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Datasheet for the decision of 25 November 2016

Case Number: T 0792/13 - 3.3.03

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Title of invention:
SLIP- AND LEVELING AGENT

Patent Proprietor:
BASF SE

Opponent:
BYK-Chemie GmbH

Relevant legal provisions:
EPC Art. 83, 54, 56

Keyword:
Sufficiency of disclosure - main request (yes)
Novelty - main request (yes)
Inventive step - main request (yes)

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Case Number: T 0792/13 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 25 November 2016

Appellant: (Opponent)	BYK-Chemie GmbH Abelstrasse 45 46483 Wesel (DE)
Representative:	Von Rohr Patentanwälte Partnerschaft mbB Rüttenscheider Straße 62 45130 Essen (DE)
Respondent: (Patent Proprietor)	BASF SE Carl-Bosch-Strasse 38 67056 Ludwigshafen am Rhein (DE)
Representative:	Zumstein, Angela Maiwald Patentanwalts GmbH Elisenhof Elisenstrasse 3 80335 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 22 March 2013 rejecting the opposition filed against European patent No. 2021389 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	D. Semino
Members:	D. Marquis
	R. Cramer

Summary of Facts and Submissions

I. AEuropean Patent No. 2 021 389 was granted on the basis of 10 claims, claim 1 reading as follows:

"1. A slip- and leveling agent **characterized in that** it comprises a copolymer which is obtainable by copolymerizing
A at least one unit of a fluorinated oxetane polymer functionalized with an unsaturated dicarboxylic acid;
B at least one terminal reactive polysiloxane unit;
C at least one alkyl(meth)acrylate unit or cycloalkyl(meth)acrylate unit and/or (meth)acrylic acid and/or other units originating from vinylic compounds that can form radicals."

II. A notice of opposition was filed in which revocation of the patent in its entirety was requested.

III. During opposition proceedings, the following documents inter alia were cited:
D1: EP-A2-0 783 023
D3: US-A1-2004 0048957
D4: US-B2-6 710 127
D5: WO-A1-03/033603
D6: US-A1-2004 0236007
D7: WO-A1-2006 125731
D8: WO-A1-01 48051
D14: EP-A2-0 588 534
D17: János Hajas "*Easy-Clean" Effect by Using Silicone/ Acrylate Copolymers*, Smart Coatings 2005, Orlando, Florida, USA, 16.-18. February 2005, Conference Papers, Eastern Michigan University, Coatings Research Institute (12 pages)

D18: Product information "POLYFOX 636" OMNOVA Solutions Inc., 23 November 2004 (4 pages)
D19: Product information OMNOVA Solutions Inc. for POLYFOX (4 pages)
D20: POLYFOX presentation, OMNOVA Solutions Inc. (64 pages)
D21: Umweltbundesamt "Per und polyfluorierte Chemikalien / Einträge vermeiden - Umwelt schützen"
D22: Chemistry and Technology of Surfactants, Edited by Richard J. Farn, 2006, pages 231-235
D25: Definition from Römpp, 1998, pages 528 and 602

IV. The decision of the opposition division to reject the opposition was announced at the oral proceedings on 6 March 2013.

The opposition division found that the claimed subject matter was sufficiently disclosed in the patent in suit because the skilled person knew from his general knowledge how to differentiate slip- and leveling agents from other additives and the patent in suit provided sufficient guidance to prepare these. Also, the opponent had merely alleged and not proven that the claimed subject matter could not be performed over the whole scope of the claims. The opposition division found that claims 1 to 10 were novel over D7 because fluorinated oxetane polymers were not disclosed in D7. D4 did not disclose component A) according to claim 1. Starting from D4 as the closest prior art, the technical problem was to provide an alternative slip- and leveling agent. None of D3, D14 or D17 provided a hint towards component A) so that the claimed subject matter was inventive. D22, which had been filed late, was not more relevant than the evidence already on file, so that it was not admitted into the procedure. Document D3 disclosed copolymers which were so

different from those in the patent that it could not constitute the closest prior art.

V. The opponent (appellant) lodged an appeal against that decision. With the statement setting out the grounds of appeal the appellant requested that the decision of the opposition division be set aside and the patent be revoked.

VI. In its reply to the statement of grounds of appeal, the respondent requested that the appeal be dismissed.

VII. With letter of 13 May 2015, the appellant additionally requested to admit document D22, that had not been admitted by the opposition division, into the procedure.

VIII. With letter of 26 August 2016 the respondent filed a first auxiliary request. With letter of 26 September 2016 the respondent filed an experimental report describing a rework of some of the examples of D4.

IX. With letter of 15 December 2015 the parties were summoned to oral proceedings.

X. In a communication sent in preparation of the oral proceedings, the Board summarised the points to be dealt with, and provided a preliminary view on the disputed issues. The Board also pointed out that no argument for the admittance of D22 into the procedure had been filed by the appellant.

XI. Oral proceedings were held on 25 November 2016 in the absence of the appellant as communicated by telephone on the same day.

XII. The arguments provided in writing by the appellant, as far as relevant to the present decision, can be summarised as follows:

Sufficiency of disclosure

The wording "slip- and leveling agent" in claims 1 to 6 did not limit the claimed subject matter. There was no accepted and reliable definition in the art for these terms so that the skilled person did not know what was encompassed by the claims. Also, claim 1 was defined by a product by process. The patent in suit did however not disclose the conditions under which the process had to be carried out to obtain the claimed polymers. The examples gave a single, very specific, guidance but that could not be generalized to all the polymers claimed. That problem was made worse by the fact that the components A), B) and C) were defined in a functional way that did not characterize them clearly and prevented the skilled reader from knowing how the components had been produced. The claims of the patent in suit therefore lacked sufficiency of disclosure.
It could not be derived from claim 2 or its corresponding passage in the description whether the amounts defined in the ranges added up to 100% or not. Claim 2 also lacked sufficiency of disclosure.

Novelty

D7 disclosed slip- and leveling agents according to claim 1 of the patent in suit. D7 disclosed as component A) perfluoroester of an unsaturated carboxylic acid for which the ester groups could be formed of polymers from fluoroalcohols. As the product of the polymerization of fluorinated 1,3-propanediol

could not be distinguished from the product of the polymerisation of fluorinated oxetane, component A) of D7 fell under the definition of A) provided in claim 1. The claimed subject matter therefore lacked novelty.

Inventive step

D1, D3 or D4 were relevant as closest prior art documents as these documents all disclosed slip- and leveling agents. The patent in suit did not provide a technical effect for the use of fluorinated oxetane polymers in slip- and leveling agents. The technical problem solved starting from any of D1, D3 or D4 was the provision of alternative slip- and leveling agents. Starting from D4 more specifically, the differences with the claimed subject matter were a) the use of polyfluoro oxetane instead of perfluoralkyl polymers and b) the functionalization of the fluoropolymers with an unsaturated dicarboxylic acid instead of with derivatives of acrylic acid. The use of fluorinated polyoxetanes as slip- and leveling agents was however known to the skilled person from D3, D18 to D20 and D22. The use of fluorinated oxetane polymers already known in the art to provide alternative slip- and leveling agents was therefore not inventive. Also, the functionalization of component A) with unsaturated dicarboxylic acids was not shown to provide any technical effect and was known to the skilled reader from D6. The claims therefore lacked an inventive step.

XIII. The arguments of the respondent, as far as relevant to the present decision, can be summarised as follows:

Sufficiency of disclosure

The definition of slip- and leveling agents was well known in the art, as exemplified by D4. There was therefore no lack of clarity or lack of sufficiency of the claims as a result of the use of that wording in the claims. The use of product-by-process features to characterize a claimed product was allowed by the case law of the Boards of Appeal and was not problematic in the present case. The functional definitions of the components in claim 1 were all known to the skilled reader. The appellant did not provide evidence that the preparation of the components implied an undue burden. The claims were therefore sufficiently disclosed.

Novelty

D7 did not disclose the use of fluorinated oxetane units, nor of fluorinated 1,3-propane diol units to prepare the component corresponding to A) of the patent in suit. As a result, the claimed subject matter was novel over D7.

Inventive step

D8 was the document representing the closest prior art as it dealt with both functions of a split- and leveling agent. Starting from D4 as closest prior art, the difference was that D4 neither disclosed a terpolymer nor the simultaneous use of fluorinated and polysiloxane side chains on macromonomers. There was no hint in D4 towards the use of macromonomers with

fluorinated and polysiloxane side chains. D3 did not disclose a fluorinated polyoxetane that had been functionalized by an unsaturated dicarboxylic acid. Even if D19 and D20 disclosed the component Polyfox as surfactant, they did not suggest that it could be used as part of a polymer in a slip- and leveling agent composition. Concerning the functionalization with an unsaturated dicarboxylic acid, D6 did not disclose a polymer structure that resembled the one claimed. For these reasons the claims were inventive in view of D4. In addition, the additional examples provided in appeal made it possible to compare the claimed slip- and leveling agents with the compositions of examples 14 and 17 of D4. This additional evidence showed that the claimed slip- and leveling agents provided improved crater resistance, coefficient of friction and foam properties.

Admittance of D22

The opposition division did not admit the late filed document D22 into the procedure. The appellant did not provide any argument in appeal as to why D22 should now be admitted. D22 should therefore not be admitted into the appeal procedure.

XIV. The appellant requested in writing that the decision under appeal be set aside and that the patent be revoked. The appellant had further requested that document D22 be admitted to the proceedings.

XV. The respondent requested that the appeal be dismissed or alternatively that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the first auxiliary request filed with the letter of 26 August 2016. The respondent further

requested that the experimental report filed with the letter of 26 September 2016 be admitted to the proceedings, and that document D22 not be admitted to the proceedings.

Reasons for the Decision

Admittance of document D22

1. Document D22 was not admitted into the procedure by the opposition division, as it was late-filed and it was not more relevant than the evidence already available. In appeal proceedings the appellant requested that the document be admitted, but did not provide any reason why this should be the case. In particular no suggestion was made that it was more relevant than the document already on file. On the contrary D22 was always cited together with documents D18 to D20 with no separate arguments as to its relevance. Under such circumstances, the Board sees no reason to overturn the decision of the opposition division and finds it appropriate to make use of its power under Article 12(4) RPBA by not admitting D22 into the proceedings.

Main request

2. Sufficiency of disclosure

2.1 Slip- and leveling agent

2.1.1 Granted claim 1 pertains to a slip- and leveling agent. The objection of the appellant relates to a lack of a definition of that term in the patent and to the lack of an accepted and reliable definition in the art. This

amounts to an objection of lack of clarity and is understood by the Board as implying that in the opinion of the appellant such a term has such a fundamental lack of clarity that it also results in a lack of sufficiency.

2.1.2 The description mentions on several occasions slip- and leveling agents in the context of the patent in suit, as well as a number of prior art references showing that the term slip- and leveling agent is usual in that art. For instance, paragraph 2 discloses that the use of organically modified polysiloxanes of the type claimed in the patent in suit as slip and leveling enhancing additives in the coatings and graphic arts industries was known since decades. Further references to the existence of slip- and leveling agents in patent prior art documents are provided in paragraphs 4 to 6, among which the documents US 6 710 127, WO 03 033 603, US 2004 236 007 and WO 2006 125 731 corresponding to D4, D5, D6 and D7 of the present procedure are cited. Though none of these documents actually provides a definition of a slip- or leveling agent, they nonetheless show that these agents were generically known to the skilled reader well before the priority date of the patent in suit and that the term was commonly used.

2.1.3 Also, D25, an extract from the Römpp technical dictionary dating back to 1998, provides definitions in German for both types of additives "Slippadditive" (page 528) and "Verlaufsmittel" (page 602) which are translated as respectively slip agent and leveling agent in English in D25 itself. According to D25, slip agents are defined as reducing the scratch sensitivity of films (measured by friction) while leveling agents provide anti-cratering properties, low

surface tensions and reduce orange peel. These definitions correspond to those provided in the patent in suit. Indeed, the slip- and leveling agents are characterized in paragraph 12 of the patent in suit as providing "a low coefficient of friction, excellent slip, complete wetting of the substrate" and helping "to prevent the formation of craters and pin-holes, to provide a smooth and/or equal leveling of the paint film without orange peel leading to improved aesthetics of the dry film". Also, the examples 2-4 of the patent in suit disclose the preparation of slip- and leveling agents according to claim 1 and show that substrates containing these agents possess anti-cratering properties, low coefficient of friction and low surface tension.

2.1.4 The definition of the slip and leveling agents given in the patent in suit as well as the properties reported in the examples are in agreement with those already known to the skilled reader from technical dictionaries as well as from patent documents. Under these circumstances, it cannot be concluded that the use of the terms "slip- and leveling agent" in the claims of the main request lacks clarity, let alone has such a fundamental lack of clarity to result in a lack of sufficiency of disclosure.

2.2 Product-by-process claim, definition of the components

2.2.1 The patent in suit pertains to a slip- and leveling agent characterized in that it comprises a copolymer which is obtainable by copolymerizing three component units A), B) and C) as defined in claim 1. Claim 1 of the patent in suit is drafted as a product-by-process claim. Such a claim is not objectionable under lack of sufficiency of disclosure merely because the conditions

of its preparation are not explicitly disclosed in the patent in suit. The relevant question is whether the skilled person found sufficient guidance in the patent in suit and in his common technical knowledge to prepare the claimed product. To answer that question, the skilled person would first turn to the description and the examples of the patent in suit.

2.2.2 The fluorinated oxetane polymers A) that can be used to prepare the slip- and leveling agents according to claim 1 are disclosed by way of a generic formula (Formula I) in paragraph 14. The components A) are further defined by way of preferences of pending groups (R_3, R_4, R and R_f) and chain length (R_1, R_2, x and n). References to the preparation process of document US 5 650 483 or to a commercially available series of products is also provided (paragraph 16). The description therefore provides guidance as to component A) in the form of a generic definition as well as a preparation process and specific commercially available compounds. The terminal reactive polysiloxane compounds B) are disclosed in paragraphs 22 to 26. Examples of readily available commercial products (paragraph 24) as well as their method of preparation (paragraph 25) from known reactants (paragraphs 25 and 26) are given. As to the vinylic compounds C), they are disclosed in paragraph 27 by a long list of individual members. In accordance with these definitions the description specifies that the monomers employed are said to be generally commercially available and/or "may be prepared readily according to methods familiar to those skilled in the art" (paragraph 38). In view of the information contained in the description of the patent in suit and summarized above and in the absence of evidence of the contrary, the argument of the appellant that the description of the components A) to C) was

insufficiently disclosed must therefore fail.

2.2.3 The appellant argued that the patent in suit did not provide a guidance as to the conditions under which the preparation of the claimed compositions shall take place which were critical to the polymer structure, like the temperature, pressure and polymerization medium. The structure of the copolymer is however not a requirement defined in granted claim 1. As a result, it cannot be sustained that additional guidance was necessary in order to obtain a specific polymer structure. The patent in suit discloses that in principle the copolymer according to the invention may be prepared in any way, e.g. by a thermal radical, controlled radical, anionic or cationic polymerisation technique, "of which the skilled professional will know how to employ them" (paragraph 37). Its molecular weight (paragraph 33), polydispersity (paragraph 34) and type (paragraphs 28 and 35) are also disclosed in the description. In order to provide leveling, it is disclosed that the monomers C) are copolymerized with monomers A) and B), e.g. using thermal random solution polymerisation or using controlled polymerisation (paragraph 39). The description does not mention the degree of fluorination nor the degree of polymerization of the claimed copolymers. It has however not been shown by the appellant how that would prevent a skilled person from obtaining the claimed copolymers. The Board therefore concludes that it has not been shown that the description lacks sufficient guidance as to the preparation of the claimed copolymer.

2.2.4 The appellant alleged that critical reaction conditions were missing from the description. It was however not shown in how far these conditions were critical to the preparation of the claimed copolymers and no evidence

was provided showing which critical information was missing that did also not belong to the common knowledge of the skilled person of that art. Examples 2 to 4, which are according to granted claim 1, disclose the claimed copolymers and describe the reaction conditions of the copolymerization. The preparation of the components A) to C) from commercially available monomers is disclosed in the experimental section (Intermediates A to C). The reaction of components A) to C) is disclosed in paragraph 50. Therein, a specific guidance is found concerning the reaction conditions of the copolymerization (xylene as a reaction medium, reactor under nitrogen atmosphere and heated to reflux at a temperature of 140 °C, reaction time of 3 hours). Also, it can be derived from the use of a radical initiator (di-tert-butyl peroxide) that the type of polymerization used was a radical polymerization. A comparison with the reaction conditions of the preparation processes disclosed in the prior art documents D4 (Example 1), D6 (Example 1) and D7 (preparation page 15) establishes that the reaction conditions of the preparation process of the copolymers disclosed in the examples of the patent in suit are fairly common in radical copolymerization. Having regard to the information provided in the patent in suit and the information available in the prior art, and in the absence of evidence that the skilled person could not perform a similar process using his general knowledge, the Board cannot conclude that critical guidance necessary to claim 1 is missing to the skilled person.

2.3 Relative quantities

2.3.1 In claim 2 of the main request, the subject matter of claim 1 is further characterized in that the weight amounts of the components A) to C) constituting the slip- and leveling agent are defined by numerical ranges, i.e. 0.1-10 wt% of A), 1-20 wt% of B) and 50-99 wt% of C). Neither the claims nor the description disclose that the amounts of the components A) to C) in claim 2 have to add up to 100%. The appellant argued that the claimed subject matter was not reproducible since the maximum amounts of the components A) to C) do not add up to 100% but their sum can go from 51.2 wt% to 129 wt%. It was however not shown how that was a problem of sufficiency of disclosure. The amounts in claim 2 refer to relative amounts of the monomers during copolymerization. Should the three monomers A) to C) be used alone, the total relative amount of the components present according to claim 2 can never exceed 100 wt% as a matter of common sense. Should claim 2 also encompass the presence of other species present during copolymerization, like the solvent and the initiator as is the case in the examples of the patent in suit, values within the ranges of claim 2 should be taken so as to allow the presence of additional components. In both cases it cannot be understood how this may result in a lack of sufficiency.

2.4 The description therefore not only contains general guidance about the preparation of slip- and leveling agents according to granted claim 1, but it also reveals that the components are largely commercially available and establishes that the preparation pathways are generally known to the skilled person. The Board is

therefore convinced that in view of that disclosure and in the absence of any facts or evidence establishing serious doubts the claimed subject matter of the main request is sufficiently disclosed.

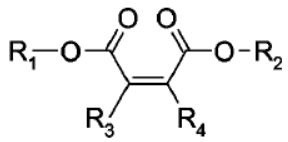
3. Novelty

3.1 The slip- and leveling agent of granted claim 1 is defined as a product by process and therefore, the question to be answered for establishing novelty is whether the product under consideration is distinguishable from known products, in the present case from the products of D7 by means of the process features.

3.2 D7 concerns a slip- and leveling agent characterized in that it comprises a copolymer which is obtained by copolymerizing A) at least one unit of a mono- or di perfluoroester of an unsaturated dicarboxylic-acid; B) at least one terminal reactive polysiloxane unit; C) at least one alkyl(meth)acrylate unit or cycloalkyl(meth)acrylate unit and/or (meth)acrylic acid and/or other units originating from vinylic compounds that can form radicals (claim 1).

3.3 In particular, it was contended by the appellant that D7 disclosed fluorinated 1,3-propanediol monomeric units that once polymerized would lead to polymers having the same polymer backbone as polymers produced from fluorinated oxetane monomeric units and be therefore not distinguishable from component A) according to claim 1. In order to decide whether the argument is correct, the first question to be answered is then whether D7 discloses fluorinated 1,3-propanediol monomeric units.

3.4 The passage on page 3, line 8 to page 4 line 2 as well as claim 3 were cited by the appellant in support of his argument that D7 discloses a component formed from fluorinated 1,3-propanediol monomeric units that falls under the definition given for component A) "at least one unit of a fluorinated oxetane polymer functionalized with an unsaturated dicarboxylic acid" in granted claim 1. In the passages of D7 mentioned by the appellant, perfluoroesters of unsaturated dicarboxylic-acids are disclosed as mono- or diesters of fluoroalcohols or mixtures of fluoroalcohols represented by formula I,



(Formula I)

wherein R_1 is a moiety selected from the group consisting of C_nF_{2n+1}-$(CH_2)_m$-, AC_nF_{2n}-$(CH_2)_m$-, C_nF_{2n+1}-$(CH_2)_m$-$(OCH_2CHR^5)_p$-, AC_nF_{2n}-$(CH_2)_m$-$(OCH_2CHR^5)_p$, C_nF_{2n+1}-$(CH_2)_m$-X-, AC_nF_{2n}-$(CH_2)_m$-X-, AC_nF_{2n}-$(CH_2)_m$-$(OCH_2CHR^5)_p$-X or C_nF_{2n+1}-$(CH_2)_m$-$(OCH_2CHR^5)_p$-X-; wherein A is selected from the group consisting of H, Cl, Br, I, C_{1-12} alkyls and OC_{1-12} alkyls, wherein $4 \leq n \leq 20$, $0 \leq m \leq 4$ and $0 \leq p \leq 20$, wherein X is a spacer moiety selected from the group consisting of esters, amides, sulphonamides, mercapto groups, polyurethane groups and alkyl groups, R_2 is selected from the group consisting of H, metal moieties, (alkyl)ammonium moieties, alkyl groups, C_nF_{2n+1}-$(CH_2)_m$-, AC_nF_{2n}-$(CH_2)_m$-, C_nF_{2n+1}-$(CH_2)_m$-$(OCH_2CHR^5)_p$-, AC_nF_{2n}-$(CH_2)_m$-(OCH_2CHR^5)p, C_nF_{2n+1}-$(CH_2)_m$-X-, AC_nF_{2n}-$(CH_2)_m$-X-, AC_nF_{2n}-$(CH_2)_m$-$(OCH_2$-$CHR^5)_p$-X and C_nF_{2n+1}-$(CH_2)_m$-$(OCH_2CHR^5)_p$-X-; wherein A is selected from the group consisting of H, Cl, Br, I, C_{1-12} alkyls and OC_{1-12} alkyls, wherein $4 \leq n \leq 20$, $0 \leq m \leq 4$ and $0 \leq p \leq 20$, wherein X is a spacer moiety selected from the group

consisting of esters, amides, sulphonamides, mercapto groups, polyurethane groups and alkyl groups, R^3 and R^4 are independently selected from the group consisting of H, alkyl-groups and phenyl-groups and wherein R^5 is selected from the group consisting of H and methyl groups.

3.5 It results from the formula I of D7 disclosed above that the fluorinated monomeric unit derived from 1,3-propanediol should correspond to the groups R^1 or R^2 as defined above. However, none of the chemical formula listed for these groups discloses a chain of three carbon atoms substituted by an oxygen on the first and third carbon atom of that chain. In particular, the group C_nF_{2n+1}-$(CH_2)_m$-$(OCH_2CHR^5)_p$- given for both R^1 and R^2 above corresponds at most to a compound having a 1,2-propanediol moiety when R^5 is chosen to be methyl but not to a 1,3-propanediol moiety. As a result, it cannot be concluded that D7 discloses a polymer obtained from the polymerization of a fluorinated 1,3-propanediol that could correspond to component A) of granted claim 1. D7 does therefore not disclose a slip- and leveling agent falling under the scope of claim 1. Claim 1 of the main request is novel over D7.

4. Inventive step

4.1 The patent in suit discloses slip- and leveling agents having anti-cratering performance, low coefficient of friction and foam control (paragraph 9 and examples). These agents may be used in a dispersion comprising a pigment (paragraph 42).

4.2 Closest prior art

4.2.1 In its contested decision, the opposition division found that D4 was the document representing the closest prior art. D3 was found so remote to the polymers of the patent in suit that it could not be considered to represent the closest prior art. The appellant mentioned in the statement of grounds of appeal that D1 or D3 could also be seen as closest prior art. The appellant did however not provide arguments as to why D1 or D3 were more relevant than D4 as closest prior art document.

4.2.2 D4 discloses leveling agents for surface coatings (column 1, lines 10-15). D4 addresses the anti-cratering performance (column 12, line 40) and the reduction of the surface tension (column 3, lines 19-22) of the copolymers produced. In particular, D4 discloses branched polymers comprising a free-radically or ionically polymerized base molecule into which monoethylenically unsaturated macromonomeric units have been incorporated by copolymerization as leveling agents for surface coating (column 1, line 66 to column 2, line 4). The general preparation of the copolymers of D4 is disclosed in the examples. Therein, one or two macromonomers having a terminal methacryloyl group are reacted with acrylate monomers by radical polymerization. Among the macromonomers having a terminal methacryloyl group, D4 discloses acrylate macromonomers (Macromonomers 2 to 15, column 7) and polydimethylsiloxanes macromonomers (Macromonomers 18 to 20, column 8). The polydimethylsiloxanes macromonomers correspond to the component B) of granted claim 1. Examples 11 and 13 disclose the copolymerization of one of these polydimethylsiloxanes

macromonomers with an acrylate macromonomer and further acrylate monomers or styrene monomers which correspond to component C) of granted claim 1.

4.2.3 D1 relates to polymeric dispersants for aqueous ink compositions showing excellent stability, print characteristics, water-fastness, light-fastness, optical density, and in-use maintenance characteristics (page 3, lines 45-50). The problem addressed in D1 is therefore remote to that disclosed in the patent in suit. Also, although the copolymers disclosed in D1 (page 3, lines 27-35) are close to those of the patent in suit, they are not closer than those disclosed in D4. D1 is therefore not more relevant than D4 as closest prior art.

4.2.4 D3 discloses polymeric surfactants derived from cyclic monomers having pendant fluorinated carbon groups and among others fluorinated oxetanes (paragraphs 15 and 16). The polymers according to D3 are said to provide an effective wetting, flow and leveling while producing little foam (paragraph 2). The copolymers produced in D3 are fluorinated short carbon atom side chain containing polymers that may also contain units derived from cyclic ethers, acrylic monomers, vinylic monomers, polyester, polyurethane, polyamide forming monomers and siloxane monomers (paragraph 70). D3 does not disclose a copolymer wherein the fluorinated oxetane component A) is reacted with two further units of the type of B) and C) as claimed in the main request. D3 is therefore not more relevant than D4 as closest prior art.

4.2.5 In view of this, the Board sees no reason to depart from the choice of document D4 as the closest prior art in accordance with the decision of the opposition

division.

4.3 Technical problem

4.3.1 D4 does not disclose the presence of a macromonomer based on fluorinated oxetane polymer functionalized with an unsaturated dicarboxylic acid (see analysis above). The product of claim 1 therefore differs from the ones of D4 in the presence in the copolymer of component A).

4.3.2 It was not disputed by the parties that the patent in suit did not contain comparative examples relating to the compositions of D4. While comparative examples were filed by the respondent at a late stage of the proceedings (see point VIII), in view of the conclusion reached in the absence of these examples, it is not necessary for the Board to decide on their admittance, nor to evaluate their content.

4.3.3 In view of the examples provided in the patent in suit, in particular examples 2-4, it is made plausible that the claimed composition comprising fluorinated polyoxetanes functionalized with unsaturated dicarboxylic acid as component A) in the claimed slip- and leveling agents provide anti-cratering properties (Table in paragraph 54). No proof to the contrary has been provided by the appellant, nor has this conclusion been contested. As a result, the problem solved over D4 is the provision of alternative slip- and leveling agents possessing anti-cratering properties.

4.4 Obviousness

4.4.1 The question that remains to be answered is whether D4 or other prior art documents suggest the use of the

component A) according to granted claim 1 in the compositions known from D4 in order to solve the posed problem.

4.4.2 D4 discloses that it is further advantageous to copolymerize perfluoroalkyl acrylates and perfluoroalkyl methacrylates having from 6 to 20 carbon atoms into the macromonomeric units to reduce the surface tension of the branched polymers (column 4, lines 11-15). D4 does therefore not suggest the incorporation of fluorinated polyoxetanes but rather perfluoroalkyl (meth)acrylates as a further component of the copolymer. Also, even if the passage in column 6, lines 8 to 13 of D4 discloses that a reactive double bond and acid function may be incorporated by reacting the produced branched polymer or macromonomer with maleic anhydride, it does not suggest to incorporate a fluorinated polymer, let alone a polymer derived from fluorinated polyoxetanes. For these reasons, D4 alone does not provide a hint towards the use of a component A) as in granted claim 1.

4.4.3 The appellant pointed at the disclosure of polyfluoro oxetanes in paragraphs 12, 13, 36, 37, 41, 70 and 71 of D3. These passages disclose that fluorinated oxetanes can be polymerized (paragraphs 36 to 41) and be subsequently reacted with other polymers and/or curing agents to form a copolymer (paragraph 70). These passages however do not disclose the functionalization of the fluorinated polyoxetane with an unsaturated dicarboxylic acid, as required for the component A) of granted claim 1, nor their suitability to solve the posed problem. D3 can therefore not lead to the claimed subject matter.

4.4.4 D6 discloses a process for leveling or anti-cratering in a liquid resin system by adding a fluorinated polymer functionalized with an unsaturated dicarboxylic acid. The fluorinated unit from which the polymer is made in D6 is disclosed in paragraphs 10 to 14. A fluorinated oxetane is not disclosed in D6, nor a polymer derived therefrom. D6 can therefore not suggest the use of component A) of granted claim 1.

4.4.5 The appellant also pointed at D18-D20 which are all datasheets pertaining to the fluorinated polyoxetanes PolyFox, or D21 relating to the use of per- and polyfluorinated chemicals. None of these documents however disclose fluorinated polyoxetanes functionalized with unsaturated dicarboxylic acid as in claim 1, nor their suitability to solve the posed problem. These documents can therefore not provide a hint towards the use of component A) in the compositions of the closest prior art.

4.4.6 It can be concluded from the above that the appellant did not show that the use of fluorinated polyoxetanes functionalized with unsaturated dicarboxylic acid was suggested in the documents D3, D6, D8, D18-D21. The use of component A) in the compositions known from the prior art D4 to provide slip- and leveling agent is therefore not obvious. The granted claims are therefore inventive over the cited prior art.

5. As none of the objections of the appellant succeeds, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

N. Schneider D. Semino

Decision electronically authenticated