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**D E C I S I O N**  
**of 16 June 2005**

**Case Number:** T 0809/02 - 3.3.2

**Application Number:** 95308275.7

**Publication Number:** 0712622

**IPC:** A61K 6/00

**Language of the proceedings:** EN

**Title of invention:**  
Dental composition and kit

**Patentee:**  
TOKUYAMA CORPORATION

**Opponent:**  
3M ESPE AG

**Headword:**  
Dental composition and kit/TOKUYAMA CORPORATION

**Relevant legal provisions:**  
EPC Art. 123(3), 164(1), 69, 54, 56  
Protocol on the Interpretation of Article 69 EPC

**Keyword:**

"Admissibility of late filed requests (yes): all the late filed requests were a response to previous discussions"

"Main request, first and second auxiliary requests: allowability (no). They extend the scope of protection"

"Third, fourth, fifth and sixth auxiliary requests: novelty (no). The dental adhesive kit is anticipated by the prior art"

"Seventh and eighth auxiliary requests: inventive step (no).

The objective problem is to provide alternative dental compositions to those known in the art and the solution results from an obvious combination of the prior art teachings"

**Decisions cited:**

G 0009/92, G 0002/88, T 0190/99, T 0346/96, UKHL 46

**Catchword:**

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Case Number: T 0809/02 - 3.3.2

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.2  
of 16 June 2005

**Appellant:** 3M ESPE AG  
(Opponent) Espe Platz  
D-82229 Seefeld (DE)

**Representative:** Brem, Roland  
3M ESPE AG  
Espe Platz  
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**Respondent:** TOKUYAMA CORPORATION  
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**Representative:** Hallybone, Huw George  
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London WC1A 2RA (GB)

**Decision under appeal:** Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
1 July 2002 concerning maintenance of European  
patent No. 0712622 in amended form.

**Composition of the Board:**

**Chairman:** U. Oswald  
**Members:** M. C. Ortega-Plaza  
J. H. P. Willems

## Summary of Facts and Submissions

- I. European patent application EP-0 712 622, based on application No. 95 308 275.7, was granted on the basis of 31 claims.

Independent claim 1 as granted read as follows:

"1. A dental composition which comprises (A) a phosphoric acid group-containing monomer, (B) a carboxylic acid groups-containing monomer and (C) water as main components in amounts of 0.5 to 50% by weight, 1 to 50% by weight and 5 to 90% by weight, based on the composition, respectively."

Independent claim 8 as granted read as follows:

"8. A dental composition which comprises (A) a phosphoric acid group-containing monomer, (B) a carboxylic acid groups-containing monomer, (C) water, (D) a water-soluble organic solvent, and (G) a polyfunctional monomer in amounts of 5 to 50% by weight, 1 to 50% by weight, 5 to 90% by weight, 1 to 80% by weight and 0.1 to 30% by weight, based on the composition, respectively."

Independent claim 9 as granted read as follows:

"9. A dental composition which comprises (A) a phosphoric acid group-containing monomer, (B) a carboxylic acid groups-containing monomer, (C) water, (D) a water-soluble organic solvent, and (E) an inorganic strong acid and/or a non-polymeric organic sulfonic acid as main components in amounts of 0.5 to

7% by weight, 3 to 50% by weight, 5 to 90% by weight, 1 to 80% by weight, and 0.01 to 3% by weight, based on the composition, respectively."

Independent claim 14 as granted read as follows:

"14. A dental composition which comprises (A) a phosphoric acid group-containing monomer, (B) a carboxylic acid groups-containing monomer, (C) water, (D) a water-soluble organic solvent, and (F) a sulfonic acid group-containing monomer as main components in amounts of 0.5 to 7% by weight, 3 to 50% by weight, 5 to 90% by weight, 1 to 80% by weight, and 0.01 to 12% by weight, based on the composition, respectively."

Independent claim 19 as granted read as follows:

"19. A dental adhesive kit comprising a dental primer composition which comprises (A) a phosphoric acid group-containing monomer in an amount of 5 to 50% by weight based on the primer composition and (C) water as main components and an adhesive which comprises (H) a carboxylic acid groups-containing polyfunctional monomer and (I) a polymerization initiator."

Independent claim 25 as granted read as follows:

"25. A dental adhesive kit comprising a dental primer composition which comprises (A) a phosphoric acid group-containing monomer in an amount of 5 to 50% by weight based on the primer composition and (C) water as main components and an adhesive which contains (J) a carboxylic acid groups-containing monofunctional monomer, (K) a water-soluble hydroxyl group-containing

monomer, (G) a polyfunctional monomer and (I) a polymerization initiator."

II. The following documents *inter alia* were cited during the proceedings:

- (1) EP-A-0 661 034
- (4) US-A-4 806 381
- (5) US-A-5 089 051
- (6) Reality 1993, 75, 71-83
- (8) US-A-5 264 513
- (10) C. A. Hampel, G. G. Hawley, Glossary of Chemical Terms, Van Nostrand Reinhold Company, 1976, page 51
- (11) J. Daintith, The Pan Dictionary of Chemistry, 1990, Pan Books Limited, pages 42-43
- (12) S. P. Parker, McGraw-Hill Encyclopedia of Chemistry, Inc 1983, pages 122-125

III. Opposition was filed and revocation of the patent in its entirety was requested pursuant to Article 100(a) EPC on the grounds of lack of novelty and lack of inventive step.

IV. The appeal lies from the interlocutory decision of the opposition division maintaining the patent in amended form, based on the main request (Articles 102(3) and 106(3) EPC).

V. The opposition division considered that the main request (set of claims filed with letter of 15 March 2002) met the requirements of Articles 123 and 84 EPC. In particular, it considered that the requirements of Article 123(3) EPC were met since the terms "monomer

having in one molecule at least one =P(O)OH group or a functional group which readily reacts with water to produce at least one =P(O)OH group" and "monomer having in one molecule a plurality of carboxyl groups or groups which readily react with water to produce a carboxyl group" as contained in the independent claims of the main request were not broader than the terms "phosphoric acid group-containing monomer" and "carboxylic acid groups-containing monomer" as used in the independent claims of the patent as granted.

The opposition division also considered that the requirements of Article 83 EPC were met, since to calculate the adequate proportions of water necessary for the hydrolysis of the functional groups was not an undue burden for the skilled person.

In the opposition division's opinion the subject-matter claimed in the main request was novel over the contents of documents (1), (6) and (8).

As regards inventive step, the opposition division considered document (8) as the closest prior art. The opposition division defined the problem to be solved as to increase the adhesiveness and marginal adaptability of the aqueous primer compositions disclosed in the prior art. It considered that the problem was actually solved in the light of the test results shown in the description of the patent in suit. The opposition division further considered that the proposed solution was inventive, since it was not obvious to combine the teaching of document (8) with that of document (5). The reason was that document (5) related, in the opposition division's view, to non-aqueous systems. Moreover, the

- opposition division further stated that the effects achieved by the claimed compositions, concerning the adhesiveness and marginal adaptability, were not to be expected by the skilled person.
- VI. The appellant lodged an appeal against said decision and filed grounds of appeal.
- VII. The respondent (patentee) contested the appeal, brought arguments in support of its position and filed a main request and two auxiliary requests.
- VIII. A board's communication was sent as an annex to the invitation for oral proceedings, in which the board expressed the preliminary opinion that the set of claims of the main request and first and second auxiliary requests contravened the requirements of Article 123(3) EPC.
- IX. The respondent filed three further auxiliary requests with its letter of 16 May 2005. It also filed corrected versions of the fourth and fifth auxiliary requests with its letter of 13 June 2005 and requested that the set of claims as granted be its sixth auxiliary request.
- X. Oral proceedings were held before the board on 16 June 2005.

During the oral proceedings, the respondent confirmed that the sets of claims filed with the letter of 2 May 2003 represented its main request and first and second auxiliary requests.



The respondent also confirmed during the oral proceedings that its third auxiliary request was that filed with the letter of 16 May 2005 and its fourth and fifth auxiliary requests were those "corrected" fourth and fifth auxiliary requests filed with the letter of 13 June 2005. Its sixth auxiliary request was the set of claims as granted.

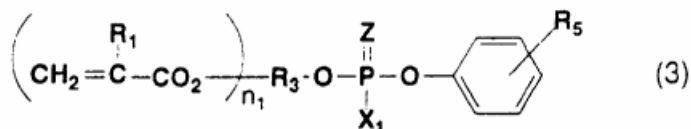
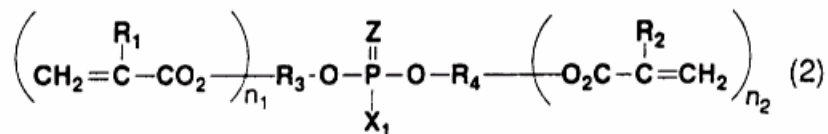
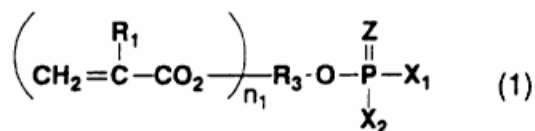
Additionally, it filed during the oral proceedings two sets of claims as auxiliary requests 7 and 8.

Claim 1 of the main request read as follows:

"1. A dental composition which comprises (A) a monomer which is a phosphoric acid ester having in one molecule at least one =P(O)OH group or a functional group which readily reacts with water to produce at least one =P(O)OH group, and a polymerizable unsaturated group; (B) a monomer having in one molecule a plurality of carboxyl groups or groups which readily react with water to produce a carboxyl group, and at least one polymerizable unsaturated group; and (C) water as main components in amounts of 0.5 to 50% by weight, 1 to 50% by weight and 5 to 90% by weight, based on the composition, respectively."

Claim 1 of the first auxiliary request read as follows:

"1. A dental composition which comprises (A) a phosphoric acid group containing monomer selected from the group consisting of:



wherein each of R<sub>1</sub> and R<sub>2</sub> is independently hydrogen atom or a methyl group, each of R<sub>3</sub> and R<sub>4</sub> is independently an organic group having a valence of 2 to 6 and 1 to 30 carbon atoms, which may have an ether linkage and/or an ester linkage, R<sub>5</sub> is hydrogen atom, an alkyl group having 1 to 5 carbon atoms or an alkoxy group having 1 to 5 carbon atoms, Z is oxygen atom, each of X<sub>1</sub> and X<sub>2</sub> is independently selected from the group consisting of hydroxyl group, a mercapto group and a halogen atom, and n<sub>1</sub> and n<sub>2</sub> are each an integer of 1 to 5, (B) a monomer having in one molecule a plurality of carboxyl groups or groups which readily react with water to produce a carboxyl group, and at least one polymerizable unsaturated group and being selected from the group consisting of acid anhydrides and acid halides, and (C) water as main components in amounts of 0.5 to 50% by weight, 1 to 50% by weight and 5 to 90% by weight, based on the composition, respectively."

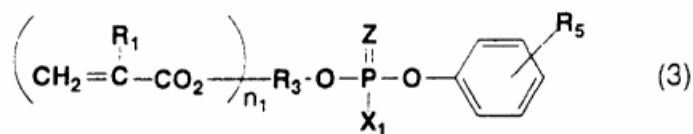
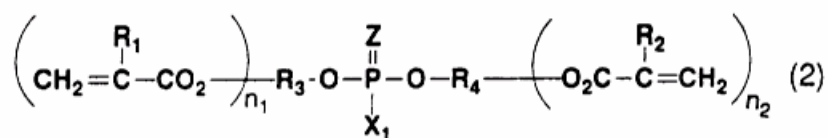
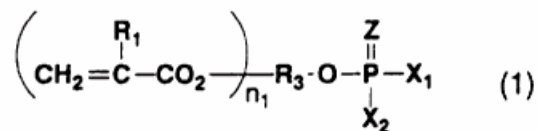
Independent claim 8 of the first auxiliary request read as follows:

"8. A dental composition which comprises (A) a monomer which is a phosphoric acid ester having in one molecule

at least one =P(O)OH group or a functional group which readily reacts with water to produce at least one =P(O)OH group, and a polymerizable unsaturated group; (B) a monomer having in one molecule a plurality of carboxyl groups or groups which readily react with water to produce a carboxyl group, and at least one polymerizable unsaturated group, (C) water, (D) a water-soluble organic solvent, and (G) a monomer having a plurality of polymerizable unsaturated groups in amounts of 5 to 50% by weight, 1 to 50% by weight, 5 to 90% by weight, 1 to 80% by weight and 0.1 to 30% by weight, based on the composition, respectively."

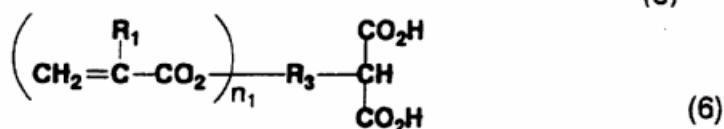
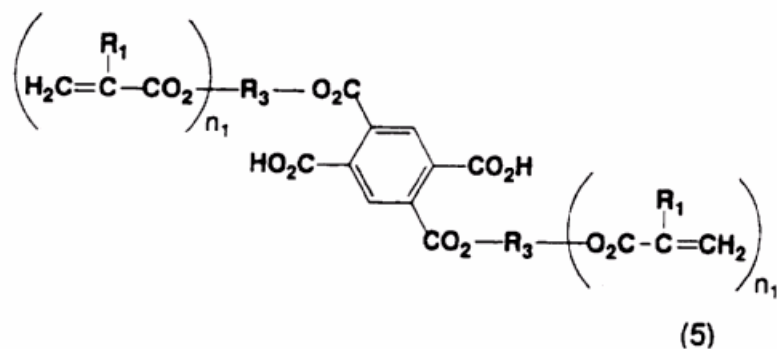
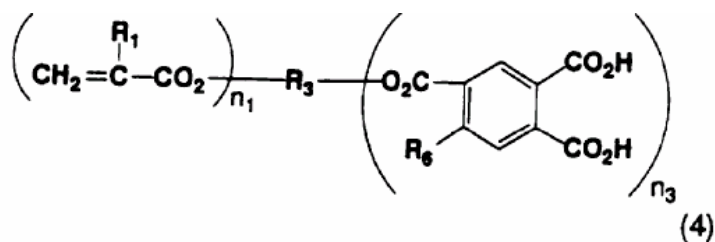
Claim 1 of the second auxiliary request read as follows:

"1. A dental composition which comprises (A) a phosphoric acid group containing monomer selected from the group consisting of:



wherein each of R<sub>1</sub> and R<sub>2</sub> is independently hydrogen atom or a methyl group, each of R<sub>3</sub> and R<sub>4</sub> is independently an organic group having a valence of 2 to 6 and 1 to 30 carbon atoms, which may have an ether linkage and/or an ester linkage, R<sub>5</sub> is hydrogen atom, an alkyl group having 1 to 5 carbon atoms or an alkoxy group having 1

to 5 carbon atoms, Z is oxygen atom, each of X<sub>1</sub> and X<sub>2</sub> is independently selected from the group consisting of hydroxyl group, a mercapto group and a halogen atom, and n<sub>1</sub> and n<sub>2</sub> are each an integer of 1 to 5, (B) a carboxylic acid groups containing monomer selected from the group consisting of



wherein R<sub>1</sub> is hydrogen atom or a methyl group, R<sub>3</sub> is an organic group having a valence of 2 to 6 and 1 to 30 carbon atoms, which may have an ether linkage and/or an ester linkage, R<sub>6</sub> is hydrogen or a carboxyl group, n<sub>1</sub> is an integer of 1 to 5, and n<sub>3</sub> is 1 or 2, acid anhydrides thereof and acid halides thereof, and (C) water as main components in amounts of 0.5 to 50% by weight, 1 to 50% by weight and 5 to 90% by weight, based on the composition, respectively."

Independent claim 8 of the second auxiliary request is identical to independent claim 8 of the first auxiliary request.

Claim 1 of the third auxiliary request read as follows:

"1. A dental composition which comprises (A) a monomer which is a phosphoric acid ester having in one molecule at least one =P(O)OH group and a polymerizable unsaturated group; (B) a monomer having in one molecule a plurality of carboxyl groups and at least one polymerizable unsaturated group; and (C) water as main components in amounts of 0.5 to 50% by weight, 1 to 50% by weight and 5 to 90% by weight, based on the composition, respectively."

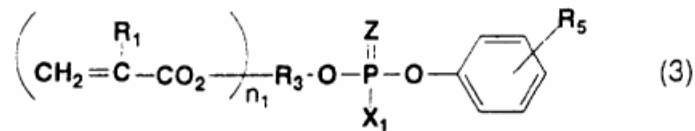
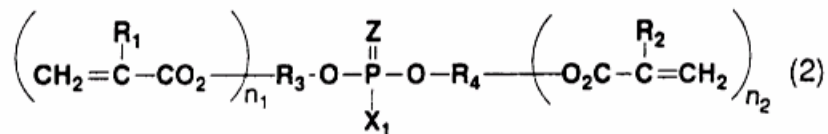
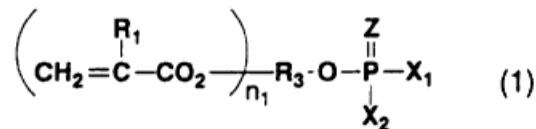
Independent claim 25 of the third auxiliary request read as follows:

"25. A dental adhesive kit comprising a dental primer composition which comprises (A) a monomer which is a phosphoric acid ester having in one molecule at least one =P(O)OH group and a polymerizable unsaturated group in an amount of 5 to 50% by weight based on the primer composition, (D) a water-soluble organic solvent, and (C) water as main components, and an adhesive which contains (J) a monomer having in one molecule a plurality of carboxyl groups and one polymerizable unsaturated group, (K) a water-soluble hydroxyl group-containing monomer, (G) a monomer having a plurality of polymerizable unsaturated groups, and (I) a polymerization initiator."

Claim 1 of the corrected fourth auxiliary request differs from claim 1 of the first auxiliary request in that "X<sub>1</sub> and X<sub>2</sub> is a hydroxyl group" and that the following expressions have been deleted from the definition of (B) "or groups which readily react with water to produce a carboxyl group" and "and being selected from the group consisting of acid anhydrides and acid halides".

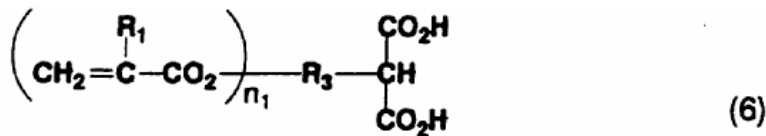
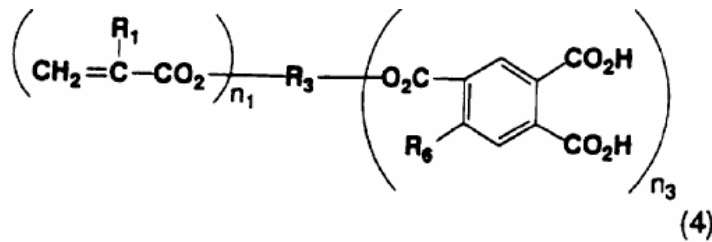
Independent claim 25 of the corrected fourth auxiliary request read as follows:

"25. A dental adhesive kit comprising a dental primer composition which comprises (A) a phosphoric acid group containing monomer selected from the group consisting of:



wherein each of R<sub>1</sub> and R<sub>2</sub> is independently hydrogen atom or a methyl group, each of R<sub>3</sub> and R<sub>4</sub> is independently an organic group having a valence of 2 to 6 and 1 to 30 carbon atoms, which may have an ether linkage and/or an ester linkage, R<sub>5</sub> is hydrogen atom, an alkyl group having 1 to 5 carbon atoms or an alkoxy group having 1 to 5 carbon atoms, Z is oxygen atom, each of X<sub>1</sub> and X<sub>2</sub>

is a hydroxyl group, and  $n_1$  and  $n_2$  are each an integer of 1 to 5 in an amount of 5 to 50% by weight based on the primer composition, (D) a water-soluble organic solvent, and (C) water as main components, and an adhesive which contains (J) a carboxylic acid groups containing monomer selected from the group consisting of:



wherein  $R_1$  is hydrogen atom or a methyl group,  $R_3$  is an organic group having a valence of 2 to 6 and 1 to 30 carbon atoms, which may have an ether linkage and/or an ester linkage,  $R_6$  is hydrogen or a carboxyl group,  $n_1$  is an integer of 1, and  $n_3$  is 1 or 2, (K) a water-soluble hydroxyl group-containing monomer, (G) a monomer having a plurality of polymerizable unsaturated groups, and (I) a polymerization initiator."

Claim 1 of the corrected fifth auxiliary request differs from claim 1 of the second auxiliary request in that " $X_1$  and  $X_2$  is a hydroxyl group".

Claim 25 of the corrected fifth auxiliary request is identical to claim 25 of the corrected fourth auxiliary request.

The set of claims of the seventh auxiliary request differs from the set of claims of the third auxiliary request in that claims 19-30 have been deleted. Hence, claim 1 of the seventh auxiliary request is identical to claim 1 of the third auxiliary request.

Claim 1 of the eighth auxiliary request differs from claim 1 of the seventh auxiliary request in that the amount of water is "20 to 80% by weight" instead of "5 to 90% by weight".

XI. The appellant did not contest the admissibility of the third to fifth auxiliary requests. However, it contested the admissibility of the sixth auxiliary request, ie the set of claims as granted. It argued that, since the opponent was the only appellant, the patentee should not be allowed to come back with the set of claims as granted. The appellant stated that the patentee should defend its patent on the basis of the amended version as maintained by the opposition division and cited decision G 9/92, OJ EPO 1994, 875.

With respect to the admissibility of the auxiliary requests filed during the oral proceedings, the appellant stated that the seventh auxiliary request should not be admitted into the proceedings since it only served to delay them. The appellant contested the admissibility of the eighth auxiliary request since it contained four independent product claims of different scope and cited Rule 29 EPC.



With respect to claim 1 of the main request, the appellant stated that it did not meet the requirements of Article 123(3) EPC and made reference to its grounds of appeal and the board's communication sent as an annex to the invitation to oral proceedings. It cited point 3.3 of decision G 2/88, OJ EPO 1990, 93, in order to support its view that it was not necessary to consider the national laws of the contracting states in relation to infringement when deciding on the admissibility of an amendment to the claims under Article 123(3) EPC.

The appellant further stated that the patent in suit was the result of a so-called "direct grant": this would explain that the claims as granted did not encompass all the illustrative examples of the invention. The patentee had tried to compensate that error during the opposition proceedings.

The expressions employed in claim 1 as granted for the components (A) and (B) were not supplemented in the amended claim 1 of the main request, but they were completely replaced by other expressions from the description. These new expressions were not identically reproduced from the description but were partly modified. Decision T 190/99 of 6 March 2001, cited by the respondent, merely pointed out that the claims should be read by the person skilled in the art who should avoid interpretations which were illogical or without technical sense. The claims as granted in the patent in suit were clear and had a technically meaningful sense. The claims as granted did not encompass all the meanings introduced in amended claim 1 for (A) and (B).

The appellant further stated that the above analysis applied *mutatis mutandis* to the sets of claims of the first and second auxiliary requests.

With respect to the third auxiliary request the appellant stated that it did not meet the requirements of Rule 29 EPC since it contained an excessive number of independent product claims. Furthermore, the appellant stated that the third auxiliary request contravened Article 123(3) EPC since the expression "carboxyl group" encompassed a carboxylic acid group but also its derivatives.

The appellant raised an objection of lack of novelty against the subject-matter of claim 25, since example 3 of document 8 was novelty-destroying. Contrary to the respondent's allegations, the adhesives according to the contested patent contained the filler as shown by paragraph [0127]. In the appellant's view, this objection applied to the sets of claims of the fourth, fifth and sixth auxiliary requests.

The appellant also contested the novelty of claim 1 of the third and seventh auxiliary requests *vis-à-vis* Optibond, disclosed in document (6), since the compound mono(2-metacryloxy ethyl) phthalate (PAMM) contained three carboxyl groups.

As regards the inventive step issue in relation to claim 1 of the third and seventh auxiliary requests the appellant considered document (8) as the closest prior art. Document (8) did not disclose specifically the

combination of (A) and (B) in the same primer composition.

The appellant defined the problem as providing dental compositions with improved adhesive strength and marginal adaptability. The question was whether this problem had indeed been solved by the claimed invention.

The appellant referred to the respondent's letter of 2 May 2003 from which it was, in its opinion, clear that the presence of component (G) was necessary. Apart from that, the appellant stated that the solution relating to the combination of components (A) and (B) was obvious in the light of document (8), column 5, lines 15-17.

Furthermore, the skilled person would have been aware of document (5) which discloses the combination of phosphoric acid monomers and carboxylic acid monomers for improving the bonding strength and avoiding peripheral fissures (column 3, lines 41-46).

The appellant stated that this inventive step analysis made for the seventh auxiliary request also applied to the eighth auxiliary request. Furthermore, the compositions of document (8) had already the adequate water contents. The question to be raised was whether it had been shown that the combination of (A) and (B) led to some unexpected effect. In the appellant's opinion, this was not the case. The patent in suit taught that enamel requires an adhesive strength of 17 MPa or more and dentin requires an adhesive strength of 15 MPa or more (paragraph [152]). Therefore, when considering the standard deviation of the values shown

in Table 2, there was a substantial overlap between the comparative examples and the examples according to the contested patent. It cited comparative example 4 and examples 8 and 10 in Table 2.

If the problem to be solved lay in the provision of alternative compositions to those known, the skilled person would have considered the teaching of document (5) since ethanol contains some water amounts. The skilled person will always try to provide for less expensive systems and hence would contemplate reducing the amount of organic solvent by increasing the water contents. It was common in the technical field to use water/alcohol mixtures (document (8), column 7, lines 58-59).

Finally, the appellant stressed that the compositions exemplified in document (8) contained 40% water and 60% 2-HEMA and the compositions claimed in the seventh and eighth auxiliary requests contained 5 to 90% and 20 to 80% water respectively. The dental compositions claimed in the contested patent also encompassed compositions where a water-soluble organic solvent such as ethanol or 2-HEMA could be present in higher amounts than water. This was confirmed by the contents of the description (page 19, paragraphs [0033] to [0038]). Therefore, the dental compositions claimed in the eighth auxiliary request were not an "aqueous system" but a system of water miscible solvents with high water contents.

XII. The respondent's arguments relating to the admissibility of the requests filed with the letters of 16 May 2005 and 13 June 2005 were as follows: the third to fifth auxiliary requests were filed in direct

response to the comments made by the board in the communication sent as an annex to the invitation for oral proceedings. The amendments were made in good faith in case the board maintained its preliminary opinion in relation to Article 123(3) EPC. The corrected fourth and fifth auxiliary requests merely related to the correction of some inconsistencies in the previously filed fourth and fifth auxiliary requests. The sixth auxiliary request, which related to the set of claims as granted, was filed in view of the board's comments on Article 123(3) EPC with respect to the main request. The main request was identical to the set of claims on which basis the patent was maintained by the opposition division. If there was a contravention of Article 123(3) EPC, then no *reformatio in peius* had taken place since the amended claims were considered to be broader.

The respondent's arguments with respect to the admissibility of the sets of claims filed during the oral proceedings may be summarised as follows: the seventh auxiliary request addressed the lack of novelty objection raised by the appellant during the oral proceedings. This request allowed the board to take a decision on the inventive step issue. The eighth auxiliary request addressed the comments made by the board during the oral proceedings in respect of the amounts of water present. Moreover, Rule 29 EPC did not apply since the independent claims were already present in the patent as granted.

As regards the requirements of Article 123(3) EPC, the respondent referred to the decision of the UK House of Lords, *Kirin-Amgen & others*, [2004] UKHL 46 of

21 October 2004. In the respondent's opinion, this decision was highly relevant to the manner in which the UK courts interpreted the scope of protection afforded by a patent and in particular provided a commentary on the Protocol to Article 69 EPC. It cited especially sections 32, 33 and 47 of the said UK decision.

The respondent further referred to Article 69 EPC and the Protocol on the Interpretation of Article 69 EPC which, by virtue of Article 164(1) EPC, formed part of the European Patent Convention.

The issues to be decided, in the respondent's view, were the interpretation of the claims and the extent of protection. The respondent cited decisions T 190/99 of 6 March 2001 and T 346/96 of 29 October 1998.

The respondent stated that decision G 2/88, cited by the appellant, merely stressed the difference between the extent of protection conferred and the rights conferred by the patent.

The respondent stated that a proper interpretation of the terms in the claims as granted must parallel the specific features of the description. The amended wording did not make a difference to the scope of protection in terms of Article 69 EPC since it was taken verbatim from the description. The claims as granted encompassed the hydrolysable derivatives since they were to be interpreted in the light of the description. The respondent cited in particular paragraphs [12] and [23] of the patent in suit and some of the specific groups depicted on pages 6, 7, 10, 12, 14, 15 and 17. Moreover, some of the dependent claims

of the granted version related to hydrolysable derivatives of phosphoric acid.

In view of the above reasons the respondent stated that neither the claims of the main request nor the claims of the first and second auxiliary requests contained extended subject-matter.

With respect to the third auxiliary request, the respondent stated that the provisions of Rule 29 EPC did not apply in the opposition appeal proceedings since the same number of independent product claims was already present in the patent as granted. Furthermore, the third auxiliary request did not contravene Article 123(3) EPC since the expression "carboxyl group" meant the group -COOH, as shown by documents (10) to (12). This interpretation was also in line with the contents of the description of the patent in suit. The derivatives of the carboxylic acid were not included.

The subject-matter of claim 25 related to a dental adhesive kit which had to have two or more bits to be put together to have a certain function. In the particular case, the separate parts were the primer and the adhesive. They were different from the cement resin. The primer composition of document (8) was added to a second part which was a cement composition and not an adhesive composition.

The respondent further stressed that in view of the clear and standard definition of the term "carboxyl group" the composition Optibond which contained the compound PAMM (one carboxyl group and two ester groups)

did not fall within claim 1 of the third and seventh auxiliary requests.

With respect to the requirements of Article 56 EPC, the respondent stated that the subject-matter of claim 1 of the third and seventh auxiliary requests involved an inventive step.

Document (8) was identified by the respondent as the closest prior art. The problem to be solved related to the increase in the adhesive strength to dentin and enamel and to the increase of the marginal adaptability in **aqueous** dental compositions (emphasis added by the respondent).

In the respondent's opinion, it was necessary to define the solvent in the problem to be solved in order to avoid taking a hindsight view and reconstruct the invention from the prior art.

The respondent also stated that document (8) did not disclose a combination of components (A) and (B) and referred to Table 1 and examples 1 to 3. The monomers 4-AET (4-acryloxyethyl trimellitic acid) and BMEPA were used separately in document (8). Moreover, document (8) did not suggest combining them. The statement in column 5 cited by the appellant was one of a general nature and did not point to the specific combination of components (A) and (B) of the contested claims, since document (8) taught that the compositions had to contain a compound having a hydroxy group and a polymerizable group.



The respondent stated that water was absolutely necessary since it served for decalcification of the tooth; if the water content was below 5% by weight then the adhesive strength to enamel was too poor. It referred to paragraph [32] of the patent in suit. Therefore, there was no reason why the skilled person would have been encouraged to look at document (5) which related to wholly organic solvent compositions without water being present. Therefore the teaching concerning the combination of the monomers (A) and (B) in the compositions of document (5) could not have been translated into aqueous compositions.

The respondent pointed to the test results shown in the description of the patent in suit in order to demonstrate that the problem was actually solved. In particular, it cited Table 2, example 8 and comparative example 1 and Table 7, example 65 and comparative example 22.

The respondent stated that although compositions containing the lowest water content of 5% had not been tested, the tests shown in Table 2 related to water contents going from 22 to 55%, and it cited again the paragraph [32] of the patent in suit.

The respondent stated that the inventive step analysis it previously made for the subject-matter of the seventh auxiliary request also applied mutatis mutandis to the subject-matter of the eighth auxiliary request. Furthermore, the respondent stressed that the skilled person would not have contemplated the teaching of document (5), since the presence of water was very significant for the adhesiveness of the dental

compositions. There was no teaching in document (5) about the possible effect of adding water to the dental compositions.

Additionally, the respondent pointed out that the experimental data in the patent in suit clearly demonstrated that the compositions having water amounts within the range claimed in amended claim 1 of the eighth auxiliary request showed an improved effect. In particular, it cited Table 2, examples 3, 4 and 5 with water contents 44, 22 and 70% and comparative example 7 with 80% ethanol and 2% water.

The respondent acknowledged that the comparative examples present in the patent in suit were not strictly comparable to the prior art due to some variations in the components and their amounts but they gave valuable information about the effect of water in the compositions and the improvements achieved by the claimed compositions in respect of the adhesive strength and marginal adaptability.

The respondent stated that it was difficult to show a direct comparison with an example of document (8) in view of the presence of 2-HEMA in an amount of 60%. However, the tests using the compound PM2 (bis(2-methacryloyloxyethyl)hydrogen phosphate) could be taken for the comparison since this compound was the same as BMEPA, used in the compositions of document (8). The respondent cited example 9 and comparative examples 1 and 2 in Table 2 of the patent in suit.

The respondent also stated that its own comments in the letter of 2 May 2003 should not be taken out of context

since they were meant to demonstrate that there was no dependency between adhesive strength and marginal adaptability.

The respondent alleged that the skilled person would not have considered the results shown in comparative example 4 for drawing his conclusions since the results of this particular experiment showed a high standard deviation.

The respondent further added that document (8) taught to use water in the dental compositions and that there was no objective reason for the skilled person to look for the ethanol compositions of document (5) when looking for an improvement.

The respondent also stated that the alternative linked to the combination of (A) and (B) in an aqueous medium was inventive since there was no incentive for the skilled person to combine the teachings of documents (8) and (5).

The respondent expressed some concerns about the framework of the present opposition appeal proceedings since, in its opinion, it should not go beyond the revision of the first-instance decision and the appellant's requests.

XIII. The appellant (opponent) requested that the decision under appeal be set aside and that European patent No. 0 712 622 be revoked.

The respondent (patentee) requested that the appeal be dismissed and that the patent be maintained on the

basis of the set of claims of the main request filed with the letter of 2 May 2003, or, alternatively, on the basis of the sets of claims of the first or second auxiliary requests, filed with said letter, or further alternatively, on the basis of the sets of claims of the third auxiliary request filed with the letter of 16 May 2005, or on the basis of the corrected fourth or fifth auxiliary requests filed with the letter of 13 June 2005. More alternatively the respondent requested to maintain the patent as granted (sixth auxiliary request by letter of 13 June 2005) or on the basis of the sets of claims filed as seventh or eighth auxiliary requests during the oral proceedings.

### **Reasons for the decision**

1. The appeal is admissible.
2. *Admissibility of the late-filed auxiliary requests*
  - 2.1 The appellant did not contest the admissibility of the third to fifth auxiliary requests. The board also sees no reason to contest their admissibility since they were a direct response to the comments made in the board's communication sent as an annex to the invitation to the oral proceedings.
  - 2.2 The appellant had raised an objection pursuant to Article 123(3) EPC in relation to the set of claims of the main request (identical to the set of claims which served as a basis for the decision of the opposition division maintaining the patent in amended form). This objection was pursued by the board in the board's

communication mentioned above. Therefore, the sixth auxiliary request was made as a direct and clear response to this objection. The respondent is allowed to defend its patent as granted since such request does not create a situation of *reformatio in peius* for the appellant in view of the alleged broadening of the claims by the main request.

The appellant cited decision G 9/92 which indeed sets the limits for the admissibility of the requests by a respondent (patentee) in that they should not go beyond the appellant's (opponent's) requests and cause it a disadvantage. However, there can be no disadvantage in filing claims which are narrower than the claims maintained by the opposition division.

Consequently, the set of claims of the sixth auxiliary request is admissible.

2.3 With respect to the sets of claims filed during the oral proceedings, the following has been considered:

The seventh auxiliary request was filed as a direct response to the objection of lack of novelty against the subject-matter of claim 25, raised for the first time by the appellant during the oral proceedings. The amendments merely concerned the deletion of the claims relating to a dental adhesive kit and therefore they were clear and simple.

The eighth auxiliary request was filed as a direct response to the discussion about inventive step during the oral proceedings. Apart from the deletion of the claims concerning an adhesive kit, the amendment

introduced in the independent claims of the eighth auxiliary request was clear and simple, namely the restriction of the definition for the water contents of the compositions.

Consequently both sets of claims of the seventh and eighth auxiliary requests are admissible.

3. *Main request, first and second auxiliary requests*

3.1 Independent claims 1 and 8 as granted related to dental compositions comprising as component (B) "a carboxylic acid groups-containing monomer". Claim 1 of the main request and claim 8 of the first and second auxiliary requests relate to dental compositions comprising as component (B) "a monomer having in one molecule a plurality of carboxyl groups or **groups which readily react with water to produce a carboxyl group**, and at least one polymerizable unsaturated group" (emphasis added).

3.2 Therefore, it has to be investigated whether the amendment mentioned above **extends the protection conferred** within the meaning of Article 123(3) EPC.

3.3 Article 69(1) EPC specifies that "The extent of protection conferred by a European patent or a European patent application shall be determined by the terms of the claims. Nevertheless, the description and drawings shall be used to interpret the claims."

In this context, the respondent cited the Protocol on the Interpretation of Article 69 EPC, which forms an

integral part of the European Patent Convention by virtue of Article 164(1) EPC.

The Protocol on the Interpretation of Article 69 EPC stipulates that:

"Article 69 should not be interpreted in the sense that the extent of protection conferred by a European patent is to be understood as that defined by the strict, literal meaning of the wording used in the claims, the description and drawings being employed only for the purpose of resolving an ambiguity found in the claims. Neither should it be interpreted in the sense that the claims serve only as a guideline and that the actual protection conferred may extend to what, from a consideration of the description and drawings by a person skilled in the art, the patentee has contemplated. On the contrary, it is to be interpreted as defining a position between these extremes which combines a fair protection for the patentee with a reasonable degree of certainty for third parties."

- 3.4 The wording and terminology of claims 1 and 8 as granted are clear and technically meaningful for the skilled person. In particular, the person skilled in the art in the light of its general knowledge (cf. documents (10) to (12)) and its knowledge in the technical field of the contested patent (cf. document (4), column 2, lines 38 and 39, and column 3, lines 18-22) would consider that the expression "carboxylic acid groups" used in the claims as granted did not encompass carboxylic acid derivatives. Hence, the component (B) has necessarily, according to claims 1 and 8 of the set of claims as granted, to bear in its structural

framework carboxyl groups -COOH. Monomers which are reactive carboxylic acid derivatives but do not bear carboxyl groups -COOH are excluded from the wording of claims 1 and 8 as granted.

- 3.5 If the skilled person goes beyond the technically meaningful (although literal) reading of the claims stated in point 3.4 above and considers the contents of the description, it faces the following definition:  
"The carboxylic acid groups-containing monomer (B) of the present invention is a monomer having in one molecule a plurality of carboxyl groups **or groups which readily react with water to produce a carboxyl group, such as acid anhydrides or acid halides** and at least one polymerizable unsaturated group." (emphasis added) (paragraph [23], page 11)

An overview of the preferred examples of the carboxylic acid groups containing monomer disclosed on pages 12-18 shows some anhydrides and acid chlorides as the only reactive carboxylic acid derivatives depicted.

- 3.6 The board is convinced that the expression "such as acid anhydrides or acid halides" implicitly limits the scope of the relative functional expression "which readily react with water to produce a carboxyl group". Indeed, those carboxylic acid derivatives which "readily" hydrolyse but are not as water labile as acid anhydrides or acid halides are excluded from the contents of the description. An example can be some esters which readily hydrolyse into acid like some tert.-butyl esters.



Therefore, since amended claim 1 of the main request and claim 8 of the first and second auxiliary requests did not take over the complete definition given in the description, but left open the relative meaning of "readily react with water to produce a carboxyl group", they encompass possibilities going beyond the disclosure in the description for the "carboxylic acid groups-containing monomer (B)".

3.7 Accordingly, even when considering, for the respondent's benefit, the Protocol on the Interpretation of Article 69 EPC for interpreting the extent of protection conferred by the granted claims within the meaning of Article 69 EPC, the board comes to the conclusion that claim 1 of the main request and claim 8 of the first and second auxiliary requests extend the protection conferred by the granted claims (Article 123(3) EPC).

3.8 In view of the above reasons, it is not necessary to discuss the board of appeal decisions or the decision of a national court cited by the respondent since they do not directly apply to the present case in view of the fact that the amended claims do not reproduce verbatim the contents of the description, but go beyond its contents.

3.9 Consequently, the sets of claims of the main request and the first and second auxiliary requests fail since they contravene the requirements of Article 123(3) EPC.

4. *Third, fourth, fifth and sixth auxiliary requests*

- 4.1 The appellant objected that the set of claims of the third auxiliary request did not meet the requirements of Rule 29 EPC because it contained too many independent claims of the same category. However, the set of claims as granted already contained six independent claims of product category and the definitions given in the claims for the technical features were of different scope. Therefore, there is no objective reason to introduce such an objection at such a late stage of the opposition appeal proceedings.
- 4.2 The amendments introduced in the claims of the third auxiliary request find their basis in the application as filed. The appellant did not contest their allowability under Article 123(2) EPC and the board sees no reason to differ.

With respect to the requirements of Article 123(3) EPC, the extent of protection for the independent claims of the third auxiliary request has not been broadened with respect to the granted version, since the expression "a monomer having in one molecule a plurality of carboxyl groups and at least one polymerizable unsaturated group" does not include more than the expression "a carboxylic acid groups-containing monomer".

The respondent has stated that, as shown by the general books (10) to (12), the carboxylic acid derivatives are not encompassed by the English expression "carboxyl group", which refers to the group -COOH (cf. also IUPAC Rule C-401.1). This is also in line with the contents of the description.

The assertion by the appellant that the English expression "carboxyl group" also encompasses acid derivatives such as esters has not been supported by any evidence. The ester derivatives are functionalised derivatives of the carboxyl group.

Therefore, the board concludes that the set of claims of the third auxiliary request meets the requirements of Article 123 EPC.

4.3 The above analysis in relation to the requirements of Article 123 EPC also applies *mutatis mutandis* to the sets of claims of the fourth and fifth auxiliary requests.

4.4 Claim 25 of the third auxiliary request relates to a dental adhesive kit comprising a **dental primer** and an **adhesive** (emphasis added).

Document (8) relates to a primer composition and its use for imparting a durable adhesive property between **dental adhesive restorative materials** such as dental resin cements or composite resins and enamel and dentin of natural teeth (paragraph bridging columns 2 and 3) (emphasis added).

The compositions disclosed in document (8) "can be used by dividing the components of the composition into two or more portions. When the components of a curing agent are composed of initiators and accelerators, for example, they can be divided into two or more portions so that they can be subjected to use after mixing." (column 8, lines 4-10).

In examples 1-5 and comparative examples 1-6 of document (8) eleven primers were prepared according to the formulation shown in Table 1 (columns 9 and 10). The primer of example 3 contains as main components: 7% of BMEPA which is bis(2-methacryloxyethyl)phosphoric acid (column 8 of document (8)) and hence falls within the definition of component (A); 2-HEMA, which is 2-hydroxyethylmethacrylate, and hence falls within the definition of component (D) (indeed it is specifically listed among the preferred water-soluble organic solvents on page 19, line 42 of the patent in suit); and water.

According to document (8) the primer is applied to the teeth and then the mixed slurry of the resin cement is cured and made to adhere to the surface of the dentin (column 9, lines 16-22). The slurry of the resin cement is made by mixing a powder component of a resin cement and a liquid component of the resin cement (column 8, lines 48-63).

The liquid component of the resin cement contains triethyleneglycol dimethacrylate, which falls within the definition of component (G); 2-hydroxyethyl methacrylate, which falls within the definition of component (K); 4-acryloxyethyl trimellitic acid, which falls within the definition of component (J) and benzoyl peroxide which is a polymerization initiator, i.e. component (I).

Therefore, document (8) anticipates the dental adhesive kit claimed in claim 25 (Article 54(1) and (2) EPC).

4.4.1 The board agrees with the respondent in that claims in the form of a "kit-of-parts" relate to two or more parts which when put or used together have a certain function (see also Case Law of the Boards of Appeal, 4th edition, 2001, I.C.5.1.3). However, in the present case, document (8) already discloses the same compositions as separate parts to be used together for the same function.

The second part of the dental adhesive kit disclosed in document (8) is the dental adhesive restorative material and it constitutes the second part of the kit-of-parts of claim 25. Moreover, document (8) discloses the powder component of the resin cement separately from the liquid component of the resin cement which indeed fulfils the function of the adhesive.

Furthermore, the appellant cited paragraph [0127] of the description of the patent in suit which states: "Preferably, a filler is further added to the adhesives of the present invention as required. It is possible to improve the mechanical strength and control the viscosity and flowability of the adhesives by adding the filler". This passage demonstrates that, contrary to the respondent's assertions, the adhesive may incorporate further components, such as the powder component of the resin cement.

4.5 The assessment made on the issue of novelty in point 4.4 above applies identically to claim 25 of the sixth auxiliary request.

Furthermore, the analysis made in point 4.4 above also applies to claim 25 of the fourth and fifth auxiliary

requests since BMEPA is encompassed by formula (2) and 4-acryloxyethyl trimellitic acid is encompassed by formula (4). This has not been disputed by the parties.

Consequently, the fourth, fifth and sixth auxiliary requests fail since the subject-matter of their claim 25 lacks novelty over the contents of document (8) (Article 54(1) and (2) EPC).

5. *Seventh and eighth auxiliary requests*

5.1 Claim 1 of the seventh auxiliary request is identical to claim 1 of the third auxiliary request. This claim meets the requirements of Article 123 EPC for the reasons stated in point 4.2 above.

Claim 1 of the eighth auxiliary request merely differs from claim 1 of the seventh auxiliary request in that the amount of water has been specified in the light of the description as originally filed (page 19, lines 26-27). Therefore, claim 1 of the eighth auxiliary request also meets the requirements of Article 123 EPC.

5.2 Document (6) has been cited by the appellant as a novelty destroying document against the subject-matter of claim 1 of the seventh auxiliary request. However the compound PAMM is not encompassed by component (B) in view of the fact that it bears only one carboxyl group. The molecule further bears two ester groups which are functionalised derivatives of carboxyl groups and hence are not encompassed by the terms of claim 1. The reasons correspond to those already stated in connection with the assessment of Article 123(3) made in point 4.2 above.

Therefore, the product Optibond disclosed on page 75 of document (6) does not fall within claim 1 of the seventh auxiliary request.

The same analysis also applies to claim 1 of the eighth auxiliary request.

Consequently, the subject-matter claimed in the sets of claims of the seventh and eighth auxiliary requests meets the requirements of novelty (Article 54(1) and (2) EPC).

5.3 As regards the assessment of inventive step (Article 56 EPC), the following has been considered:

5.3.1 Document (8) represents the closest prior art.

Document (8) discloses dental (primer) compositions comprising 0.5-90% by weight, preferably 5-80% by weight and more preferably 10-50% by weight water (column 3, lines 39-42); a compound having a hydroxy group and a polymerizable unsaturated group and a compound having acidic group and polymerizable unsaturated group (column 3, lines 6-29, claim 1).

The compound having a hydroxy group and a polymerizable unsaturated group is, *inter alia*, 2-hydroxyethyl methacrylate (2-HEMA) (column 3, lines 46-47, 53-54).

The **compounds having acidic group** and polymerizable unsaturated group are **polymerizable monomers having carboxy group** such as, *inter alia*, 1,4-dimethacryloxyethyl pyromellitic acid, 6-

methacryloxyethyl naphthalene-1,2,6-tricarboxylic acid, 4-methacryloxyethyl trimellitic acid, 4-methacryloxybutyl trimellitic acid, 4-methacryloxyhexyl trimellitic acid, 4-methacryloxydecyl trimellitic acid, 4-acryloxybutyl trimellitic acid (column 4, lines 26-59), or **polymerizable monomers containing phosphoric acid groups** (column 4, lines 65-68, and column 5, lines 1-4).

Additionally, 4-acryloxyethyl trimellitic acid (4-AET) and 4-methacryloxyethyl trimellitic acid, both containing a plurality of carboxyl groups, are listed among the preferred polymerizable monomers having a carboxy group (column 4, lines 55-56).

Document (8) further discloses that "Two or more kinds of the above depicted polymerizable **compounds having acidic groups** can be used together, if desired." (column 5, lines 16-18) (emphasis added).

Document (8) discloses that the dental primer compositions are able to impart a strong and durable adhesive property between vital hard tissues, especially an enamel or a dentin of natural teeth and dental adhesive restorative materials such as dental resin cements or composite resins (column 2, lines 63-68, and column 3, lines 1-5).

Document (8) specifically exemplifies eleven primers listed in Table 1. Examples 1 and 4 comprise 40% water and 7 or 10% 4-AET; example 3 comprises 40% water and 7% BMEPA (bis(2-methacryloxyethyl) phosphoric acid). None of the examples listed in Table 1 comprises



simultaneously 4-AET and BMEPA; examples 1 and 4 comprise 60% 2-HEMA.

5.3.2 In the light of this prior art the problem to be solved lies in the provision of alternative water-containing (aqueous) dental compositions.

5.3.3 The solution relates to the combination of components (A) and (B) as defined in claim 1.

The board is satisfied that the problem has been plausibly solved in the light of the examples shown in the description.

5.3.4 The respondent defined the problem to be solved as relating to the increase in the adhesive strength to dentin and enamel and to the increase of the marginal adaptability of aqueous dental compositions. In other words, as defined by the respondent, the problem to be solved over the prior art lies in the provision of aqueous dental compositions with increased adhesive strength to dentin and enamel and increased marginal adaptability.

The respondent stated that the solution related to the combination of the components (A) and (B) as defined in claim 1.

Therefore, it has to be investigated whether the test results displayed in the patent in suit demonstrate the presence of increased adhesive strength and/or increased marginal adaptability over the closest prior art.

Leaving aside the question of whether a composition containing only 5% by weight of water can still be considered as an "aqueous composition", the dental compositions according to claim 1 of the seventh auxiliary request can comprise, as the compositions exemplified in document (8) do, 60% 2-HEMA. As shown by the description, the compositions of the patent in suit preferably contain a water-soluble solvent (paragraph [0010]) and 2-HEMA is listed among the preferred organic solvents in paragraph [0035], line 42.

Furthermore, 4-AET falls within the definition given for component (B) and BMEPA falls within the definition given for component (A) in claim 1 of the seventh auxiliary request. Indeed, as stated by the respondent, the compound PM2, which is specifically disclosed as component (A) in some of the examples of the patent in suit, is the same as BMEPA, namely bis(2-methacryloyloxyethyl)hydrogen phosphate, which is its systematic name.

The respondent stated that although the examples and comparative examples shown in the patent in suit did not represent a direct comparison with the compositions specifically disclosed in document (8) in view of the lack of 2-HEMA, they served however to demonstrate the presence of an improved effect in terms of increased adhesive strength and marginal adaptability directly linked to the combination of (A) and (B). This was due to the fact that the pairs of compositions chosen for the comparison related to comparable features, i.e. the compositions only differed in the presence or absence of component (A) or (B) respectively. The respondent

pointed in particular to example 9 and comparative example 1 in Table 2.

It is true that PM2 is used as component (A) in example 9 but PM2 is not used as component (A) in comparative example 1. Indeed, comparative example 1 contains no component (A) but a component (B) which is MAC-10. MAC-10 is a carboxylic acid groups-containing monomer which does not appear listed among the options disclosed in column 4 of document (8) for the polymerizable monomers having carboxy groups. Moreover, since its full chemical name is 11-methacryloyloxy-1,1-undecanedicarboxylic acid it is structurally far removed from the preferred polymerizable monomers having carboxy group disclosed in document (8) which are monoesters of trimellitic acid such as 4-AET.

Correspondingly, comparative example 1 cannot serve to demonstrate the presence of an effect over the prior art compositions. This also applies to the other "comparative examples" in Table 2. Accordingly, on the one hand, the possible influence of the presence of 60% 2-HEMA in the results on adhesive strength of the compositions remains unknown and, on the other, no less important, the components (A) or (B) chosen for all the "comparative examples" appearing in Table 2 do not correspond to the compounds disclosed in document (8), either to those used in the examples, or to those specifically disclosed in said document.

The same problems appear with example 65 and comparative example 21 in Table 7, relating to the marginal adaptability, which, again, use MAC-10 as component (B) and do not contain any 2-HEMA.

Additionally, the amounts used for the components are not comparable.

Consequently, in the light of the data present in the description of the patent in suit, the skilled person cannot conclude that the claimed subject-matter plausibly solves the problem as defined by the respondent.

Whether an increase of the adhesive strength can be linked to the combination of specific components (A) and (B) is not conclusive, since claim 1 is a broadly formulated product claim encompassing compositions for which it is not credible that the problem as defined by the respondent has been actually solved.

Therefore, the problem to be solved had to be defined in a less ambitious way.

5.3.5 Therefore it remains to be assessed whether the claimed solution is obvious in the light of the cited prior art.

It is a fact that document (8) does not disclose specifically dental primer compositions simultaneously containing components (A) and (B). However, the skilled person when starting from the primer compositions of the specific examples 1, 4 or 5 (all containing 4-AET, which falls within the definition of component (B)) and facing the problem of looking for alternatives thereto, would look at the contents of the description, where it is taught that two or more kinds of the polymerizable compounds having acidic groups can be used together (column 5, lines 16-18). Among the disclosed polymerizable compounds having acidic groups are those

having carboxy groups and those containing phosphoric acid groups. Although document (8) does not preclude the possibility of taking, in addition to 4-AET, a phosphoric acid containing monomer (component (A)), this is an option among others, such as the option concerning taking a further polymerizable compound having carboxy groups.

However, the skilled person working in the field of dental compositions and adhesion promoters, such as the primers of document (8), is aware of document (5), especially because it also discloses dental compositions containing polymerizable compounds having acidic groups.

Document (5) discloses dental compositions "with which the bonding strength between the hard substance of the tooth, particularly the dentine, and photopolymerizable dental materials can be improved. The use of the composition is intended above all to prevent the formation of peripheral fissures caused by the initial polymerization shrinkage, and the secondary caries caused thereby." (column 2, lines 44-51).

Furthermore, document (5) discloses that "The adhesion promoter according to the invention serves to improve the adhesion of photopolymerizable tooth filling materials both to the enamel and to the dentine." (column 3, lines 29-32).

The compositions disclosed in document (5) comprise "1 to 25% of an acryloyloxyalkyl hydrogen phosphate wherein the alkyl group of which has 2 to 6 carbon atoms; for example, (meth)acryloyloxyethyl dihydrogen

phosphate and/or di(meth)acryloyloxyethyl hydrogen phosphate; 3 to 40% by weight of at least one acidic carboxylic acid ester selected from the group comprising dicarboxylic acid mono(meth)acryloyloxyethyl ester, o-trimellitic acid mono(meth)acryloyloxyethyl ester and pyromellitic acid di(meth)acryloyloxyethyl ester; 0.05 to 5% by weight of photopolymerization catalyst; and the remainder an organic solvent." (column 2, lines 53-64).

The acryloyloxyalkyl phosphate compounds are all monomers which are a phosphoric acid ester having in one molecule at least one =P(O)OH group and a polymerizable unsaturated group (i.e. component (A)).

Ethanol is preferred as organic solvent, since it is used in all the examples, which contain 80% ethanol approximately.

Document (5) further teaches: "Unexpectedly, using the unsaturated phosphate and the unsaturated acidic carboxylic ester jointly leads to a bonding strength twice as high as that attained with the use of phosphate or acid ester alone. Peripheral fissures between the tooth substance and the filling material do not occur..." (column 3, lines 41-46).

- 5.3.6 Although the board agrees with the respondent that the skilled person would not be able to know whether the quantitative improvement taught for the combination of monomers in document (5) could be translated into compositions having higher water amounts than technical ethanol or containing other organic solvents such as 2-HEMA, there is enough motivation for the skilled person

in the said document to impel him to try the addition of an acryloylalkyl hydrogen phosphate compound to the specific compositions of examples 1, 4 or 5 of document (8) as an alternative thereto.

Therefore, the board considers that the dental compositions claimed in claim 1 of the seventh auxiliary request do not involve an inventive step, since they result from an obvious combination of the contents of documents (8) and (5) (Article 56 EPC).

5.3.7 The respondent has argued that the skilled person would not have been encouraged to look at document (5), since this document related to non-aqueous compositions where the solvent was an organic solvent and water was absent.

This argument, however, does not hold. The solvent used for the compositions of document (5) is ethanol. Ethanol commonly contains water in different amounts. For the compositions disclosed in document (5) to have been water-free, it would have been necessary to use absolute ethanol and take especial technical measures to avoid water during the working-up of the examples. Document (5) is silent about such unusual measures which do not make any technically meaningful sense in the field of application of the compositions of document (5). However, since document (5) does not state the exact water contents of the ethanol used, it has been assumed, for the respondent's convenience, that it is that with the lowest water content, i.e. 95.57% ethanol (azeotrope with 4.43 % water).

The dental compositions according to claim 1 of the seventh auxiliary request may contain only 5% water.

Furthermore, according to the description of the patent in suit, the presence (preferably up to 80%) of an organic solvent such as ethanol is preferred (cf. paragraphs [0033] to [0038]).

- 5.3.8 The analysis made in points 5.3.1 to 5.3.7 with respect to the inventive step of claim 1 of the seventh auxiliary request also applies to claim 1 of the eighth auxiliary request. The only difference between the two claims is that the water contents in the dental compositions of the eighth auxiliary request have been restricted to 20 to 80%.

The respondent argued that since the presence of water was very significant for the adhesiveness of the dental compositions, the skilled person would not have contemplated the teachings of document (5). Additionally, it stated that there was no incentive for the skilled person to combine the teachings of documents (8) and (5).

The board agrees with the respondent in that the presence of water is very significant for the adhesiveness of the dental compositions. This teaching, however, is already known from document (8) which is considered the appropriate starting point for the skilled person. The preferred water contents in document (8) are 5-80% and most preferred contents are 10-50% (column 3, lines 34-45). Moreover, the examples contain 40% water.

Although the presence of 20-80% water is one essential feature of the claimed compositions, the presence of organic solvents such as ethanol or of substances such



as 2-HEMA, listed as water-soluble organic solvents, is also encompassed by claim 1 of the eighth auxiliary request and appears to be preferred according to the description of the patent in suit. Indeed, a mixture of a plurality of water-soluble organic solvents can also be used (paragraph [0037]).

Under such circumstances, claim 1 of the eighth auxiliary request clearly encompasses dental compositions where a system of water-miscible solvents with high water contents is used.

As already stated, the compositions of document (8) contain water and 2-HEMA, which in the amounts employed will act as water-soluble organic solvent within the meaning of the patent in suit, and may also contain other organic solvents such as ethanol (column 7, lines 58-60).

Therefore, to use ethanol as solvent for the dental compositions is common in the field and does not stand in contradiction either with the teaching of the closest prior art or with the disclosure of the patent in suit.

Accordingly, there is no objective reason why the skilled person working in the field of dental compositions would discard document (5) just because ethanol has been used as solvent.

However, the board agrees with the respondent, as previously mentioned in this decision, in that the skilled person would not have been able to translate directly the **quantitative improvement** disclosed in

document (5) for the combination of the monomers disclosed therein to a different medium.

Nevertheless, the skilled person looking, in the light of document (8), for alternatives having two or more kinds of polymerizable compounds having acidic groups and aware of the contents of document (5) would have been motivated to try the addition of an acryloyloxyalkyl hydrogen phosphate compound such as (meth)acryloyloxyethyl dihydrogen phosphate and/or di(meth)acryloyloxyethyl hydrogen phosphate.

The tests present in the description of the patent in suit do not demonstrate whether or not an increase in the adhesive strength has taken place with respect to the closest approximation possible to the prior art compositions of document (8), and hence the presence of an unexpected effect cannot be taken into account for the formulation of the objective problem.

Therefore, to combine components (A) and (B) in the dental compositions claimed represents, in the light of the cited prior art, an obvious solution to the problem to be solved.

5.3.9 Consequently, the eighth auxiliary request fails for lack of inventive step (Article 56 EPC).

5.4 As regards the respondent's concerns with respect to the framework of the present opposition appeal proceedings, it has to be said that the board has the power and the duty to investigate the correctness of the opposition division's decision.

The decision of the opposition division dealt with Article 123(3) EPC in respect of the replacement of the expression "carboxylic acid groups-containing monomer".

Moreover, the opposition division also dealt with Article 54 and Article 56 EPC, in connection with which it expressed the opinion that the compositions claimed were aqueous systems and that it was not obvious for the skilled person to combine documents (8) and (5) since document (5) related to non-aqueous systems. Additionally, the opposition division's findings were that the tests present in the patent in suit demonstrated an unexpected increase in the adhesive strength and marginal adaptability.

In addition to the opposition division's reasoning, the appellant raised objections relating to Articles 123(3), 54 and 56 EPC in its grounds of appeal.

Therefore, the framework of the present opposition appeal proceedings has not gone beyond the revision of the first-instance decision, taking into account the appellant's requests.

**Order**

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

The decision under appeal is set aside.

The patent is revoked.

The Registrar:

The Chairman:

U. Bultmann

U. Oswald