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Datasheet for the decision of 28 April 2009

Case Number: T 1067/06 - 3.2.07

Application Number: 97925596.5

Publication Number: 0921910

IPC: B24D 3/28

Language of the proceedings: EN

Title of invention:
Waterproof paper-backed coated abrasives

Patentee:
Saint-Gobain Abrasives, Inc.

Opponent:
3M Innovative Properties Company

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 123(2)
RPBA Art. 13

Relevant legal provisions (EPC 1973):
-

Keyword:
"Admissibility of requests (main and first auxiliary request - yes; second to fifth auxiliary request - no)"
"Admissibility of amendments (yes)"
"Novelty (yes)"
"Inventive step (main and first auxiliary request - no)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1067/06 **-** 3.2.07

D E C I S I O N
of the Technical Board of Appeal 3.2.07
of 28 April 2009

Appellant: (Patent Proprietor)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 9 May 2006 revoking European patent No. 0921910 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: P. O'Reilly
Members: H. Hahn
E. Dufrasne

Summary of Facts and Submissions

I. The patent proprietor (appellant) lodged an appeal against the decision of the Opposition Division to revoke European patent No. 0 921 910.

II. In this decision the following documents are cited:

D1 = US-A-4 871 376
D2 = US-A-4 773 920
D5 = US-A-3 498 827
D7 = WO-A-97 07934
D8 = US-A-2 878 111

III. An opposition had been filed against the patent in its entirety under Article 100(a) EPC, for lack of novelty and inventive step.

IV. The Opposition Division held that the amendments made in the main request and auxiliary requests 1 to 7 are not admissible under Rule 57a EPC 1973, that auxiliary request 9 is not allowable for lack of novelty of claim 1 over D2, that auxiliary request 10 is not admissible under Article 132(3) EPC and that auxiliary requests 11 and 12 are not admissible at least under Article 84 EPC, all requests as filed during the oral proceedings dated 25 April 2006. As an ***obiter dictum*** the Opposition Division additionally remarked with respect to auxiliary request 12 that dependent claims 6 to 9 contravene Article 123(2) EPC while claim 10 contravenes Article 123(3) EPC. Auxiliary request 8 had been withdrawn by the Patent Proprietor during the oral proceedings.

V. Claims 1 and 6 of auxiliary request 9 (corresponding to claims 1 and 6 as granted) read as follows:

"1. A paper-backed coated abrasive characterized in that it comprises a hydrophobic radiation-curable resin maker and/or size coat wherein the resin comprises a silane or siloxane and is obtained by incorporating to the resin a silane or a siloxane having hydroxyl or acrylate functional groups that enable the silane or siloxane to bond to the binder resin."

"6. A process for the production of a waterproof paper-backed coated abrasive which comprises applying to a paper backing, in sequence, a maker coat, a layer of abrasive particles and a side [sic] coat, wherein at least one of the maker and size coats comprises a hydrophobic radiation-curable resin binder obtained by incorporating to the resin a silane or a siloxane having hydroxyl or acrylate functional groups that enable the silane or siloxane to bond to the binder resin and the binder is cured by radiation selected from the group consisting of electron beam radiation and UV radiation."

VI. With a communication annexed to the summons dated 18 December 2008 the Board arranged for oral proceedings and presented its preliminary opinion based on claims 1-10 of a single request as filed together with the grounds of appeal dated 5 July 2006 (which - except from the deletion of the alternative "silane" - corresponded to claims 1-10 of said auxiliary request 9 underlying the impugned decision).

It stated amongst others that dependent claim 9 - allowing the incorporation of silane - rendered claims 1 and 6 unclear so that the request appeared to be inadmissible.

The Board was inclined to admit documents D7 to D11 into the procedure.

It stated that the issue of novelty would have to be discussed with respect to Article 54(3) and (4) EPC and document D7, particularly whether or not the term "coated abrasive" implied the use of a paper-backing to the person skilled in the art and whether the use of certain binders implied the use of certain curing mechanisms.

With respect to the discussion of inventive step it remarked that this issue would be dealt with taking into consideration the problem-solution approach. Starting from the closest prior art and taking account of the problem to be solved - which would be based on the effect of the distinguishing features - it would be discussed whether or not the available prior art, particularly D2 which appeared to represent the closest prior art, rendered the subject-matter claimed obvious when either combined with another teaching in the prior art or the common general knowledge of the person skilled in the art as represented by e.g. D8 or D5.

In this context the Board noted that the comparative test results as submitted with the grounds of appeal were not suitable for acknowledging an effect attributed only to a siloxane compound since the samples contained a mixture of silane and siloxane.

Finally it remarked that any further written submission should be filed as soon as possible and at least one month before the date of the oral proceedings and that the admittance of facts and evidence was still subject to the provisions of Article 114(2) EPC and Articles 12 and 13 of the Rules of Procedure of the Boards of Appeal (RPBA).

VII. With letter dated 30 January 2009 the appellant submitted a new experimental report as a response to the Board's communication in combination with arguments concerning the allowability thereof.

VIII. With letter dated 6 March 2009 the appellant submitted sets of claims as an amended main request together with first to fourth auxiliary requests in combination with arguments concerning the allowability of the amendments made therein and concerning the patentability of the subject-matter of these claims, taking account of the Board's communication.

IX. Oral proceedings before the Board were held on 28 April 2009. At the start the amendments and the admissibility of the requests were discussed and the second to fourth auxiliary requests were considered not to be admissible. Thereafter the issue of novelty was discussed with respect to D7. The subject-matters of the independent claims 1 and 6 of the main request and of claim 1 of the first auxiliary request were considered to be novel. Subsequently inventive step of the subject-matters of the main request and of the first auxiliary request were discussed, particularly with respect to a combination of D2 with the common general knowledge as

represented by D8 or D5, and taking account of the test report as filed by the appellant with letter dated 30 January 2009. As a result of this inventive step discussion the appellant submitted an additional fifth auxiliary request which eventually after discussing its admissibility was considered ***prima facie*** not to be admissible.

X. The appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request, filed with letter dated 6 March 2009, or in the alternative, on the basis of one of the first to fourth auxiliary requests, filed at the same date, or on the basis of the fifth auxiliary request filed during the oral proceedings.

The respondent requested that the appeal be dismissed.

At the end of the oral proceedings the Board announced its decision.

XI. The subject-matters of product claim 1 and of process claim 6 of the main request differ from claims 1 and 6 as granted (see point V above) in that the features "**a silane or**" (emphasis added by the Board) have been omitted from claims 1 and 6. In claim 6 additionally the obvious printing error "side coat" has been amended to read "si**z**e coat" (emphasis added by the Board).

XII. Independent process claim 1 of the first auxiliary request is identical with independent claim 6 of the main request.

XIII. Product claim 1 of the second auxiliary request differs from claim 1 of the main request in that the feature ", **and wherein the abrasive particles are selected from diamond, cubic born nitride and blends thereof**" (emphasis added by the Board) has been added. Process claim 6 of the second auxiliary request differs from claim 6 of the main request in that the feature "**selected from diamond, cubic born nitride and blends thereof**" has been inserted between the feature "… a layer of abrasive particles" and the feature "and a size coat …" (emphasis added by the Board).

XIV. Independent process claim 1 of the third auxiliary request is identical with claim 6 of the second auxiliary request.

XV. Process claim 1 of the fourth auxiliary request differs from process claim 6 of the second auxiliary request in that the feature "**fiber reinforced**" has been introduced between the expressions "… comprises applying to a" and "paper backing …" and that the feature "the binder is cured by radiation selected from the group consisting of electron beam radiation and UV radiation" has been restricted to "**the binder is cured by electron beam radiation**" (emphasis added by the Board).

XVI. Process claim 1 of the fifth auxiliary request differs from the process claim 1 of the fourth auxiliary request in that the feature "**selected from diamond, cubic born nitride and blends thereof**" has been omitted (emphasis added by the Board).

XVII. The appellant argued essentially as follows:

The deletion of the alternative "silane" from the independent claims of all requests does not contravene Article 123(2) EPC while dependent claim 9 as granted has been deleted to overcome the clarity objection raised by the Board in its communication. The restriction of the abrasive particles to "diamond and cubic boron nitride and blends thereof" according to the second and fourth auxiliary requests has a basis at page 6, lines 8 and 9 of the application as originally filed (corresponding to the published WO-A-98 03307). The further restriction of the fourth auxiliary request to "fiber reinforced paper" and "electron beam curing" has a basis at page 6, lines 10 to 34 of the application as originally filed. Although the new main request and the first to fourth auxiliary requests were filed at a late stage of the proceedings they were filed before the time limit set in the Board's communication. These requests were filed so late because there had been a change of the representative and of the attorney partnership after the opposition procedure. The limitations according to the second to fourth auxiliary requests are based on the fact that the prior art teaches silane coupling agents which have an affinity to certain abrasive particles whereas diamond and/or cubic boron nitride abrasive particles do not have any affinity for siloxanes or other coupling agents which results in that the siloxanes will be statistically distributed in the resin. No proof for this effect has been provided. However, the skilled person can deduce this effect from the abrasive particle properties, i.e. the more non-polar and less hydrophilic, respectively, the abrasive particles are

the less interaction with the siloxane will take place. It is difficult to say how big this effect is. D8 concerns a hardened coating on the grits which is different but not inconsistent with the teaching of the patent in suit, i.e. adding the siloxane to the resin composition to improve the wet grinding properties.

Novelty of the subject-matter claimed should be acknowledged since the specific "paper-backed coated abrasive" is novel compared to the generic term "coated abrasive" of D7. The example of D7 reveals a polycotton cloth substrate which does not represent a paper-backed coated abrasive. Furthermore, only some of the resins disclosed in D7 are suitable for the intended purpose and do not imply radiation curing (see page 2, third and fourth paragraphs).

D2 represents the closest prior art. The objective problem to be solved is the provision of an improved water-proof coated abrasive product and process for making the same. As can be derived from the test report filed with letter dated 30 January 2009 the addition of siloxane reveals an improved effect as compared to that of the silane. It is believed that the effect derivable from Figure 1 of the test report will be the same for all siloxanes although at present no proof is available. D8 teaches coating the abrasive grits with siloxane whereas the patent in suit teaches adding the siloxane to the resin. Therefore D8 cannot suggest the claimed subject-matter.

D5 concerns the coating of a pipe and discloses two alternatives: a) to mix silane, the filler and the resin, and b) that the silane treated filler is added

to the resin (see column 8, lines 32 to 37 and column 9, line 13). Therefore the person skilled in the art would not combine D5 with D2 but even if he would do so he would not arrive at the claimed subject-matter. It is admitted that said silane would hydrolyse with water and eventually would form some siloxane (see D5, column 6, line 30). Therefore the subject-matters of claims 1 and claim 6 of the main request and of claim 1 of auxiliary request 1 involve an inventive step.

In case of a negative outcome with respect to inventive step of the main and first auxiliary request it is requested to file a fifth auxiliary request. Claim 1 of this request is based on claim 5 as granted and is related to another aspect of the invention which aims to better use the production facilities. This request is filed at such a late stage of the proceedings because the representative owes it to his client to file another request.

XVIII. The respondent argued essentially as follows:

It is requested not to admit the second to fourth auxiliary requests for being late filed and for raising complicated issues which could not be dealt with before the oral proceedings.

Furthermore, the amendment concerning the selection of diamond and cubic boron nitride abrasive particles contravenes Article 123(2) EPC on the basis of the reasoning given in the letter of 6 March 2009 - namely that these two grit materials do not bond to the siloxane - which has no basis in the application as originally filed. Therefore this amendment results in a

new teaching since the added silane and siloxane were in the application as originally filed considered to be coupling agents (see e.g. page 8, lines 5 to 17) but now the siloxane is stated to be something different. The siloxanes were originally presented as an alternative to the silanes and the example compares with conventional waterproof phenolic binder coated abrasives (see patent, chapter [0028]). Thus the invention is shifted in a way which has not been originally disclosed. It is also not known what happens with the siloxane in the resin binder. It seems, however, that the prior art D8 uses siloxane as a coupling agent (see D8, column 4, lines 13 to 15).

Furthermore, these features were taken from the description and not from the claims as granted. Consequently, this amendment and these requests bring the respondent into a disadvantageous situation. It might have been necessary to carry out experiments to verify the allegation.

Likewise the subject-matter of claim 1 of the fourth auxiliary request which is directed to a coated abrasive comprising a fiber reinforced paper backing, a siloxane and diamond and/or cubic born nitride grits with electron beam curing of the binder contravenes Article 123(2) EPC since such a specific embodiment was not originally disclosed.

The intermediate document D7 is novelty destroying for the subject-matters of claims 1 and 6 of the main request. The coated abrasive according to D7 comprises a make coat and a size coat (see page 1, last paragraph) and the resin comprises the required functional groups

which can react with the added polysiloxane (see page 2, third and fourth paragraph). According to the Guidelines for Examination, C-IV, 9.2, a document takes away the novelty of any claimed subject-matter derivable directly and unambiguously from that document including any features implicit to the person skilled in the art. For the person skilled in the art analysing D7 it becomes clear that the teaching, i.e. to improve the properties of the last applied coat, is applicable to all coated abrasives without any need that the backing material is further specified. The opposed patent talks about paper-backed coated abrasives and there exists no generic teaching of what is understood by this. Only in the context of electron beam curing the patent in suit is specific and discloses a fiber reinforced paper backing (see chapters [0020] and [0021]). The problem of the patent in suit is to provide an alternative to commercial phenolic resin coated abrasives. Thus D7 covers all kinds of coated abrasives. Furthermore, the person skilled in the art would read the term "coated abrasive" as inherently including a paper backing as proven by D1 (see column 1, line 14 and lines 35 to 39) and as mentioned in the patent in suit (see page 2, lines 3 and 4). If a restriction is made with respect to the prior art and is not important with respect to the invention the prior art is novelty destroying. The bond according to D7 is formed by reaction of the unsaturated compound with either thermal, UV or electron beam curing. All the three alternatives represent radiation curing since the thermal curing of coated abrasives is normally carried out by using infrared light sources. Conventional phenolic resin is inherently not cured by

UV or electron beam. It is not a core part of the invention how the resin is cured.

The test report was late filed and there is no surprising effect visible. It is not understandable why the sample without siloxane additive in the size coat (F6) gave the best result in the grinding test. The other grinding results with siloxane - taking into consideration the standard error bars - are within the range of the silanes. The surface roughness results according to Figure 2 have nothing in common with the water-proof property. It should be considered that the used siloxane compound - BYK-371 -contains "pendant acrylate groups" but it is nowhere specified how many of these groups are present and if, how they are substituted. It is clear, however, that the bonding between the siloxane molecule and the binder resin provided by these acrylate groups may influence the behaviour and properties of this compound which has been compared with a well defined silane, i.e. A-174. Hence no correct comparison has been made and no conclusion can be drawn for all siloxanes. The late filing of this report was not caused by the actions of the respondent but due to this late filing the respondent has not had sufficient time to check it. Therefore it should not be admitted into the proceedings.

It is already clear from the patent in suit that an alternative to conventional phenolic coated abrasives should be provided (see patent, paragraph [0029]). Thus the problem to be solved is to provide an alternative to the product of the prior art. Therefore the person skilled in the art would start from the closest prior

art D2 wherein the water-proof property is improved by the addition of silane and wherein the resin binder system is cured by electron beam curing. D2 discloses two possibilities of adding the coupling agents (see column 5, lines 32 to 39). D8 discloses that conventional phenolic paper-backed coated abrasives are not completely satisfactory for wet grinding conditions as the water adversely affects the bond strength of the binder to the abrasive particles (see column 1, lines 50 to 59). D8 suggests coating the abrasive grain with siloxane which then bonds to the resin. The term "incorporating" of the claims 1 and 6 includes what D8 describes, i.e. the siloxane can bond to the binder. It is also known from D8 that silane and siloxane are considered to be exchangeable (see column 3, lines 6 to 13; column 4, lines 5 to 10). D5 discloses that siloxane allows to improve the bonding of abrasive particles (see column 9, lines 13 to 15). Therefore the person skilled in the art would apply the teaching of D2 in combination with the general knowledge as represented by D8 or D5 in order to increase the water-proof property and thereby would arrive at the subject-matter of claims 1 and 6 of the main request without any inventive skills. Therefore the solution to said problem does not involve an inventive step and the subject-matter of claims 1 and 6 of the main request and of claim 1 of the first auxiliary request thus lacks an inventive step.

The fifth auxiliary request was filed very late and should therefore not be admitted into the proceedings. The only difference resides in the restriction to electron beam curing and the additional feature of a fiber reinforced paper backing is the consequence of

the restriction to electron beam curing since ordinary paper is thereby deteriorated. The subject-matter was comprised in dependent claim 5 as granted and hence actually does not limit the invention. Additionally, said backing has nothing to do with the invention. Therefore it should not be allowed into the proceedings as it ***prima facie*** does not change the situation with respect to inventive step.

Reasons for the Decision

1. *Admissibility of requests*

Main request and first to fourth auxiliary requests

1.1 The amended main request and the first to fourth auxiliary requests were filed by the appellant with letter dated 6 March 2009. Thus these five requests were filed before the time limit set by the Board in its communication annexed to the summons to oral proceedings wherein the parties were requested to make any submissions at least one month before the oral proceedings and were advised to take note that the admittance of facts and evidence was still subject to the provisions of Article 114(2) EPC and Articles 12 and 13 RPBA (see point VI above).

1.1.1 From Article 13(3) RPBA it is clear that amendments to a party's case after the issue of the summons to oral proceedings shall not be admitted if they raise issues which the Board or the other party cannot reasonably be expected to deal with without adjournment of the oral proceedings.

The Board thus examined the amendments and their consequences for the appeal proceedings.

1.1.2 Claims 1 to 9 of the main request correspond to claims 1 to 8 and 10 as granted, respectively, being restricted to siloxane (see point XI, above).

Claims 1 to 4 of the first auxiliary request are identical with claims 6 to 10 of the main request (see point XII, above).

Hence the main request and the first auxiliary request do not raise any new issues and are admitted into the proceedings.

1.1.3 Claims 1 to 9 of the second auxiliary request are based on the main request but the subject-matters of the independent claims 1 and 6 have been restricted to abrasive particles selected from diamond, cubic born nitride and blends thereof (see point XIII, above).

Claims 1 to 4 of the third auxiliary request are identical with claims 6 to 9 of the second auxiliary request (see point XIV, above).

1.1.4 Claims 1 to 4 of the fourth auxiliary request are based on claims 1 to 4 of the third auxiliary request with the further restriction to a fiber reinforced paper backing in combination with only curing by electron beam radiation (see point XV, above).

1.1.5 The additional feature concerning the abrasive particles to be "selected from diamond and cubic boron

nitride and blends thereof" of the second to fourth auxiliary requests is taken from the description (see patent, page 3, lines 31 and 32) whereas the other restriction according to the fourth auxiliary request is taken from dependent claim 5 as granted.

1.1.6 With respect to the abrasive particles feature the appellant stated in its letter dated 6 March 2009: "These types of abrasive particles do not have any affinity for siloxanes (or other coupling agents). Accordingly, there will be no migration of siloxane to the abrasive particle/resin interfaces, and consequently it is clear that the siloxane will be statistically distributed in the resin".

The application underlying the patent in suit as originally filed (corresponding to the published WO-A-98 03307) is silent with respect to such an effect of siloxane and diamond and/or cubic boron nitride abrasive particles. On the contrary, the silane used according to the example is explicitly designated to be a "silane coupling agent" (see patent, page 4, lines 18 and 28) while siloxane is presented as an alternative to said silane (see patent, paragraphs [0013] and [0018]). Furthermore, the Board considers that siloxane - according to the prior art - is used to coat abrasive particles in order to improve the bond strength between these abrasive particles and the binder resin (see D8, column 1, lines 60 to 69). Hence the siloxane compound is used as a coupling agent and can be applied amongst others onto diamond, boron carbide, and the like (see D8, column 4, lines 13 to 15).

Consequently, in combination with the restriction to diamond and/or cubic boron nitride abrasive particles the appellant alleged a new effect of siloxane which is not supported by any evidence as admitted during the appeal proceedings. Therefore the incorporation of this feature raises new and complex issues. Such a combination of features had never been proposed before by the appellant, nor was it the subject of any of the earlier discussions. It would have been unfair to the respondent to confront it with these three new auxiliary requests without allowing it to carry out an additional search or even experiments. This, however, would at least have necessitated adjournment of the oral proceedings and arrangement of a further date for them, a situation which is addressed in Article 13(3) RPBA as an express reason for not admitting an amendment to a party's case.

The appellant argued that the second to fourth auxiliary request could not have been filed earlier since there has been a change of representative and attorney partnership after the opposition procedure. This fact, however, does not provide an excuse in the present case as the change actually took place **before** the filing of the present appeal, i.e. before any submission in the appeal proceedings.

1.1.7 Taking account of all these elements the Board therefore decides not to admit the second to fourth auxiliary requests into the proceedings.

Fifth auxiliary request

1.2 At the end of the discussion of inventive step of the subject-matter of product claim 1 and process claim 6 of the main request and process claim 1 of the first auxiliary requests, respectively, i.e. before the break for deliberation on this issue by the Board, the appellant requested to submit a new fifth auxiliary request. By this new request, which then was submitted after said break, it attempted to overcome the conclusion of the Board of lack of inventive step with respect to the two aforementioned requests.

1.2.1 The representative stated that the reason for submitting this new request at this very late stage of the proceedings was that it owed to the client to file another request in order to maintain the patent in suit. It could, however, not give any reason as to why this request had not been filed earlier.

The fact that the respondent submitted with letter of 6 March 2009 a new main request and first to fourth auxiliary requests in reaction to the Board's communication shows that it was aware of the risk that the appeal could be dismissed. Therefore it could have filed the fifth auxiliary request earlier than during the oral proceedings, which is thus considered as filed very late.

1.2.2 The respondent objected to the filing of this new request at the oral proceedings and requested that it should not be admitted into the proceedings for being clearly late filed and for ***prima facie*** not overcoming the lack of inventive step objection.

1.2.3 The proposed amendment (see point XVI, above) is based on a combination of the subject-matter of independent claim 6 and dependent claim 5 as granted. Thus it does not contravene Articles 123(2) and (3) EPC.

1.2.4 The differences between the subject-matter of process claim 1 of the fifth auxiliary request and process claim 6 of the main request reside in the restriction to the curing of the binder resin by "electron beam radiation", i.e. the second alternative of claim 6 of the main request, and the restriction to a "fiber reinforced paper backing". The limitation to a fiber reinforced paper backing is, however, the direct consequence of the use of electron beam radiation for curing the binder resin.

Furthermore, it belongs to the common general knowledge that exposure to electron beam radiation degrades (ordinary) paper and results in a product with reduced internal strength and integrity. This is already acknowledged in the patent in suit in the discussion of the prior art (see patent, page 2, lines 15 to 16). It is likewise known from this passage that electron beam radiation is advantageous compared to UV radiation in that it may be applied from the backing side, it is much more penetrating, particularly if the paper is highly filled, and it results in a more uniform and faster curing (see patent, page 2, lines 12 to 15).

Since the additional feature of claim 1 of the fifth auxiliary request corresponds to those of dependent claim 5 of the main request - which referred to product claim 1 of the main request - it is clear that its

subject-matter, likewise as product claim 1, also lacks an inventive step.

Therefore the fifth auxiliary request *prima facie* does not overcome the lack of inventive step objection. The Board therefore decides not to admit the fifth auxiliary request into the proceedings taking account of the Rules of Procedure of the Boards of Appeal.

1.3 Thus only the main request and the first auxiliary request were admitted into the proceedings and discussed as to their substance.

2. *Admissibility of amendments (Articles 123(2) and (3) EPC)*

The deletion of the alternative "silane" from the subject-matter of claims 1 and 6 as granted and the deletion of dependent claim 9 as granted are not objectionable. The Board is thus satisfied that claims 1 to 9 of the main request and claims 1 to 4 of the first auxiliary request comply with Articles 123(2) and (3) EPC.

3. *Novelty (Article 54 EPC)*

3.1 Novelty of the subject-matter of the independent claims 1 and 6 of the main request has only been disputed by the respondent with respect to the disclosure of the intermediate document D7. The appellant has never challenged that D7 represents an intermediate document according to Article 54(3) EPC.

3.1.1 D7 discloses, however, either only the generic term "coated abrasive" (this coated abrasive comprises a size coat and optionally a supersize coat applied over the size coat, wherein the last applied coat comprises a resin binder and a polysiloxane additive bonded to the resin binder), or more specifically according to the example a coated abrasive having "a polycotton cloth substrate material" which was treated with a conventional phenolic size coat to which a functionalized polysiloxane had been added and cured (see page 1, first and fifth paragraphs; pages 5 and 6, example 1; claims 1 and 8).

Consequently, according to the established case law of the Boards of Appeal the specific feature "**paper-backed** coated abrasive" of claims 1 and 6 of the main request is novel compared to said generic disclosure "coated abrasive" according to D7.

3.1.2 The respondent's arguments to the contrary cannot hold for the following reasons:

Firstly, D7 does not inherently disclose a paper-backed coated abrasive. Although the substrate for typical coated abrasives is typically paper, a polymeric film, cloth, a fibre web, a nonwoven web, combinations or composites thereof as evidenced by document D1 (see column 1, lines 35 to 39) it is evident that a paper backing - although representing a typical backing material for coated abrasives according to the prior art - is not the only possible choice for the person skilled in the art when reading the disclosure of D7. Consequently, the strict criteria as applied by the Boards of Appeal for a lack of novelty objection, i.e.

that the implicit feature is directly and unambiguously derivable from what is expressly mentioned in the document in question, are not met (see Case Law of the Boards of Appeal of the European Patent Office, 5th edition 2006, chapters I.C.2.3 and I.C.2.4; see also the Guidelines for Examination in the European Patent Office, C-IV, 9.2).

Secondly, if the skilled person were to deduce from the teaching of D7 that the addition of siloxane is applicable to all kinds of coated abrasives, i.e. also to the paper-backed ones, then this is a matter of obviousness but not of novelty.

The third line of argument is that the restriction of the patent in suit to paper-backed coated abrasives is not important with respect to the invention, which is based on the finding that a specific siloxane is added to the binder resin to improve the waterproof property, and therefore cannot establish novelty while another restriction such as a more precise definition of the binder resin or siloxane, which would be important to said invention, would create novelty. This argument is not in agreement with the established case law of the Boards of Appeal which requires that the subject-matter claimed only has to differ in at least one feature over the disclosure of the prior art - irrespective whether it is important to the invention or not - in order novelty to be acknowledged (see Case Law of the Boards of Appeal of the European Patent Office, 5th edition 2006, chapters I.C.2 to I.C.2.1).

3.1.3 The Board therefore considers that the subject-matters of independent claims 1 and 6 of the main request are novel (Article 54 EPC).

3.2 The above conclusion applies ***mutatis mutandis*** to claim 1 of the first auxiliary request 1 (see point XII above) since it is identical with independent process claim 6 of the main request (see point XI above). Consequently, the subject-matter of claim 1 of the first auxiliary request is considered to be novel (Article 54 EPC).

4. *Inventive step (Article 56 EPC)*

Main request

4.1 The Board comes to the conclusion that claims 1 and 6 of the main request lack an inventive step over the disclosure of D2 and the common general knowledge available to the skilled person as represented by D8 for the reasons that follow:

4.2 D2 is considered to represent the closest prior art with respect to the production of a coated abrasive having a water-resistant paper backing including the incorporation of a coupling agent, preferably a silane, into the binder system thereof.

The method of D2 comprises the steps of:
a) providing a coatable composition comprising a binder curable by free radical polymerization having lapping size abrasive grains suspended therein,
b) applying said composition to a backing, e.g. a water resistant paper, and

c) curing said composition by means of free radical polymerization (see column 1, line 61 to column 2, line 4; column 2, lines 40 and 41).

Sources of radiation useful for the curable binder of the process include ultraviolet, visible, γ-radiation, X-rays, and electron beam, most preferably electron beam radiation (see column 3, lines 8 to 13). The curable binder comprises radiation curable monomers (preferably acrylates and methacrylates), and optionally reactive diluents, conventional additives, for example, wetting agents, lubricants, dispersing agents, fillers, and coupling agents (see column 3, lines 17 to 32). It is preferred that the coupling agent be included with the monomer in order to promote adhesion between the abrasive grains and the binder to enhance the durability of the lapping film (see column 4, lines 48 to 54). A preferred coupling agent is γ-methacryloxypropyl trimethoxy silane, e.g. available under the trade designation A-174 from Union Carbide Corp (see column 4, lines 54 to 58).

4.3 The subject-matter of claim 1 of the main request is thus only distinguished from the paper-backed coated abrasive according to D2 in that a siloxane having hydroxyl or acrylate functional groups is used instead of the silane. The preferred silane A-174 according to D2, however, comprises an acrylate functional group and is identical with the silane used according to the only example of the patent in suit (see patent, page 3, lines 27 and 28; page 4, lines 18 and 28).

The subject-matter of independent process claim 6 of the main request is distinguished from the process

according to D2 in that additionally a size coat is applied over the maker coat and that said siloxane is comprised in at least one of the maker coat and/or size coat.

4.3.1 According to the patent in suit said siloxane provides hydrophobicity to the resin binder and represents an alternative to the silane (see patent, paragraphs [0004], [0013] and [0018]). The abrasive performance of the waterproof paper-backed coated abrasive comprising a silane is stated to be essentially equivalent to that of commercial waterproof paper, i.e. wherein the grain is held by phenolic modified varnish resin maker and size coats (see patent, paragraphs [0001], [0002] and [0029]).

4.3.2 Contrary to the aforementioned statements in the patent in suit the appellant submitted an experimental report dated 30 January 2009 (see point VII above) and argued that the siloxane additive would show better performance in terms of cumulative cut as compared to the respective abrasives with an A-174 silane additive (see Figure 1) and equal or improved finish (see Figure 2). It further assumed that the effect of the used siloxane BYK-371 would be the same for all other siloxanes. Thus the problem would have been the provision of an improved waterproof coated abrasive (see patent, paragraph [0003]).

The Board does not share this view for the following reasons:

4.3.3 According to Figure 1 of said test report sample F6, i.e. a coated abrasive containing the siloxane only in

the maker coat but not in the outermost size coat layer, showed the best cumulative cut, while the remaining samples F1 to F5 and F7 were similar given the error margins. This result of sample F6 is not understandable since no siloxane is present in the outermost layer which is in contact with the water during the cutting action (see table 6). On the other hand the tests concerning the resulting surface finish reveal that said sample F6 is about the same as the sample F1 without any additive (see Figure 2). The Board further considers that these surface roughness results of Figure 2 have nothing in common with the waterproof property which should be improved.

Furthermore, as admitted by the appellant no evidence has been submitted that other siloxanes differing from the used BYK-371 would also give better results than said silane A-174. The Board wonders in this context that said unspecific siloxane BYK-371, i.e. "a siloxane containing pendant acrylate groups" (see patent, page 3, lines 28 and 29) which chemical nature (i.e. the number of the acrylate groups, and if, how they are substituted, etc.) has been compared with the well defined silane A-174. It is plausible that the bonding between the siloxane molecule and the binder resin provided by these acrylate groups influences the behaviour of the resulting cured resin in water with respect to its hydrophobicity and other properties.

Hence from the Boards view no sufficient comparison has been made and consequently no conclusion can be drawn for all siloxanes. The appellant admitted in this context that it had been assumed that other siloxanes

would reveal about the same effect as the commercial product BYK-371.

The Board therefore - also in view of the respondent's objections concerning the late filing thereof - decided to disregard said experimental report dated 30 January 2009.

4.3.4 The objective problem is therefore the provision of an alternative to a coated abrasive containing a silane coupling agent.

4.4 This problem is solved by the coated abrasive as defined in claim 1 and by the process for making a coated abrasive as defined in claim 6 of the main request. It is credible that the claimed measures provide a solution to said technical problem.

4.5 It belongs to the common general knowledge of the person skilled in the art that a typical coated abrasive product comprises a backing which is coated with a first layer of adhesive (i.e. a resin) commonly referred to as "make coat", onto which the abrasive grains are applied, and which is then coated with a second layer of adhesive (i.e. a resin) commonly referred to as "size coat". Said "size coat" reinforces the coated abrasive product (see e.g. D1, column 1, lines 17 to 26; column 4, lines 22 to 40).

4.5.1 The person skilled in the art further knows that conventional phenolic paper-backed coated abrasives are not completely satisfactory for wet grinding conditions as the water adversely affects the bond strength of the binder to the abrasive particles (see D8, column 1,

lines 50 to 59 referring explicitly to this available knowledge). In order to improve the waterproof property of abrasive structures D8 suggests to coat the abrasive grains with vinyl polysiloxane which then bonds to the resin (see column 1, lines 60 to 69). D8 thus deals with the identical technical problem as the patent in suit. It is also known from D8 that silane and siloxane are considered to be exchangeable since the hydrolysis of vinyl silane generates vinyl polysiloxane containing hydroxyl groups (see column 3, lines 6 to 13 and lines 33 to 60; column 4, lines 5 to 10).

4.5.2 Taking account of the above objective problem the person skilled in the art would start from the closest prior art D2 wherein the waterproof property of the paper-backed coated abrasive is improved by the addition of a silane to the resin binder system which preferably is cured by electron beam curing. D2 discloses two possibilities of adding the coupling agent to the resin binder system, i.e. the dry abrasive grains can be pre-treated with the coupling agent or the coupling agent can be mixed in the curable binder along with the dry abrasive grains (see column 5, lines 32 to 39).

The terms "incorporating to the resin a siloxane … that enable the siloxane to bond to the binder resin" of the claims 1 and 6 of the main request includes what D8 describes, i.e. that the vinyl polysiloxane - which has been used to coat the abrasive grains - can bond to the binder.

Therefore the Board holds that the person skilled in the art would apply the teaching of D2, i.e. to add a coupling agent to the radiation-curable binder system in order to improve the adhesion between the abrasive grain and the cured binder of the paper-backed coated abrasive, in combination with the teaching of D8 to use a vinyl polysiloxane which contains hydroxyl groups in order to increase the waterproof property of the paper-backed coated abrasive and thereby would arrive at the subject-matter of claims 1 and 6 of the main request without any inventive skill.

4.5.3 The appellant's arguments with respect to D8 cannot hold since claims 1 and 6 do not contain any corresponding limitations and thus neither exclude any pre-treatment such as the coating of the abrasive grains with a siloxane as disclosed by D8 nor do they require any co-polymerization or reaction of the functional groups with the radiation curable resin system.

4.6 Claims 1 and 6 of the main request therefore do not comply with the requirements of Article 56 EPC. Consequently, the main request is not allowable.

First auxiliary request

4.7 Since claim 1 of the first auxiliary request is identical with independent claim 6 of the main request 1 (compare point XII) the above conclusion with respect to claim 6 of the main request applies ***mutatis mutandis*** to claim 1 of the first auxiliary request.

The Board therefore concludes that claim 1 of the first auxiliary request does not comply with the requirements of Article 56. The first auxiliary request is thus also not allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

V. Commare P. O'Reilly