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**Datasheet for the decision  
of 29 June 2012**

**Case Number:** T 0731/11 - 3.3.03

**Application Number:** 03815251.8

**Publication Number:** 1578865

**IPC:** C08L 31/00

**Language of the proceedings:** EN

**Title of invention:**  
Polymerizable composite materials

**Applicant:**  
Pulpdent Corporation

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 123(2), 56

**Keyword:**  
"Amendments - added subject matter (main Request: yes; first  
auxiliary request: no)"  
"Novelty - yes (first auxiliary request)"  
"Inventive step - yes (first auxiliary request)"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 0731/11 - 3.3.03

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.03  
of 29 June 2012

**Appellant:**  
(Applicant)

Pulpdent Corporation  
80 Oakland Avenue  
P.O. Box 780 Watertown  
MA 02471-0780 (US)

**Representative:**

Rupprecht, Kay  
Meissner, Bolte & Partner GbR Postfach 86 06 24  
81633 München (DE)

**Decision under appeal:**

**Decision of the Examining Division of the  
European Patent Office posted 19 October 2010  
refusing the application 03815251.8.**

**Composition of the Board:**

**Chairman:** B. ter Laan  
**Members:** D. Marquis  
C. Vallet

## Summary of Facts and Submissions

- I. The appeal lies from the decision of the examining division dated 19 October 2010 to refuse European patent application number 03 815 251.8, originating from international application PCT/US2003/041523 having an international filing date of 31 December 2003 and published as WO 2004/063274.
- II. The application as originally filed contained 14 claims, claims 1, 3 and 14 reading as follows:
1. A polymerizable composite material comprising:
    - at least one multifunctional acid containing monomer having a concentration ranging from about 10% to about 85% by weight;
    - a non-reactive filler having a concentration ranging from about 1% to about 80% by weight;
    - a polymerization system having a concentration ranging from about 1.5% to about 15% by weight; and
    - water having a concentration ranging from about 0.1% to about 25% by weight.
  3. The polymerizable composite material of claim 1 further comprising a non-acid co-monomer having a concentration ranging from about 5% to about 80% by weight.
  14. A method of making a polymerizable composite material comprising:
    - providing at least one multifunctional acid containing monomer having a concentration ranging from about 10% to about 85% by weight;
    - adding a non-reactive filler having a concentration ranging from about 1% to about 80% by weight;
    - adding a polymerization system having a concentration ranging from about 1.5% to about 15% by weight; and
    - adding water having a concentration ranging from about 0.1% to about 25% by weight.

Claims 2, 5, 6 and 10 were dependent on claim 1, claim 4 on claim 4 (sic), claim 7 on claim 6, claims 8 and 9 on claim 7 and claim 11 on claim 10. Claim 12 was a further independent claim, on which claim 13 depended.

- III. The decision of the examining division was based on a single set of claims filed by the applicant on 10 June 2008 which contained thirteen claims, of which claims 1, 11 and 13 were independent. In its decision, the examining division was silent on the allowability of the amendments, but found that claim 1 lacked an inventive step in view of the closest prior art document D2 (EP-A-0 356 868). The objective problem underlying the invention was to provide an alternative composite polymer material. It was found that the solution to that problem, a composition comprising a higher amount of an acrylate with fewer functional groups per molecule than the acrylate known from D2, was obvious in view of D2 combined with the common general knowledge of the person skilled in the art.
- IV. On 21 December 2010, the applicant filed an appeal and the prescribed appeal fee was paid on the same day. The statement containing the grounds of appeal was filed on 28 February 2011.
- V. In a notification dispatched on 07 March 2012, the Board raised *ex officio* an objection under Article 123(2) EPC against claims 2 to 10 and an objection of lack of clarity (Article 84 EPC) against claims 1 to 13.
- VI. By letter dated 30 April 2012, the applicant submitted a new main request as well as four auxiliary requests.

During the oral proceedings held on 29 June 2012, the appellant filed nine auxiliary requests replacing the auxiliary requests filed on 30 April 2012.

The main request contained thirteen claims, claim 1 reading:

1. A polymerizable composite material comprising:  
at least one multifunctional acid containing monomer having a concentration ranging from 10% to 85% by weight;  
a nonacid co-monomer having a concentration ranging from 5% to 80% by weight;  
a non-reactive filler having a concentration ranging from 1% to 80% by weight;  
a polymerization system having a concentration ranging from 1.5% to 15% by weight; and  
water having a concentration ranging from 0.1% to 25% by weight.

The first auxiliary request contained two claims:

1. A polymerizable composite material comprising:  
at least one multifunctional <sup>acidic</sup> ~~acid containing~~ monomer having a concentration ranging from 10% to 85% by weight;  
a nonacid co-monomer having a concentration ranging from 5% to 80% by weight;  
a non-reactive filler having a concentration ranging from 1% to 80% by weight;  
a polymerization system having a concentration ranging from 1.5% to 15% by weight; and  
water having a concentration ranging from 0.1% to 25% by weight.
- used in restorative dental applications*

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13.

used in restorative dental applications

A method of making a polymerizable composite material comprising:  
 providing at least one multifunctional ~~acid-containing~~ <sup>acidic</sup> monomer having a concentration ranging from 10% to 85% by weight; < >  
 adding a non-reactive filler having a concentration ranging from 1% to 80% by weight;  
 adding a polymerization system having a concentration ranging from 1.5% to 15% by weight; and  
 adding water having a concentration ranging from 0.1 % to 25 % by weight.

<and a nonacid co-monomer having a concentration ranging from 5% to 80% by weight>

VII. Auxiliary requests 2 to 9 are not relevant for the present decision.

VIII. The arguments provided by the appellant can be summarised as follows:

*Main request*

Claim 1 was based on original claim 3. The combination of features resulting from the dependencies of claims 2 to 10 was supported by the original description as a whole. In particular, claim 2 found a support in the list of comonomers of paragraphs [0029] and [0031] of the description and the examples. Furthermore, features taken from different dependent claims could be combined with one another even if these claims did not depend upon each other, because a feature present in a dependent claim was meant to represent a preferred embodiment. Therefore the person skilled in the art would not be confronted with new information that was not originally disclosed.

*First auxiliary request*

(a) Amendments

The limitations introduced in claim 1 found support in originally filed paragraphs [0001] and [0027] of the application as filed. Claim 2 was amended accordingly and was adapted to the formulation of claim 1.

(b) Inventive step

Document D2 was the closest prior art. The compositions of D2 did not contain water and the concentration of acidic monomer was limited to 2 to 3%, outside the range now claimed. The technical problem solved by the compositions of present claim 1 was to provide an improved composition especially in view of compressive strength and adhesive strength described in table 1. Starting from D2, a person skilled in the art would not have arrived at the solution proposed in claim 1.

IX. The appellant requested that the appealed decision be set aside and that a patent be granted on the basis of the main request filed on 30 April 2012 or, alternatively, one of auxiliary requests 1 to 9 filed during the oral proceedings on 29 June 2012.

X. At the end of the oral proceedings, the chairman announced the Board's decision.

## Reasons for the Decision

1. The appeal is admissible.
  
2. *Main request*
  - 2.1 Article 123(2) EPC
    - 2.1.1 Claim 1 of the main request is based on claim 3 as originally filed. The dependent claims have been renumbered accordingly but their wording has not changed. Since original claims 2 to 6 (except original claim 4) and original claim 10 all depended on claim 1 only and did not depend upon each other - in particular not on original claim 3 - the combination of features now claimed in the main request, based on original claim 3, was never disclosed as such in the original claims.
  
    - 2.1.2 The application as originally filed contains general references to the features of original claims 2 to 10, but it does not contain an explicit and unambiguous disclosure of their multiple combinations with one another, nor is the combination of the subject-matter of original claim 3 with the subject-matter of the other claims clearly suggested. Thus, the list of non-acid comonomers of paragraph [0029] does not suggest any combination of non-acid comonomers with any other individualized component of the composite material. In particular, there is no disclosure of combinations of non-acid comonomers with bis-2(methacryloxy)ethyl phosphate as the acidic monomer (present claim 2), with silica or radiopaque glass as specific filler (present claim 4), with camphorquinone as photoinitiator



(present claim 7) or ionic compounds (present claim 9), especially not in the concentration range now specified.

2.1.3 The examples 1, 2, 8, 10A and 13 of Table 1, which are according to claim 1, disclose compositions comprising specific combinations of bis-2(methacryloxy)ethyl phosphate as the acidic comonomer with several non-acid comonomers, an accelerator, water, sodium fluoride, submicron and micron glass. These examples disclose multiple combinations of individualized compounds falling under claims 2, 3, 4, 5 and 9 all at once. These specific embodiments may at most suggest combinations of all these features together, however they do not support combinations of any two of them taken independently as now claimed. In other words, the specific combinations found in the examples cannot be generalized to support the amended claims according to the main request.

2.1.4 In summary, neither the original claim structure nor the presentation of the individual features disclosed in the description and examples as originally filed supports the specific combinations now claimed in the main request.

2.1.5 The content of the application as originally filed is not a reservoir from which it is possible to pick and choose individually disclosed features and create new combinations, if there is no support for such combinations (See Decision T 872/01, pt 2.2.3). Even when reading the original application as a whole, the combinations now being claimed are not clearly and unambiguously derivable as it is nowhere suggested that those features could be combined with one another or

were particularly preferred in the combinations now being claimed. Hence, the main request does not meet the requirements of Article 123(2) EPC.

3. *Auxiliary request 1*

3.1 Auxiliary request 1 was filed during oral proceedings in response to objections under Article 123(2) EPC and Article 84 EPC raised by the Board in its communication in preparation of the oral proceedings against the claims underlying the appealed decision and pursued by the applicant in appeal. The Board considers that the amendments carried out in auxiliary request 1 overcome those objections and do not raise further issues which cannot be dealt with without adjournment of the oral proceedings. Therefore, the Board makes use of its discretionary power and admits auxiliary request 1 into the proceedings (Article 13(1) and (3) of the Rules of Procedure of the Boards of Appeal of the EPO).

3.2 Article 123(2) EPC

Auxiliary request 1 contains two claims. Claim 1 corresponds to claim 1 as originally filed in which it is further specified that the composite material is "*useful in restorative dental applications*", as originally disclosed in paragraph [0001] of the description, and in which the wording "*multifunctional acid containing monomer*" is amended to "*multifunctional acidic monomer*", which is based on paragraph [0027] of the original description. Claim 2 corresponds to original method claim 14 and has been adapted to match the wording of claim 1.

As auxiliary request 1 does not contain any dependent claims, the problems of the main request in that respect are no longer present. Auxiliary request 1 therefore complies with Article 123(2) EPC.

3.3 The Board considers the claims of auxiliary request 1 to be clear so that the requirements of Article 84 EPC are also fulfilled.

3.4 Novelty

3.4.1 D1 (US 6,245,872) discloses (claim 1) a method for the adhesive securing of dental filling materials, comprising the steps of applying to a hard tooth substance an unpolymerized mixture consisting essentially of i) 10 to 90 parts by weight of at least one singly or repeatedly ethylenically unsaturated phosphoric acid ester, ii) 5 to 85 parts by weight of a solvent, iii) 0.01 to 5 parts by weight of an initiator which can form free radicals, and iv) 0 to 10 parts by weight of customary auxiliaries and additives; and coating the applied mixture with a polymerizable filling material immediately after the application of the mixture to the hard tooth substance.

D1 does not disclose the presence of a non-reactive filler and a non-acid comonomer as required in claim 1 of auxiliary request 1.

3.4.2 D2 (EP-A-0 356 868) discloses a dental composition which when it is used as a base or liner, will comprise by weight about 30-80% resin monomers, 15-70% inorganic fillers, about 0-10% fluoride salts, 0.05-2.0% photo-

initiator, 0-2.0% reducing agent and optionally 0.1-1.0% stabilizers (page 3, lines 39 to 41).

In D2, neither the presence of water, nor of 10% to 85% by weight of a multifunctional acidic monomer is disclosed.

3.4.3 Therefore, the claimed subject-matter is novel (Article 54 EPC).

3.5 Inventive step

3.5.1 The closest prior art

The application relates to polymerizable composite materials, in particular for dental applications.

Such materials are also described in D2, which discloses a method of treating a tooth with adhesive dental cavity basing compositions.

The examining division and the appellant considered that D2 is the closest prior art. The Board sees no reason to deviate from that point of view.

3.5.2 The technical problem

According to the application, the composite materials seal and protect a tooth while providing strength (paragraphs [0008] and [0011]). In accordance, values of compressive strength and interfacial bond strength to composite are indicated in Table 1. Starting from the closest prior art D2, the appellant formulated the technical problem as to provide improved compositions

in terms of compressive strength and bond strength to other composite materials.

### 3.5.3 Solution of the technical problem

The solution proposed to solve the technical problem defined above is to incorporate 10 to 85% by weight of a multifunctional acidic monomer together with 0.1 to 25% by weight of water in the claimed restorative dental compositions.

### 3.5.4 Success of the solution

The examples 1, 2, 8, 10A and 13 on pages 8 to 10 and Table 1 show that the polymerizable composite materials now claimed can effectively be used in restorative dental applications such as tooth sealing or glazing and have good compressive strength and interfacial bonding.

The data of Table 1 show that the compressive strength of the claimed polymerized materials of above 150 MPa (about 20000 psi) is similar to that reported for the materials of Tables I and II of D2 (about 19000 to 21000 psi). The application does however not provide a direct comparison of the compressive strength of the claimed materials and those disclosed in the closest prior art D2, so that an improvement of the compressive strength over D2 cannot be acknowledged for the present composite materials.

As for the bond strength, the application documents do not provide any evidence showing improved adhesion properties of the compositions according to auxiliary

request 1. Therefore, no improvement over claim 1 of D2 has been established.

In view of the above, the Board concludes that the technical problem defined by the appellant has to be reformulated in a less ambitious way. Starting from the closest prior art D2, the problem that is derivable from the application in suit can only be seen as to provide further polymerizable composite materials that display a satisfying compressive strength and that are compatible with restorative dental applications. The data provided in the application show that that technical problem has been effectively solved.

#### 3.5.5 Obviousness

It remains to be decided whether the proposed solution to the technical problem as defined above is obvious in view of the prior art. The question to be answered is whether a skilled person, starting from the closest prior art D2, would have considered the compositions of claim 1 or method of claim 2 in order to solve the technical problem defined above.

The dental sealer or liner base compositions of D2 may comprise resin monomers, inorganic fillers, photoinitiator, an adhesion promoting composition as well as a reducing agent, fluoride salts and stabilizers (page 3, lines 39 to 41). Among the resin monomers described in D2, dipentaerythritol pentaacrylate phosphate (PENTA) is said to be preferred when good adhesion and bonding strength are sought (D2, page 3, lines 24 to 27, 42 and 43). The amount of PENTA in D2 represents between 2 and 3% by weight of the

composition (claim 5; page 3 line 46 and example 1) alongside other resin monomers, so as to provide a total of between 30 and 80 % by weight of resin monomers in the composition (page 3 line 39). PENTA is a multifunctional acidic monomer according to the definition of the application in suit (paragraph [0004]). However, D2 does not contain any suggestion or motivation to raise the amount of PENTA so as to provide 10 to 85% by weight of acidic monomer with the expectation to obtain a composition that is still compatible with a dental application and provides polymerized compositions with sufficient compressive strength.

Moreover, D2 does not hint at any multifunctional acidic monomer other than PENTA and so does not suggest a substitution of the pentafunctional monomer with a difunctional monomer in a higher concentration to preserve the amount of functionalities in the dental composition.

Furthermore, the present claims all require the presence of 0.1 to 25% by weight of water which is described in paragraph [0017] of the application as essential to activate the multifunctional acidic monomer, which is not disclosed in D2.

In D1 (column 3, lines 27 to 34), water is described as a particularly preferred solvent to dissolve both acidic monomers and initiators but it is not said to be necessary to activate the acidic groups of the multifunctional monomer. Hence, the person skilled in the art does not find in D1 a motivation to use water in polymerizable composite materials.

Therefore, a person skilled in the art, starting from D2, finds no incentive in D2 itself, in D1 or in any of the other documents on file, to arrive at the subject-matter of claim 1 in the expectation of providing further polymerizable composite materials that display a satisfying compressive strength and that are compatible with restorative dental applications. The subject-matter of claim 1 is not obvious in view of the cited prior art.

3.5.6 The arguments in respect of claim 1 also apply to claim 2 so that that, too, is found to be inventive.

3.5.7 In view of the above, the auxiliary request complies with Article 56 EPC so that a patent can be granted on that basis.

4. Since auxiliary request 1 is allowable, the other auxiliary requests need not be dealt with.



**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.
  
2. The case is remitted to the department of the first instance with the order to grant a patent on the basis of the first auxiliary request filed during the oral proceedings.

The Registrar

The Chairman

E. Görgmaier

B. ter Laan