding the lactone compounds that may be employed in the addition reaction used in example 16. Besides, according to page 7, lines 48-52, the hydroxycarboxylic acid suitably used in example 16 may be chosen from a list of several alternatives comprising compounds

having a linear C₁₋₆ rest (e.g. δ -hydroxyvaleric acid, ϵ -hydroxy caproic acid, lactic acid, glycolic acid), a branched C₁₋₆ rest (e.g. 2-2-dimethylolpropionic acid) or a linear rest falling outside the requirement of C₁₋₆ for the POAC chain recited in claim 1 (e.g. 12-hydroxystearic acid, salicylic acid).

2.1.4 There is however no disclosure in D1 to combine specifically example 14 with that part of page 6, lines 37-40, directed to the specific lactones as defined in claim 1 of the patent in suit. In particular, D1 contains no motivation to substitute the 4-methylcaprolactone used in example 14, which is branched, by a linear hydroxycarboxylic acid or lactone thereof. There is also no hint in D1 to use a linear hydroxycarboxylic acid or lactone thereof as defined in present claim 1 in addition to the two monomers used in example 14. In this regard, it is noted that the addition of such a monomer would lead to a POAC obtained from three units, one of which not being according to claim 1 of the patent in suit, so that it would not be novelty destroying.

2.1.5 D1 further does not contain any incentive to modify the particular process of example 14 by selecting two lactones according to present claim 1 as monomers for the preparation of the POAC out of the whole list given in D1, which also includes other lactones that are equally suitable.

2.1.6 The same is valid for the substitution of the 12-hydroxy-stearic acid in example 16 by a linear hydroxycarboxylic acid or lactone thereof according to

present claim 1 on the basis of the list of D1, page 7, lines 41-43 and/or lines 48-52.

2.2 Multiple selections within the ambit of D1

The modification of a specific example (either example 14 or example 16) on the basis of a specific passage of the description of D1 (see above paragraph 2.1.3) in order to arrive at the subject-matter now being claimed amounts to a multiple combination of individual elements that has not been explicitly mentioned in D1. Indeed, one has, first, to choose a specific example among all those of D1, secondly, to choose to substitute either the 4-methylcaprolactone used in example 14 or the 12-hydroxy-stearic acid used in example 16, and thirdly, to choose a compound according to claim 1 of the patent in suit within the list of alternative hydroxycarboxylic acids and lactones recited in D1 which is not limited to those compounds (see e.g. page 6, lines 37-40 and page 7, lines 8-10 and 48-52).

The same conclusion would be reached if one would consider e.g. claims 1 and 2 of D1, which both disclose dispersants comprising a POAC chain obtainable from hydroxycarboxylic acids or lactones thereof: here, one would have to choose to prepare a POAC chain from two compounds according to claim 1 of the patent in suit within the list of alternative compounds defined in either formula 1 (see in particular the definition of the R3 group) or in claim 2, which are not all according to the definition of claim 1 of the patent in suit. This modification would amount to at least two selections within a list of equivalent alternatives.

According to decision T 12/81 (published in OJ EPO 8/1982, 296) such a multiple selection confers novelty since it represents a combination of features that was not specifically disclosed in the prior art.

In decision T 332/87, novelty was denied considering the modification of an example illustrative of the invention with a general teaching disclosed in the description of the same prior art document concerning the mere optional addition of a filler applicable to any composition claimed, including those specified in the examples. T 332/87 describes, thus, a different situation from the present case, wherein the objection of lack of novelty raised was based on the modification of an example of a prior art document by selecting in the description of the same document a specific monomer among a list of alternative compounds, not all of which would lead to the subject-matter as claimed. Therefore the argument of the appellant based on T 332/87 (section VIII a2) above) can not be followed.

2.3 For these reasons, the Board considers that D1 does not contain a direct and unambiguous disclosure which inevitably leads the skilled person to a dispersant as defined in claim 1 of the patent in suit. Hence, the subject-matter of claim 1 of the patent in suit is novel.

2.4 Since claims 2-11 of the patent in suit are dependent on claim 1, those, too, fulfil the requirements of Art. 54 EPC. The same is valid regarding claims 12 and 15 to 18 which are directed to a process for making a dispersant according to claim 11 and to various

compositions comprising a dispersant according to any one of claims 1 to 11 of the patent in suit, respectively.

2.5 The reasoning followed above regarding claim 1 equally applies to the compounds according to claim 13 of the patent in suit. Considering that none of the documents on file, in particular D1, specifically discloses a compound comprising a $(\text{CO-V-O})_m$ chain according to formula (7), the subject-matter of claims 13 and 14 of the patent in suit is novel.

2.6 The main request, thus, satisfies the requirements of Art. 54 EPC.

3. Inventive step

3.1 Closest prior art

The first instance and both parties considered D1 as the closest prior art document and the Board sees no reason to deviate from that view.

D1 aims, as does the patent in suit, at providing amine dispersants based on lactones and, optionally, hydroxycarboxylic acids and is also directed to their use in printing inks, coatings and mill-base (claims 1 and 11-19; page 2, lines 5-14; page 10, lines 11-12). The dispersants of D1 are furthermore colourless and exhibit good compatibility with other polymers and good solubility in solvents (page 3, lines 16-19), also in polar solvents (page 10, lines 4-5). Finally, coatings having good gloss are obtained with said dispersants (Table 3).

In particular, examples 14 and 16 of D1 both deal with dispersants comprising a POAC chain based on two different repeating units derived from a hydroxycarboxylic acid or a lactone thereof.

Each of examples 14 and 16 of D1 therefore equally represents a suitable starting point.

3.2 Problem to be solved

The problem addressed in the patent in suit is to provide dispersants that exhibit good dispersing properties, good compatibility in polar solvents and that lead to the preparation of dispersions/millbases/paints/printing inks having good gloss and low haze values. Those properties are assessed, according to paragraph [0074] and the examples of the patent in suit, in terms of optical properties (haze and gloss of paints or inks comprising said dispersants), solubility in organic media and/or storage properties under cold conditions (4°C).

It is further derivable from paragraphs [0002]-[0003] of the patent in suit that the claimed dispersants are said to be more effective than those of D1.

The problem to be solved according to the patent in suit may therefore be seen as to provide dispersants having improved optical (haze, gloss) and storage properties compared to those of D1.

3.3 Solution

The solution to the above problem resides in the dispersants defined in claim 1 of the main request, which are characterised in that they contain a POAC chain obtainable from two or more different linear hydroxycarboxylic acids or lactones thereof as defined in claim 1 of the patent in suit. As agreed upon by the parties, the distinguishing feature of said claim 1 over D1 resides in that the alkyl rest of at least two of the acids or lactones thereof used to prepare the POAC chain are either

- linear (the 4-methylcaprolactone used in example 14 corresponds to a branched hydroxycarboxylic acid); or
- lead to a poly(oxy-C₁₋₆-alkylene carbonyl) chain (the compound 12-hydroxy-stearic acid used in example 16 comprises a linear C₁₈ chain).

3.4 Success of the solution - Problem effectively solved

3.4.1 Test reports D7, D8 and D12 compare the performance in various resins (alkyd resins, polyester resin and acrylic resin, respectively) of dispersants prepared according to example 2 of the patent in suit (Example 2 describing a POAC chain prepared from ϵ -caprolactone and δ -valerolactone) or to example 16 of D1 (example 16 disclosing a POAC chain prepared from ϵ -caprolactone and 12-hydroxy stearic acid). The results show a better haze and gloss for the samples containing a dispersant according to the patent in suit as compared to that of example 16 of D1. The gloss shows an improvement in the compromise between i) a high value in each of the measurements performed at 20° and 60° while ii)

maintaining the difference between both measurements as small as possible.

3.4.2 D7, D8 and D12 compare dispersants according to the patent in suit or to D1 under the same conditions in various resin systems. The examples illustrative of the patent in suit differ from those given for comparison in the above identified distinguishing feature. Hence, those data allow a fair comparison of the performance of those dispersants. The argument of the appellant that D7 and D8 should be disregarded because they did not illustrate the resin systems used in the closest prior art can therefore not be followed. The same applies to D12 on which the respondent did not comment.

3.4.3 Therefore, it can be accepted that the use of a dispersant according to the patent in suit results in an improvement in optical properties over that of Example 16 of D1.

3.4.4 Test report D14 compares the storage stability in two different solvents of the following dispersants:

- Inventive Example 1, which is a repetition of example 2 of the patent in suit (POAC chain prepared from ϵ -caprolactone and δ -valerolactone); and
- Comparative example 1, which is a repetition of example 14 of D1 (POAC chain prepared from ϵ -caprolactone and 4-methylcaprolactone)
- Comparative example 2, which is a repetition of example 14 of D1 but using a polyethyleneimine having a lower molecular weight of 1, 800 (cf. point 2.1.2 above).

The results show an improvement in storage stability for the samples containing a dispersant according to

the patent in suit as compared to that of a dispersant according to example 14 of D1.

- 3.4.5 In view of D7, D8 and D12, taking into account the explanations provided by the respondent and in the absence of any argument or evidence to the contrary provided by the appellant, it is credible that an improvement in terms of gloss, haze and storage stability is present as compared to each of examples 14 and 16 of D1.
- 3.4.6 Test report Test 1 compares the storage stability of dispersants prepared according to
- Example A-0, which is a repetition of example 16 of D1 but using Epomin SP 003 instead of SP 200 (Example 16 disclosing a POAC chain prepared from ϵ -caprolactone and 12-hydroxy stearic acid);
 - Example A-1, which is the same as example A-0 but using valerolactone instead of 12-hydroxystearic acid in the same weight amount;
 - Example A-2, which is the same as example A-0 but using valerolactone instead of 12-hydroxystearic acid in the same molar amount.

According to the letter of the appellant dated 27 April 2009, the only difference between examples A-0, A-1 and A-2 resided in the use of valerolactone instead of 12-hydroxystearic acid to prepare the POAC chain. Hence, although the exact process conditions have not been given, it is concluded that all dispersants were prepared using the process disclosed in example 16 of D1, which refers to preparation Example 7 according to which the hydroxy carboxylic acid and lactone are heated at 190°C. This procedure goes, however, against

the teaching of D1 that when only lactones are used to prepare the POAC chain a temperature of 50 to 150°C should be used (page 5, lines 12-14 in combination with page 6, lines 37-50 and page 7, lines 6-22). This is confirmed by the fact that a temperature of 100°C is used in the examples of D1 when only lactones are used to prepare the POAC chain (see Preparation Examples PE-1 to PE-6). Considering that D1 further teaches in said passage of page 5 that temperatures higher than 150°C did not allow to prepare the desired products, it has to be concluded that the products prepared in examples A-1 and A-2 of Test 1, which were prepared from two lactones at 190°C, are not dispersants according to D1.

This conclusion is confirmed by the results reported in Test report D10, which deals *inter alia* with the preparation of a dispersant comprising a POAC chain obtained from ϵ -caprolactone and δ -valerolactone according to example 15 of D1 i.e. prepared from two lactones, at 100°C. Whereas the dispersant comprising a POAC chain obtained from ϵ -caprolactone and δ -valerolactone prepared at 190°C (Test 1) resulted in a hazy, unsuitable, product, a similar dispersant prepared in D10 at 100°C was clear.

On the basis of these considerations, it is concluded that the data reported in Test 1 are not illustrative of the teaching of D1 and that no conclusion can be drawn from those data. Therefore, the argument of the appellant that Test 1 showed that the technical effect was not present over the whole scope of the claims can not be followed.

3.4.7 Finally, although all the examples provided by the respondent concern a single type of dispersant comprising a POAC chain obtained from ϵ -caprolactone and δ -valerolactone, in the absence of any evidence to the contrary, the Board sees no reason to suppose that the above-defined problem is not solved over the whole scope of the claims.

3.4.8 The Board is, thus, satisfied that the technical problem as set in the patent in suit (see section 3.2 above) has been effectively solved.

3.5 Obviousness

3.5.1 It remains to be decided here whether or not it was obvious to solve the above identified problem by modifying the dispersant of either example 14 or of example 16 of D1 in such a way as to arrive at claim 1 of the patent in suit i.e. whether or not it was obvious, starting from D1, to prepare dispersants containing a POAC chain derived from at least two linear hydroxy carboxylic acids or lactones thereof as defined in claim 1.

3.5.2 None of the cited documents deals with dispersants having good storage properties at 4°C. Therefore, none of those documents could effectively suggest the solution proposed by claim 1 of the main request in order to solve that part of the problem addressed by the patent in suit.

3.5.3 Furthermore, the skilled person would not find any guidance in D1 to use dispersants comprising a POAC prepared from at least two hydroxy carboxylic acids or

lactones thereof which are linear and in C₁₋₆ as required in claim 1 of the patent in suit, in particular to do so in order to improve the optical and storage properties of the dispersants.

- 3.5.4 D1 in particular does not provide a suggestion, nor a motivation, to modify the dispersants of Example 14 or 16 so as to arrive at a dispersant according to claim 1 of the patent in suit.

In order to arrive at such a dispersant, it would be necessary to substitute either the 4-methylcaprolactone used in example 14 or the 12-hydroxy-stearic acid monomer used in example 16 by a suitable hydroxycarboxylic acid or lactone thereof, respectively.

The substitution of the 4-methylcaprolactone in example 14 of D1 would, however, go against the teaching of D1 to use a branched monomer in order to improve the properties of the dispersants (see e.g. page 6, lines 42-45; page 7, lines 11-15 and 44-47). Since the substitution of the 12-hydroxy-stearic acid monomer in example 16 of D1 would also lead to a branched POAC, the skilled person would draw the same conclusion regarding the dispersant prepared in example 16 of D1. Hence, D1 teaches away from a substitution of the 4-methylcaprolactone used in example 14 and also from a substitution of the 12-hydroxy-stearic acid monomer of example 16. As explained above (see end of section 2.1.4), the use of an additional monomer according to claim 1 of the patent in suit to modify the POAC prepared in examples 14 or 16 of D1 does also not lead to a dispersant as claimed and therefore does not need to be considered here.

Hence, the appellant's argument that the skilled person would have modified the POAC chain of the dispersants prepared in examples 14 or 16 of D1 on the basis of the information of the description of D1 cannot be followed.

3.6 Therefore, the subject-matter of claim 1 of the patent in suit is inventive.

3.7 Under these circumstances, it is not necessary to consider the argumentation presented by the respondent during the oral proceedings in relation with colour strength as an optical property.

3.8 Since claims 2-11 of the patent in suit are dependent on claim 1, those, too, fulfil the requirements of Art. 56 EPC. The same is valid regarding claims 12 and 15 to 18 which are directed to a process for making a dispersant according to claim 11 and to various compositions comprising a dispersant according to any one of claims 1 to 11.

3.9 Claim 13 and claim 14, depending on claim 13, were not objected to as lacking an inventive step. The subject-matter of claims 13 and 14 is directed to intermediate products of formula (7) for the preparation of dispersants according to claim 11, which are inventive. Considering that both the intermediate products and the dispersants prepared therewith comprise the same structural element $((\text{CO-V-O})_m \text{ chain})$ and in view of the prior art at hand, an inventive step may be acknowledged for the same reasons as above.

3.10 The main request, thus, satisfies the requirements of Art. 56 EPC.

4. The main request of the respondent (patent proprietor) being allowable there is no need to consider the auxiliary requests.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

D. Hampe

B. ter Laan