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**D E C I S I O N**  
**of 5 May 2004**

**Case Number:** T 1252/01 - 3.2.7

**Application Number:** 95925566.2

**Publication Number:** 0782492

**IPC:** B24D 3/28

**Language of the proceedings:** EN

**Title of invention:**  
Composite abrasive products

**Patentee:**  
NORTON COMPANY

**Opponent:**  
3M Innovative Properties Company Office of Intellectual  
Property Counsel

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 54, 56, 83, 111(1)

**Keyword:**  
"Novelty - yes"  
"Inventive step - remitted to first instance"  
"Ground filed for first time in appeal proceedings -  
proprietor agrees to its admittance"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 1252/01 - 3.2.7

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.7  
of 5 May 2004

**Appellant:** NORTON COMPANY  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 19 October 2001  
revoking European patent No. 0782492 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** A. Burkhart  
**Members:** P. A. O'Reilly  
E. Lachacinski

## 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. 0 782 492.

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).

The Opposition Division held that the subject-matter of claim 1 of the patent was not novel.

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

D1: US-A-5 224 970

D2: US-A-5 219 806

D3: US-A-5 201 916

D12: WO-A-94/07970

D13: WO-A-94/07809

D14: WO-A-94/07969

III. The appellant requested that the decision under appeal be set aside and the opposition be rejected.

The respondent (opponent) requested that the appeal be dismissed, or alternatively that the case be remitted to the first instance for further prosecution.

IV. The independent claim of the patent as granted reads as follows:

"1. A composite abrasive product comprising a random nonwoven fibrous web with abrasive particles adhered thereto by means of an organic polymer characterized in that the abrasive particles are shaped particles of an abrasive material having a consistent cross-sectional shape along a longitudinal axis and an aspect ratio of at least 1.5:1."

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

(i) The subject-matter of claim 1 is novel. Document D1 discloses a mass of fibres. There is no disclosure of a fibrous nonwoven web.

Document D2 discloses crushing the shaped particles so that irregular particles are formed. This occurs in every case. Even when shaped particles are formed they are afterwards crushed.

Document D3 does not disclose abrasive particles as defined in claim 1. When the aspect ratio as properly understood from claim 1 is applied to the disclosure of document D3 the aspect ratio of the abrasive particles disclosed therein is lower than that specified in claim 1. This is because the definition of aspect ratio used in document D3 is the opposite of that used in claim 1. This means that the statement in document D3 that the aspect ratio is 1.5:1 or more indicates an aspect ratio in the sense of claim 1 which is far lower than that specified in claim 1.

In document D12 the passage on page 13, line 14 to page 14, line 8 refers to a coated abrasive product. However, claim 1 is not directed to a coated abrasive product and the skilled person would recognise this. The passage on page 14, lines 16 to 25 and figure 3 do not show a nonwoven web but rather a polymer filament structure. Also in document D12 even where shaping of abrasive particles is mentioned it is always followed by crushing which produces irregular particles.

Documents D13 and D14 each have a similar disclosure to that of document D12 and do not disclose the features of claim 1 for the same reasons.

- (ii) Even if the definition of aspect ratio is different to the usual definition the skilled person has no difficulty in producing molded particles in accordance with this definition as is described in the description of the patent.
  - (iii) With regard to remittal to the first instance the appellant would prefer that inventive step also be discussed by the Board but can accept that the case be remitted to the first instance if the Board prefers this.
- VI. The respondent argued in written and oral submissions essentially as follows:
- (i) The subject-matter of claim 1 lacks novelty over the disclosure of each of documents D1, D2, D3, D12, D13 and D14.

Document D1 discloses a nonwoven fibrous web with abrasive particles adhered thereto, since the abrasive fibres mentioned therein may be mixed with other fibres, processed as a nonwoven fabric and admixed with a resin (column 2, lines 51 to 63). The abrasive particles have the properties specified in the characterising portion of claim 1 (column 2, lines 14 to 30).

Document D2 discloses the preamble of claim 1 in column 11, lines 47 to 51. The abrasive grains may be fibres which have a consistent cross-section (column 9, lines 49 to 53) and an aspect of more than 1.5:1 (inherent in a fibre). It is true that these features are only disclosed individually but claim 1 is so broad as to cover this.

Document D3 discloses all the features of the preamble of claim 1. Moreover the document discloses expressly an aspect ratio of more than 1.5:1. The normal meaning of aspect ratio must be taken for claim 1, i.e. the greatest dimension as the length which is divided by the greatest perpendicular dimension. This is also the definition used in document D3. The feature of claim 1 that there is a consistent shape along a longitudinal axis is independent of the feature which defines the aspect ratio. The aspect ratio can only mean taking the longest dimension as length and dividing by the greatest perpendicular dimension. Any other interpretation would not be reproducible for molded articles following the description of the patent.

Document D12 discloses a fibrous nonwoven web. On page 13, line 16 this is explicitly disclosed and on page 14, lines 17 to 25 the polymer structure described therein is a fibrous nonwoven web. In both cases abrasive grains are adhered. On page 8, lines 18 to 24 shaping of abrasive material is described. One of the disclosed shapes is a rod. A rod inherently has an aspect ratio of more than 1.5:1. If the ratio of length to width were less than this value the shape would not be described as a rod.

Documents D13 and D14 each have a similar disclosure to that of document D12.

- (ii) Claim 1 has been interpreted by the appellant to mean that the dimension taken along the axis for which the abrasive particle has a consistent cross-sectional shape is to be considered the length for the purposes of deriving the aspect ratio, irrespective of whether it is the greatest dimension. With this interpretation the claim is non-reproducible in the sense of Article 83 EPC for particles produced by molding. The claim includes particles made by molding within its scope. If the interpretation of claim 1 when applied to the prior art as described in document D3 means that the molded abrasive particles disclosed therein are not within the scope of the claim then the claim may not include molded abrasive particles within its scope.

(iii) If the patent cannot be revoked by the Board the case should be remitted to the first instance to discuss inventive step.

## **Reasons for the Decision**

### 1. *Interpretation of claim 1*

1.1 Claim 1 specifies shaped particles having a consistent cross-sectional shape along a longitudinal axis. The Board understands this feature as defining the longitudinal axis. The Board understands the feature that the cross-sectional shape is consistent as meaning that the ratios between the various cross-sectional dimensions do not change along the axis even though the magnitude of the individual dimensions may vary. In the case of a rectangular cross-section this means that the ratio of the lengths of the perpendicular sides does not change along the longitudinal axis even if their magnitudes do change. A shape which remains rectangular along the longitudinal axis but with varying ratios between the lengths of the perpendicular sides of the rectangle does not, in the view of the Board, provide a consistent cross-section in the sense of claim 1. This view was confirmed by the appellant.

The Board is also of the opinion that the reference in the claim to aspect ratio cannot be taken in isolation from the rest of the claim. The term longitudinal inherently refers to length. Since a longitudinal axis has been defined in the claim it is clear that the aspect ratio must be seen in the light of this



definition. This means that for deriving the length to be considered for the aspect ratio the starting point is the longitudinal axis. This length should then be compared with the dimensions perpendicular thereto, as is normal for the aspect ratio. This view of the Board is consistent with the description of the patent.

- 1.2 Claim 1 specifies a fibrous web with adhesive particles adhered thereto. The Board understands by this that the particles are adhered to the surface of the web as opposed to the interior of the web. This interpretation is consistent with the description of the patent.

## 2. *Novelty*

- 2.1 The appellant has argued that document D1 does not disclose a nonwoven fibrous web with abrasive particles adhered thereto. The Board agrees with the appellant. Document D1 discloses that alumina fibres as abrasive fibres together with other fibres may be bonded with a resin (column 1, lines 68 and column 2, lines 51 to 63). In the opinion of the Board this does not constitute a disclosure of a web. There is no indication that the connections between the fibres are such that a nonwoven fibrous web is formed and that abrasive particles are attached thereto. Rather there is a disclosure of a simple mixture of two types of fibre and a resin. Also, in Example 1 of the document, to which the respondent referred, there is merely a statement that unidirectional alumina fibres were spread to make a sheet which was sandwiched between resin films. Again here there is no indication that a web is formed and no indication that abrasive particles are attached to such

a web. Document D1 does not therefore take away the novelty of claim 1.

2.2 Document D2 discloses individually many of the features of claim 1. However, the document does not disclose these features in combination. The document is not directed exclusively to abrasive materials. In column 11, lines 19 to 22 there are mentioned eight products. Only one of the products is an abrasive grain. It is disclosed that abrasive grain may be used in conventional abrasive products which include not just nonwoven webs (column 11, lines 34 to 46) but also other types of abrasive products (column 11, lines 47 to 60). The abrasive grain may be shaped by cutting or machining (column 7, lines 16 to 17), or alternatively crushed (column 7, lines 17 to 21) to a shape which is presumably an irregular shape. In this respect the Board does not agree with the appellant that in every case the grain is crushed since the sentence in column 7, lines 16 to 19 quite clearly describes two alternative processes. Examples 1 to 5 of document D2 do not disclose the production of an abrasive. Example 6 discloses the production of abrasive grain by crushing (column 16, line 63 to column 17, line 3), which would produce irregular shapes. Example 7 uses the abrasive grain according to Example 6 (column 17, lines 62 to 65). Examples 8 to 11 disclose the production of fibres without however indicating any abrasive use. According to column 4, lines 11 to 18 the fibres have a number of uses. None of these uses is an abrasive use. According to column 4, lines 4 to 11 the abrasive embodiments make use of abrasive grains. Although the shaping of grains is disclosed there is no indication in the document that the abrasive grains

according to document D2 have a shape corresponding to the characterising portion of claim 1. Document D2 does not therefore take away the novelty of claim 1.

- 2.3 Document D3 discloses an abrasive product having the features of the preamble of claim 1 and the appellant has not disputed this view. The appellant however disputes that the abrasive material has a form corresponding to the characterising portion of claim 1. When applying the earlier mentioned interpretation of aspect ratio to document D3 the conclusion is reached that the document does not disclose the characterising feature of claim 1 but rather the opposite. Document D3 uses a definition of aspect ratio which, even if it may be conventional, is the opposite of the definition used in claim 1. This means that the statement in document D3 referring to an aspect ratio of 1.5:1 or more leads, in the terminology of claim 1, to a disclosure of an aspect ratio of 0.67:1 or less.

The respondent and the Opposition Division took the view that the aspect ratio must be considered separately from the definition of the longitudinal axis. They considered that the conventional definition of aspect ratio should be used which they considered to be that the greatest dimension is taken and then this is divided by the greatest dimension perpendicular thereto. The Board cannot agree with this view. The longitudinal axis is defined in the claim with respect to the axis along which the material has a consistent cross-sectional shape. The term longitudinal by definition implies lengthwise and hence the longitudinal axis specifies a length. Since the claim immediately after defining the longitudinal axis defines an aspect ratio it is quite

clear that these two features cannot be taken isolation but must be considered together. The defined longitudinal axis must be used for the length when deriving the aspect ratio. The greatest perpendicular dimension to this longitudinal axis must be used to calculate the aspect ratio.

The Board has considered the application of the definition in claim 1 to document D3 by considering which axes of the abrasive particles may be considered to correspond to the longitudinal axis as defined in claim 1 and which aspect ratios may then be derived. In the case of the triangular shapes mentioned for instance in Example 1, it is not possible to identify a longitudinal axis in accordance with claim 1 other than the axis which is perpendicular to the plane of the triangle. If an axis is considered in the plane of the triangle which passes through an apex of the triangle then the cross-sectional shape will not be consistent along the axis. The cross-sectional shape will be rectangular but the ratio of the lengths of the sides will vary along the axis. The same applies to the disc shape in Example 2 if a diameter is used as an axis. In the case of the square shape disclosed in Example 3 an axis passing through one of the side face will have a rectangular cross-section perpendicular thereto. This shape will also be consistent along the axis, without indeed the dimensions changing. However, the greatest perpendicular dimension - a diagonal across the face of the rectangular cross-section - will in fact be slightly greater than the length along the axis. This implies an aspect ratio in the sense of claim 1 which is less than 1:1. Examples 4 to 11 all disclose triangular shapes so that the same considerations apply as to Example 1. The

Board therefore concludes that none of the abrasive particles disclosed in document D3 comply with the characterising feature of claim 1. Document D3 does not therefore take away the novelty of claim 1.

- 2.4 Document D12 discloses the preparation of abrasive grains and their application to certain types of abrasive products. On page 13, line 14 to page 14, line 3 a nonwoven web is disclosed as a backing. Abrasive grain, as described in the document, is adhered to the backing by an organic binder. The Board considers that the skilled person would implicitly understand a polymer as the organic binder. The Board is therefore satisfied that this passage discloses the preamble of claim 1. In the section of document D12 which describes the preparation of the base grits the shaping of a gel is described on page 8, lines 18 to 24. Five specific shapes are described. The respondent specifically referred to the shape of a rod and indeed there is no indication or possible expectation that the other shapes would necessarily have an aspect ratio approaching 1.5:1 or more. The shape of a disk for instance seems to imply an aspect ratio of less than 1:1. With regards to the rod the Board is aware that the normal expectation is that this shape is long relative to its width. However, the Board considers that the term must be considered in the context of its disclosure and taking into account the fact that it is one of five possible shapes. The Board considers that in this particular instance a rod shape does not imply a length which is necessarily much greater than its width. In the case of a rod with circular cross-section if the length were less than its diameter it would be termed a disk. Since a disk is also mentioned as a

possible shape the Board considers that the only implicit disclosure derivable from the term rod in the context is that it has a length greater than its diameter. This disclosure does not go so far as to imply a length of 1.5:1 or more times the width. Indeed, such an implication would mean that the rod is very different to the four other disclosed shapes. The Board has also considered the shapes disclosed in figure 1 which is a coated abrasive product. The shapes appear to be irregular and the maximum perpendicular dimension cannot be ascertained since the figure only shows two dimensions and knowledge of three dimensions is needed to derive the maximum dimension.

The Board considers that document D12 does not disclose the rod shape in combination with the features of the preamble of claim 1. The rod shape is one of five shapes in a list. Also on page 13, line 16 the nonwoven web is disclosed as one of five backing materials, wherein some of the others, e.g. cloth, are not a nonwoven web. This means that there is no specific disclosure of the said combination, nor is the number of possible combinations so small as that it could be considered that all combinations are specifically disclosed.

With respect to document D12 the respondent referred to the embodiment of figure 3, referring to page 14, lines 17 to 25. However, the abrasive grains are stated to be distributed throughout the structure and bonded therein in contrast to claim 1 which requires that they be adhered thereto. Moreover, as explained above the rod shaped grains are not disclosed to have the required aspect ratio.

Document D12 does not therefore take away the novelty of claim 1.

2.5 The disclosure of documents D13 and D14 does not go beyond that of document D12. Neither of documents D13 and D14 therefore takes away the novelty of claim 1.

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

### 3. *Insufficiency*

3.1 This ground was mentioned for the first time during appeal proceedings. The proprietor however agreed that the ground could be introduced into the appeal proceedings.

3.2 Claim 1 sets out a definition of the aspect ratio. This definition may be different to that which is conventional in the art. However, the description describes methods of molding abrasive particles which comply with this definition. The Board can see no reason therefore why the skilled person cannot carry out the teaching of claim 1. The mere fact that the definition of aspect ratio may differ from the conventional does not prevent the skilled person from carrying out the teaching of claim 1 since the description is consistent with the definition used in claim 1.

3.3 Therefore, the invention as claimed in claim 1 of the patent is sufficiently disclosed in the sense of Article 83 EPC.

4. *Late filed evidence*

During the appeal proceedings the appellant filed the results of tests performed by the appellant. The appellant indicated that these tests related to the question of inventive step. The Board did not therefore take a decision as to whether this evidence should be admitted into the proceedings.

5. *Remittal to the First Instance*

The Opposition Division has not yet examined claim 1 with regard to inventive step. In accordance with Article 111(1) EPC, the Board therefore considers it appropriate to remit the case to the first instance so as to give the parties the possibility to argue their case before two instances.

**Order**

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

1. The decision under appeal is set aside.
2. The case is remitted to the first instance for further prosecution.

The Registrar:

The Chairman:

R. Schumacher

A. Burkhart