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**D E C I S I O N**  
**of 2 June 2004**

**Case Number:** T 0569/02 - 3.2.7

**Application Number:** 90108486.3

**Publication Number:** 0396150

**IPC:** B24D 11/00

**Language of the proceedings:** EN

**Title of invention:**

Coated abrasive material and method of making same

**Patentee:**

SGA, Inc.

**Opponent:**

3M Innovative Properties Company

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 54, 56, 83, 114(2)

**Keyword:**

"Insufficiency - no"

"Novelty - yes"

"Inventive step - yes"

"Late filed comparative tests - not admitted"

**Decisions cited:**

-

**Catchword:**

Comparative tests filed one month before the oral proceedings were found inadmissible regardless of their possible relevance (point 5).



Case Number: T 0569/02 - 3.2.7

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.7  
of 2 June 2004

**Appellant:** SGA, Inc.  
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**Respondent:** 3M Innovative Properties Company Office of  
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**Representative:** Weinberger, Rudolf, Dr.  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 28 March 2002  
revoking European patent No. 0396150 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** C. Holtz  
**Members:** P. A. O'Reilly  
K. Poalas

## Summary of Facts and Submissions

- I. The appellant (proprietor) filed an appeal against the decision of the Opposition Division to revoke the European Patent No. 0 396 150.
- II. Opposition was filed against the patent as a whole and based on Article 100(a) EPC (lack of novelty and lack of inventive step) and Article 100 (b) EPC (insufficiency).

The Opposition Division held that the subject-matter of the independent claims of each of the main and the two auxiliary requests did not involve an inventive step.

The most relevant prior art documents for the present decision are:

D1: GB-A-2 094 824

D2: EP-A-0 052 758

D3: US-A-3 605 349

D4: US-A-4 773 920

D5: US-A-4 644 703

D6: US-A-4 642 126

D7: US-A-4 142 334

D8: DE-A-173 314

III. The appellant requested that the decision under appeal be set aside and the patent be maintained as granted.

The respondent requested that the appeal be dismissed.

IV. The independent claims of the patent as granted read as follows:

"1. A coated abrasive material (10) suitable for use in lapping operations comprising:

a. a flexible and dimensionally stable backing member (12),

b. an abrasive material (14) comprising a dispersion (18) of abrasive grains (20) in a cured binder (22), said abrasive material being adhered to one surface (16) of the backing member (12) and being configured in a plurality of discrete raised three-dimensional formations (28) interspersed with areas (32) devoid of abrasive grain and binder such that the abrasive material forms a discontinuous surface opposite the backing member (12), wherein each formation has widths which diminish in the direction away from said backing member (12)."

"18. A process for the manufacture of a coated abrasive material suitable for use in lapping operations comprising:

a. providing an abrasive material comprising a dispersion of abrasive grain in a curable binder, said dispersion having non-Newtonian properties,

b. depositing said dispersion on one side of a dimensionally stable backing member in a pattern of three-dimensional coated abrasive formations interspersed with areas devoid of abrasive grain and binder, wherein each formation has widths which diminish in the direction away from said backing member (12), and

c. curing said binder to freeze said dispersion in said three-dimensional pattern."

"27. Use of the coated abrasive material obtainable by the process according to one of claims 18 to 26 in lapping operations."

"28. Use of the coated abrasive material obtainable by the process according to one of claims 18 to 26 in an ophthalmic finishing machine in the second fining operations."

V. The appellant argued in written and oral submissions essentially as follows:

(i) The skilled person can carry out the invention. None of the features mentioned by the respondent are essential for carrying out the invention and they will vary depending upon the intended use. It is necessary to have non-Newtonian properties even if there are non-Newtonian dispersions that do not work. It is only necessary that the properties are non-Newtonian at the temperature and shear stress at which the process is carried out so that it is not necessary to mention the temperature and the shear stress in the claims. A specific viscosity

is not required to carry out the invention and the skilled person would choose a suitable viscosity depending on the requirements of the application. The dot pattern mentioned in Example 5 is not suitable for the particular application mentioned there but is suitable for other applications.

- (ii) The subject-matter of claims 1 and 18 is novel. None of documents D1 to D4 discloses formations with widths which diminish away from the backing member. In the case of documents D1 to D3 there is no proof that formations having diminishing widths would be formed. In the case of document D4 the expression "ridges and valleys" does not imply that the ridges have diminishing widths.
  
- (iii) The skilled person would not combine document D4 with any of documents D1, D2 or D3. Document D4 mentions the use of a rotogravure roller. However, there is no indication as to how such a roller can produce non-continuous coatings. Such rollers provide normally a continuous coating. The skilled person would not know how to use such a roller to obtain formations on a surface and would not know how to obtain void areas. The problem to be solved is to improve the cutting rate. Documents D1 to D3 do not provide a solution to this problem.
  
- (iv) The appellant had considered document D1 to be the closest prior art and only realised that document D4 might be considered the closest prior art when it received the provisional opinion of the Board. For this reason, comparative tests with products according to document D4 were filed by the

appellant. The comparative test results should be admitted into the proceedings. The submission of the respondent which was filed two days before the oral proceedings should not be admitted as this must always be considered too late irrespective of any arguments of the respondent.

VI. The respondent argued in written and oral submissions essentially as follows:

- (i) The patent is insufficiently disclosed in the sense of Article 83 EPC since the skilled person cannot carry out the invention across the whole scope of claims 1 and 18. In particular, unless a specific coupling agent, abrasive composition and pattern of dots are used the desired results are not obtainable. Also, the expression "non-Newtonian" as used in claim 18 only has meaning when the temperature is specified since a liquid may be Newtonian at one temperature and non-Newtonian at another temperature. The same applies to the shear stress exerted on the liquid which affects whether the liquid acts as a Newtonian or a non-Newtonian liquid. The claim does not specify any temperature or shear stress range with which the claimed dispersion has non-Newtonian properties.

It is indicated in the patent that certain viscosities are required to carry out the invention. These viscosities are not mentioned however in claim 18. It is also indicated in Example 5 of the invention that a dot pattern is

not suitable. The claims however include a dot pattern within their scope.

(ii) Each of documents D1 to D4 discloses the subject-matter of claims 1 and 18. In the cases of documents D1 to D3 it is inevitable that when the discrete formations are formed there will be some flow of the abrasive material before the binder of the formations is cured. This flow will inevitably produce formations of diminishing width away from the backing. In the particular case of document D1 this effect is visible in figure 3. The valleys and ridges to which reference is made in document D4 necessarily have sloped sides as it is well known that valleys and ridges have sloped sides. These sloped sides will lead to abrasive formations with widths diminishing away from the backing. In the case of document D4 the abrasive material is applied to the backing with a rotogravure roller. Such rollers use a doctor blade which would remove material which is not in the recesses of the roller and thus create areas void of abrasive and binder.

(iii) Starting from document D4 the subject-matter of claims 1 and 18 is obvious in view of documents D1, D2 or D3. Starting from document D4 the problem to be solved is to improve the flexibility. This problem is solved in each of D1, D2 and D3. The features that the formations have diminishing widths cannot be considered as solving the problem of improving the cutting rate so that this feature may only be considered as solving the



problem of providing an alternative abrasive material.

- (iv) The late filed evidence of the appellant should not be admitted into the proceedings. The appellant has known since the opposition was filed that document D4 could be considered to be the closest prior art. The tests are not relevant since they do not contain enough information for them to be repeated. If the tests are admitted into the proceedings it is requested that the oral proceedings be postponed and the costs for the postponement are carried by the appellant. The submission of the respondent filed two days before the oral proceedings was a response to the late filed tests of the appellant and could not be filed earlier. This submission should therefore be admitted.

## **Reasons for the Decision**

### **1. *Insufficiency***

- 1.1 The appellant has argued insufficiency mainly on the basis that claims 1 and 18 do not specify certain features which are necessary to obtain the results desired by the invention. These features include the specific coupling agent, abrasive composition and pattern of dots used. It is clear however that these features will depend upon the intended use and the skilled person has no difficulty in selecting the appropriate values depending upon the use. The respondent offered no evidence to the contrary.

The respondent argued that specific values for the viscosity were required as being essential. However, the specific viscosities mentioned in the patent were explicitly stated to be examples of suitable dispersion viscosities.

The respondent further argued that if a dot pattern is present as in Example 5 then the result was not suitable. Example 5 was concerned with ophthalmic second-fining applications. The stated conclusion in the patent was that the dot pattern was not suitable for such applications. The fact that one particular pattern is not suitable for one group of applications does not mean that the skilled person cannot carry out the invention. The skilled person will always choose the appropriate pattern for the appropriate application.

The respondent has also argued that the skilled person cannot carry out the feature of claim 18 that the abrasive material has non-Newtonian properties because this depends upon the temperature and shear stress. Since claim 18 specifies a process it is clear, as argued by the appellant, that the non-Newtonian properties are at the temperature and shear stress at which the process takes place.

- 1.2 The Board considers that the invention is sufficiently clearly disclosed that it may be carried out by the skilled person as required by Article 83 EPC.

2. *Novelty*

2.1 The respondent has argued that each of documents D1, D2, D3 and D4 discloses the subject-matter of each of claims 1 and 18.

2.2 It is common ground that the feature of claims 1 and 18 that is disputed regarding its disclosure in document D1 is the feature that each formation has widths which diminish in the direction away from said backing. In the opinion of the Board, the feature of figure 3 showing a diminishing width in the formations is nothing more than an artefact produced by the instrument used to establish the drawings for the document. There is also nothing in document D1 which indicates that the means used to create the discrete formations is removed before curing and that the abrasive material which is used is necessarily non-thixotropic so that the formations will have a diminishing width. Document D1 therefore does not disclose all the features of claims 1 and 18.

2.3 It is also common ground that the feature of claims 1 and 18 that is disputed regarding its disclosure in document D2 is the feature that each formation has widths which diminish in the direction away from said backing. In this document discrete formations are mentioned. These formations are indicated as being for example cylindrical nubs ("zylindrischen Noppen"). The abrasive material which is used to form the formations is described as flowable. It is indicated as especially advantageous if the abrasive material is thixotropic, i.e. decreasing viscosity with increasing stress, as this facilitates the formation of the desired shape and

the subsequent removal of the sieve or grid. From this the Board concludes that the shape in document D2 is maintained either via the type of abrasive material used or via the sieve or grid. There is nothing in document D2 to indicate that the sieve or grid would be removed before curing the binder unless the abrasive material will keep its shape due to thixotropic properties. The argument of the respondent that there is necessarily some flow of the abrasive material before curing to create sloped walls to the abrasive material formations cannot therefore be followed by the Board. Document D2 therefore does not disclose all the features of claims 1 and 18.

- 2.4 It is further common ground that the feature of claims 1 and 18 that is disputed regarding its disclosure in document D3 is the feature that each formation has widths which diminish in the direction away from said backing. The respondent has argued that also in the case of the abrasive article taught in this document there would be flow of the abrasive material before curing to create formations of diminishing widths. The Board cannot agree with this argument for the same reasons as already explained with respect to documents D1 and D2 above. The respondent also referred to a part of the description where it is stated that a small part of the adhesive substance may penetrate under the grid and then thin out progressively and then vanish, suggesting that this would create formations of diminishing widths (column 5, lines 31 to 34). However, that part of the description only refers to adhesive whereas the abrasive material is formed by a combination of adhesive and abrasive particles (column 5, lines 14 to 15). The Board concludes that

the abrasive particles do not partake in this penetration. There is thus no creation of formations of abrasive material as a result of this penetration. Furthermore claim 1 and claim 18 require that the areas between the formations are devoid of abrasive grain and binder so that this requirement would not be fulfilled. Document D3 therefore does not disclose all the features of claims 1 and 18.

- 2.5 It is finally common ground that the features of claims 1 and 18 that are disputed regarding their disclosure in document D4 are the feature that each formation has widths which diminish in the direction away from said backing and the feature that the areas between the formations are devoid of abrasive material and binder. The respondent has argued that the expression "ridges and valleys" which is used in that document necessarily implies sloped sides for the ridges and hence formations with widths which necessarily diminish in the direction away from said backing. The Board cannot agree with this view. Whilst the expression "ridges and valleys" when considered in the countryside may conjure up pleasant images of sloped hillsides the terms must here be understood in their technical context. In the view of the Board the skilled person would understand the expression to mean that there are higher areas and in-between lower areas. This is logical since the stated purpose of creating the valleys is to form channels allow flow of lubricant and removal of abraded material. Such removal does not require a special form for the valley side. Indeed for this purpose the floor of the valley should be as wide as possible to create the greatest cross-section and a channel will commonly have a perpendicular side to

facilitate this purpose. The skilled person would not therefore conclude that in the context the sides must be sloped and hence that sloped sides are disclosed. The Board concludes that this feature is therefore not disclosed in document D4. The Board also considers that there is no disclosure that the areas between the formations are devoid of abrasive material. The document merely mentions valleys which serve as channels with no indication that there should be no material at the bottom of the channels. The only conclusion which might be drawn is that the bottom of the channel is lower than the top of the ridge. Document D4 therefore does not disclose all the features of claims 1 and 18.

2.6 Therefore, the subject-matter of claims 1 and 18 is novel in the sense of Article 54 EPC.

3. *Inventive step*

3.1 Closest prior art

The closest prior art in the view of the Board and the respondent is represented by document D4 which discloses all the features of claims 1 and 18 except those which have been indicated above in the discussion of novelty.

3.2 Problem to be solved

In the view of the Board the problem to be solved by the distinguishing features is to provide improved flexibility, and to improve the cut rate whilst

maintaining fine surface finishing (page 7, lines 44 to 46).

The respondent argued that the problem was to provide an alternative abrasive material. The Board cannot agree with this problem. This problem would, in the context, mean that all solutions were obvious on the mere basis that they are different to that already disclosed.

### 3.3 Solution to the problem

The solution to the problem is that there are a plurality of discrete formations interspersed with areas devoid of abrasive grain and binder such that the abrasive material forms a discontinuous surface opposite the backing member and wherein each formation has widths which diminish in the direction away from the backing member.

### 3.4 The solution to the problem is not obvious for the following reasons:

The formations which are mentioned in document D4 are stated to be created by a rotogravure coater. A rotogravure coater normally comprises a plurality of cells in the surface of a roller. The cells serve as reservoirs to transport liquid material from a liquid source to another surface, for instance for printing this other surface. The liquid is spread on the treated surface and the pattern of the surface of the roller is not reproduced on the treated surface. The roller thus does not produce areas devoid of material and does not produce formations corresponding to its cells. The

skilled person reading document D4 would be aware of this. The mention of a rotogravure coater in document D4 gives no indication of how the coater is to be used and in particular of how the valleys and ridges are to be formed. The skilled person when considering document D4 would find no teaching as to how to proceed to form particular shapes and how to create void areas. The skilled person thus would not consider creation of these features starting from document D4 as it contains no teaching for this purpose.

In another document which mentions the use of a gravure roller, document D5, the roller is used to achieve a uniform thickness of the treated surface despite having a trihelical pattern (column 7, lines 37 to 42 and 50 to 68) on the roller surface. This document thus also discloses no indication about how to achieve particular shapes and void areas using a rotogravure roller. The fact that the surface of the roller disclosed in document D5 produces a uniform thickness whilst having a particular pattern shows that it is by no means evident that a rotogravure roller may be used to provide three dimensional formations with void areas in between these formations.

In the case of document D4 it thus cannot be assumed that shapes may be created by using the cells of a roller as a mould.

The Board concludes therefore that the skilled person would not consider that the distinguishing features of the claim could be provided in an article of the type disclosed in document D4. Also the documents D1 - D3 and D6 to D8, which were mentioned by the respondent,



do not help. These documents show abrasive articles with areas devoid of abrasive material. However, the void areas are not created by rotogravure rollers so that the skilled person would not consider these documents as helping in the context of creating desired forms with rotogravure rollers as disclosed in document D4.

The respondent also argued that the subject-matter of claims 1 and 18 was obvious to the skilled person starting from document D1 and combining this with document D4. The distinguishing feature of these claims over the disclosure of document D1 is that each formation has widths which diminish in the direction away from the backing member.

However, the problem to be solved is to improve the cut rate whilst maintaining fine surface finishing. Document D4 does not in the opinion of the Board disclose the above mentioned distinguishing feature as has already been explained with respect to the novelty of document D4. Moreover, the ridges and valleys mentioned in document D4 are provided to form channels to enable the run off of slurry. The device of document D1 having a discontinuous abrasive which allows the run off of slurry has no need for additional slurry runoff capacity. The skilled person would thus have no reason to combine the teaching of document D4 with that of document D1.

3.5 Therefore, the subject-matter of claims 1 and 18 of the patent as granted involves an inventive step in the sense of Article 56 EPC.

4. *Claims 27 and 28*

These claims were not discussed by the parties but were discussed by the Opposition Division in their decision. The claims are directed to the products obtainable from the process of claim 18. Following the jurisprudence of the Boards of Appeal (see Case Law of the Boards of Appeal 4<sup>th</sup> edition 2001, section II.B.6.2) such claims must be considered as claims to the product independent of the process. In the present case the product of the process of claim 18 does, due to the requirements of the process, necessarily have certain characteristics. In particular abrasive formations are necessarily present which are interspersed with areas devoid of abrasive grain and binder, wherein each formation has widths which diminish in the direction away from the backing member. This is necessarily the case since claim 18 specifies that such formations are deposited on the backing member. Thus, the scope of claims 27 and 28 following the requirement that the coated abrasive material is obtainable by the process according to one of claims 18 to 26 is similar to that of claim 1 with the further limitation that they must be used in lapping operations or in an ophthalmic finishing machine in the second fining operations respectively. By virtue of the inherent features of the abrasive material due to the production process the subject-matter of claims 27 and 28 is novel and involves an inventive step for the same reasons as already set out with respect to claims 1 and 18.

5. *Late filed test results and other evidence*

- 5.1 One month before the oral proceedings before the Board the appellant filed the results of comparative tests with the teaching of document D4. As a reason for filing the evidence at this stage the appellant explained that he had considered that document D1 was the most relevant document and it was only on receipt of the provisional opinion of the Board that he realised that the Board considered that document D4 might be the closest prior art.

The Board cannot accept this argument. In the grounds for opposition the opponent had argued lack of inventive step based on document D4 as the closest prior art. In the appealed decision the Opposition Division considered document D4 to be the closest prior art. It was therefore quite clear to the appellant from a very early stage of both the opposition and the appeal proceedings that document D4 could be considered the closest prior art. The provisional opinion of the Board merely reflected the views of the Board at that time and did not particularly take an unexpected turn. The opinion cannot be considered as indicating for the first time any importance of document D4. A party to oral proceedings must be prepared that arguments by others may convince the Board. A communication from the Board is therefore not necessary for a party to react with regard to a specific issue.

Furthermore, comparative tests normally require careful consideration by the other party including discussions with technical experts who cannot be expected to be immediately available. It may also be necessary for the

other party to repeat the tests or perform other tests themselves. It is quite clear that it was not reasonable for the other party to do this within the short time available. The Board does not consider the relevance of the tests to play a role since even relevant evidence of this type should not be filed at such a late stage in the proceedings (see e.g. T 951/91, OJ 1995, 202). Moreover, in the case of comparative tests the relevance can only then be established when the other party has had an opportunity to repeat the tests. No good reason has been given why the oral proceedings should be postponed, which would be necessary, if the tests were admitted.

- 5.2 The Board decided therefore to exercise its discretion under Article 114(2) EPC not to admit the test results into the proceedings.
- 5.3 The evidence filed by the respondent two days before the oral proceedings was a response to the late filed evidence of the appellant. Since the evidence of the appellant was not admitted the evidence of the respondent became irrelevant and did not need to be considered.

**Order**

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

1. The decision under appeal is set aside.
2. The patent is maintained as granted.

The Registrar:

The Chairman:

G. Nachtigall

C. Holtz