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**D E C I S I O N**  
of 22 August 2001

**Case Number:** T 0659/97 - 3.3.5

**Application Number:** 85100506.6

**Publication Number:** 0152768

**IPC:** C04B 35/10

**Language of the proceedings:** EN

**Title of invention:**

Abrasive grits or ceramic bodies and preparation thereof

**Patentee:**

NORTON COMPANY

**Opponents:**

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Minnesota Mining & Manufacturing Company  
H.C. STARCK GmbH & Co. KG  
Hermes Schleifmittel GmbH & Co.

**Headword:**

Abrasive grits/NORTON

**Relevant legal provisions:**

EPC Art. 100(c), 123(2), 113(1)

**Keyword:**

"Fresh ground of opposition (no)"  
"New arguments on appeal (allowable)"  
"Subject-matter claimed not clearly and unambiguously disclosed  
in application as originally filed"

**Decisions cited:**

G 0010/91, G 0001/93, G 0001/95, G 0007/95, G 0002/98,  
T 0086/94, T 0432/94, T 0688/99, T 0383/88

**Catchword:**

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Case Number: T 0659/97 - 3.3.5

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.5  
of 22 August 2004

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**Decision under appeal:**

Decision of the Opposition Division of the  
European Patent Office posted 18 April 1997  
revoking European patent No. 0 152 768 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** R. K. Spangenberg  
**Members:** B. P. Czech  
M. B. Günzel

## Summary of Facts and Submissions

- I. The appeal is from a decision of the opposition division to revoke the European patent 0 152 768.

Claim 1 of the granted patent read as follows:

"1. Aluminous abrasive grits, of a high density polycrystalline phase consisting of submicron equiaxed  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> crystalites, and impurities, said grits having a density of greater than 90% of theoretical density and a hardness of at least 18 GPa optionally containing additives of zirconia, magnesia present as spinel and chromiumoxide".

- II. In the decision of the opposition division (page 3, item 6 and reasons 1. and 1.1) it was inter alia held that claim 1 as granted met the requirements of Article 123(2) EPC. More particularly, the opposition division considered the combination of "a density of greater than 90%" and "a hardness of at least 18 GPa" to be covered by the original disclosure. Account having been taken of the various amendments submitted in the form of auxiliary requests, the patent was revoked on the grounds of insufficiency of the disclosure and lack of novelty. In the context of the assessment of sufficiency of disclosure, the opposition division interpreted the expression "consisting of" as used in claim 1 as requiring that "the grits contain 100 percent submicron equiaxed  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> crystalites and impurities", and held that "only example IV discloses a product which contains 100% submicron particles".

- III. With its written statement setting out the grounds of appeal, the appellant NORTON COMPANY (patent proprietor) filed two amended sets of claims, stating that the respective claims 1 corresponded to the

granted claim 1. It contested the findings of the opposition division concerning sufficiency of disclosure and novelty.

IV. The parties were summoned to oral proceedings.

V. With its letter dated 18 July 2001, in preparation of the oral proceedings, respondent 02 (Minnesota Mining & Manufacturing Company, opponent II) inter alia raised objections under Article 123(2) EPC against the respective claims 1 filed on appeal. More particularly, it objected to the extent of the expression "chromiumoxide" in comparison to the formula  $\text{Cr}_2\text{O}_3$  used in the application as filed. It also argued that since both claims 1 were not restricted to products obtained by sol-gel processes, let alone by seeded sol-gel processes, they would extend "beyond the subject-matter as originally filed". In the context of objections concerning the sufficiency of the disclosure, it doubted "whether the product of example IV fulfills the hardness and density criteria of claim 1".

VI. In a communication dated 20 July 2001, the board noted

- "that the appellant has not contested the finding of the opposition division according to which only the products of example IV, first run in table 6, contain 100% submicron equiaxed alpha-alumina particles";
- that "in the application as originally filed, the hardness and density obtained according to this particular example has not been specifically indicated"; and
- that "an addition of Zr, Mg or Cr does not appear to be specifically addressed in this example";

and indicated inter alia

- that "since claim 1 comprises two alternatives (with or without additives) of a very specific combination of features (chemical, structural and physical properties)", it was "arguable whether the application as originally filed provides a sufficient basis for supporting all of the amendments carried out in the claims and the description";
- that the appellant "should therefore be prepared to indicate a supporting basis, in the application as originally filed, for every amendment to the description and/or claims, including the dependent claims (be it by addition, combination, generalisation or deletion of features) made during the examination, opposition and appeal proceedings"; and
- that the parties should be prepared to comment on the meaning of the terms and expressions used in claim 1. The terms "consisting", "submicron" and "impurities" were specifically addressed.

VII. With its letter dated 23 July 2001, the appellant filed seven sets of claims, amended in response to the objections raised by respondent 02. It requested to disregard the written submissions of respondent 02 as being filed late. It argued that the submission of a new line of argument at this late stage constituted an abuse of the proceedings. In addition, it submitted that the introduction of new objections under Article 100(c) EPC contravened established case law. Moreover, it refuted the objections raised by respondent 02, and inter alia indicated passages of the application as published supporting the amendments to the claims. The appellant also submitted that "there is no reason to

believe that the product of example IV should not fulfill the hardness and density criteria of claim 1".

VIII. Oral proceedings were held on 22 August 2001, in the presence of the appellant and respondents 02 and 03 (H.C. STARCK GmbH & Co. KG, opponent III).

In the course of the oral proceedings, the respondents 02 and 03 inter alia questioned whether the combination of features comprised in the respective claims 1 had been disclosed in the application as filed. More particularly, it was discussed whether the application as filed disclosed grits having a hardness of at least 18 GPa and consisting of submicron equiaxed  $\alpha$ -alumina. The board also questioned whether magnesia present in the grits had to be considered as an impurity and where in the application as filed there could be found a disclosure for entirely magnesia-free grits, having the required hardness and micro-structure.

The appellant submitted two sets of amended claims labelled "New request 1" and "New Request 2" to replace the claims on file. Claim 1 according to "New Request 1" has been restricted in comparison to claim 1 as granted by replacing the minimum relative density value of "90%" by "95%" and by deleting the expressions "additives of zirconia" and "and chromiumoxide".

Claim 1 according to "New Request 2" has been further restricted in comparison to claim 1 of "New Request 1" by adding the feature "having a size of 0.2 to 0.4  $\mu\text{m}$ " concerning the  $\alpha\text{-Al}_2\text{O}_3$  crystallites.

IX. The appellant's submissions concerning the interpretation of claim 1 according to both of these requests and the original disclosure of the claimed subject-matter, as made essentially during the oral proceedings, can be summarised as follows:

In a first alternative, claim 1 according to both requests was directed to grits consisting only of submicron equiaxed  $\alpha$ -alumina crystallites and impurities. After some discussion, the appellant confirmed that blocky or lath-like alumina particles were not to be considered as impurities in the sense of claim 1. It maintained that magnesia present in very small amounts in the final grits had to be considered as an impurity in the sense of claim 1. Hence, both examples II and X would disclose grits according to the first alternative of claim 1. Moreover, these examples would also implicitly disclose the absence of coarser alumina particles, since blocky or lath-like shapes were not addressed. These essentially magnesia-free products were the commercially most important ones, for which protection was sought by means of the first alternative of claim 1. The grits obtained according to example IV would be fully sintered and would implicitly have the required hardness and density. Concerning this example, it initially asserted that it was carried out without the addition of a magnesium compound, but later it stated that it did disclose the addition of magnesia by means of the reference to the "general procedure of example I". It indicated various parts of the claims, the general description and the examples as originally filed which the skilled person would understand to form a basis for the claimed subject-matter. Although none of the examples literally mentioned all the features of the first alternative of claim 1, the skilled person would take from the whole application as filed that it was feasible and one of the intentions of the invention to produce grits with all these features, i.e. grits consisting of submicron equiaxed alumina crystallites, comprising no magnesia at all or only in the impurities range, and having the required density and hardness values. It submitted that it was legitimate to combine important features, disclosed in general form in



different parts of the original description, into a new claim.

- X. Respondent 02 stated that objections under Article 100(c) EPC had already been raised during the opposition proceedings and that, therefore, he was entitled to present arguments concerning this ground of opposition.

During the oral proceedings, respondents 02 and 03 essentially submitted that the application as originally filed would not disclose the combination of features according to claim 1 of both requests. Some features of claim 1 as granted had been taken from the examples, and combined with some more general and some more specific features not referred to in each of these examples, in particular the features "consisting of", "high-density polycrystalline phase", "density greater than 90%" and "hardness of at least 18 GPa". They pointed out that example IV did not indicate measured density or hardness values. During the oral proceedings, respondent 02 submitted that according to his own experts consolidated ceramic grits having a hardness of at least 18 GPa could not have been obtained with a firing time of only one minute as according to example IV. The respondents noted the referral, in examples II and X, to example I which disclosed the presence of "blocky shapes", and pointed out the absence, in examples II and X, of any indications concerning the crystal sizes obtained.

- XI. As main request, the appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the claims of "New Request 1" submitted during the oral proceedings.

As auxiliary request, the appellant requested that the decision under appeal be set aside and that the patent

be maintained on the basis of the claims of "New Request 2" submitted during the oral proceedings.

The respondents 02 and 03 requested that the appeal be dismissed.

The respondents 01 and 04 did not participate in the appeal proceedings and submitted no requests.

### **Reasons for the Decision**

#### **1. *New objections under Article 100(c) EPC***

1.1 In the first instance proceedings, Article 100(c) EPC had been invoked as a ground of opposition by respondent 01 and respondent 04. This ground of opposition was addressed during the first instance proceedings, see e.g. the minutes of the oral proceedings, items 10.1 and 11.1. The opposition division decided on this issue in its written decision, see reasons 1. Hence, objections on the ground of Article 100(c) EPC raised by any one of the respondents or by the board in the course of the appeal proceedings are not based on a "fresh ground" of opposition in the sense of opinion G 10/91 (OJ EPO 1993, 420) and decisions G 1/95 (OJ EPO 1996, 615) and G 7/95 (OJ EPO 1996, 626).

1.2 In the present case, some of the specific objections/arguments under Article 100(c) EPC dealt with during the opposition proceedings were not the same as the ones discussed in the appeal proceedings (see items II, V, VI and VIII here above), and on which the present decision is based. However, the board is not aware of any justification for excluding or disregarding relevant arguments concerning the ground

of opposition under Article 100(c) EPC, for the sole reason that they differ from the lines of argument relied upon - under the same ground - before the first instance. In the examination of objections under Article 100(c) EPC, the contents of the application as filed and of the granted patent are to be considered as the relevant facts, and all attempts to demonstrate divergences between them are to be considered as arguments based on these facts. In such a case, the "legal and factual framework" as referred to in opinion G 10/91 (reasons 6) is not changed since no new facts or evidence and no new ground need to be relied upon. Where Article 100(c) EPC has been raised as a ground of opposition and has been considered in the appealed decision, it is the board's duty to assess correctly whether or not the appellant's requests comply with said Article. Hence, the board has to consider **all** arguments which are relevant, independently of the point in time at which they were introduced into the proceedings. This position is in line with earlier jurisprudence, see e.g. Case Law of the Boards of Appeal of the EPO, 1998, VI-F, 6, decision T 86/94 of 8 July 1997, reasons 2.2.2, and decision T 432/94 of 19 June 1997, reasons 5.4.1. For the same reason, once the board has become aware, during the prosecution of the case, of additional arguments not raised by one of the parties, and which are of decisive importance in the correct assessment of the case, within the given framework of Article 100(c) EPC, it has the power and the duty to bring them into consideration in the course of the proceedings.

- 1.3 With its communication date stamped 24 July 2001, issued in preparation of the oral proceedings, the board has addressed the question of whether the application as originally filed provided a sufficient basis for all the amendments carried out in the claims.

Respondent 02 (opponent II) has raised some objections in its written submission of 18 July 2001. The period of roughly one month in advance of the date of the oral proceedings was sufficient for the appellant to reconsider this aspect of the case and to familiarise itself again with the contents of its own application as filed, in particular since the latter has a size of thirteen pages only. Moreover, ample opportunity was given to the appellant during the oral proceedings to file requests comprising claims amended to overcome the deficiencies as discussed. Hence, he has not been deprived of his right to be heard, in accordance with Article 113(1) EPC.

2. *Alternative products covered by claim 1 (main request)*

Leaving out all the features recited as optional, claim 1 according to the main request is directed, in one alternative, to "aluminous abrasive grits, of a high-density polycrystalline phase consisting of submicron equiaxed  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> crystallites, and impurities, said grits having a density of greater than 95% of theoretical density and a hardness of at least 18 GPa". This embodiment is, in the following, labelled "alternative A" for the sake of conciseness of the decision.

3. *Interpretation of claim 1 (main request), alternative A*

3.1 As explicitly acknowledged by the appellant during the oral proceedings, it follows from the language used in claim 1 that, in the case of alternative A, no other alumina components than "a polycrystalline phase of submicron, equiaxed  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> crystallites" may be present in the grits according to claim 1. Crystallites having a size of more than 1  $\mu$ m, and/or being non-equiaxed may thus not be present. Moreover, the grits

according to this alternative may not comprise the optional "magnesia present as spinel" component.

3.2 In claim 1, the term "impurities" is used to designate further components that may be present in the grits. Concerning the meaning of this term, which is not further defined in claim 1 itself, and which has only been introduced into the claim during substantive examination, one has to refer to the following passages of the application as originally filed:

- On page 3, lines 16 to 17, zinc and iron are mentioned as possible **impurities** introduced from the piping and associated **equipment**.
- On page 5, lines 6 to 7 and page 5, line 37 to page 6, line 2, reference is made to **impurities** contained in the alumina **milling media** used.
- On page 9, lines 14 to 26,  $\text{SiO}_2$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{TiO}_2$ ,  $\text{CaO}$  and  $\text{Na}_2\text{O}$  are referred to as **impurities** introduced during the **milling** operation.

On the other hand,  $\text{MgO}$ ,  $\text{SiO}_2$ ,  $\text{Cr}_2\text{O}_3$ , and/or  $\text{ZrO}_2$  are referred to as **additives** on - inter alia - page 2, lines 30 to 34, on page 4, lines 1 to 9, in example X and on page 11, lines 9 to 26. According to the passages on pages 2 and 11, the addition of these compounds is optional, and they act as **crystal** or "**grain**" **growth inhibiting additives** where the high purity of the alpha-alumina is not a requirement. Moreover, it is noteworthy that on page 4, lines 1 to 4, the appellant himself qualified magnesia precursors as "the most useful **additives**", and that zirconia, magnesia and chromiumoxide were labelled as "additives" in granted claim 1.

- 3.2.1 The appellant argued during the oral proceedings that in view of the cited passages a skilled person would consider any components present in very small amounts to be impurities. Magnesia present in amounts as small as the 0.14% present in the grits according to run 9498 of example X would therefore have to be considered as an impurity in the sense of claim 1.
- 3.2.2 The board cannot accept this interpretation, since it is not supported by the text of the application as originally filed.

The description as filed only refers to magnesia as an impurity of the alumina milling media. Nowhere, not even in the passage on page 9, is it clearly indicated that any magnesia comprised in the final grits, irrespective of whether it has been deliberately added as magnesium compound or whether it originates from the alumina raw material or the milling media debris, has to be considered as an impurity. The board did not overlook that some of the components that might be comprised in the grits produced, e.g. silica, are sometimes labelled as impurities and sometimes as additives (compare e.g. page 9, lines 23 to 26 and page 11, lines 9 to 10). The board also noted that although  $\text{SiO}_2$ ,  $\text{Cr}_2\text{O}_3$  and  $\text{ZrO}_2$  are mentioned as "grain" growth inhibitors on page 11, lines 9 to 10, they are not included as optional components in present claim 1.

However, since magnesia is qualified in the description as "the most useful **additive**", the board holds that it cannot be considered as an impurity at the same time. Whether a magnesium component present in the final grits has been introduced by way of a separate addition of a magnesium compound or by means of the milling operation is of no relevance for the interpretation of the present product claim 1. In both cases, the

magnesium component has to be considered as an additive with the inherent function indicated in the description, i.e. the suppression of crystal growth. Moreover, it does not clearly and unambiguously emanate from the application as filed that magnesia, which has not been added as magnesium compound, but is nevertheless present in the final grits in very small amounts of e.g. the 0.14% mentioned in example X, run No 9498, would not have a certain crystal growth inhibiting effect. Since neither the application as filed nor claim 1 indicate a clear borderline - in terms of a magnesia percentage - between a concentration range where magnesia is to be considered as an additive, and a concentration range where magnesia is to be considered as an impurity in the sense of claim 1, the interpretation of the term impurity as adopted by the appellant is entirely arbitrary and cannot be accepted.

3.3 The cited passages of the description also confirm that in the application as filed, the term "impurities" is exclusively used to refer to the chemical nature of such components and not the shape of the alumina particles. Alumina particles of blocky, lath-like or any other shape which is not submicron and equiaxed are not to be regarded as impurities in this sense and may thus not be contained in the grits according to claim 1, alternative A, as accepted by the appellant at the end of the oral proceedings.

3.4 Hence, the board holds that claim 1, alternative A has to be construed as being directed to grits comprising no other  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> components besides the "submicron equiaxed  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> crystallites" and no magnesia (or other crystal growth suppressing component) in more than trace amounts being clearly ineffective to suppress crystal growth.

4. *Basis for amended claim 1 (main request), alternative A, in the application as originally filed*
- 4.1 According to Article 100(c) EPC, a granted patent may be opposed on the ground that it's subject-matter "extends beyond the content of the application as filed". This wording is essentially the same as the one used in Article 123(2) EPC.
  - 4.1.1 The idea underlying these provisions is that an applicant should not be allowed to improve his position by adding subject-matter not disclosed in the original application, giving him an unwarranted advantage by obtaining patent protection for something he had not properly disclosed and maybe not even invented at the filing date of the application, and possibly being damaging to the legal security of third parties relying on the contents of the original application (see G 1/93, OJ EPO 1994, 541, reasons 9 and 16).
  - 4.1.2 An amendment must be regarded as introducing subject-matter extending beyond the content of the application as filed, if the overall change in the content of the application results in the skilled person being presented with information which is not clearly and unambiguously presented in the originally filed application, even when account is taken of matter which is implicit to a person skilled in the art (see e.g. T 688/99 of 11 July 2001, reasons 2.2 and T 383/88 of 1 December 1992, reasons 2.2.2). The criteria to be used when comparing a claimed invention to the subject-matter disclosed in an earlier document allegedly disclosing the same invention have recently been defined once more in the conclusion of opinion G 2/98 (OJ EPO 2001, 413), relating to the comparison between a claimed invention and a priority document: The skilled person must have been able to derive the



subject-matter of the claim directly and unambiguously, using common general knowledge, from the previous application as a whole.

4.1.3 Where, as in the present case, an independent claim present in the application as originally filed has been amended and restricted by means of additional features taken from a number of not clearly related parts of the application as filed, it is not sufficient that all the added features are mentioned somewhere in that document. Rather, the **combination** of features in question must be clearly and unambiguously derivable from the application as filed by a skilled person using common general knowledge. Therefore, multiple limitations generating specific subject-matter not derivable from the application as filed cannot be allowed.

4.2 In the present case, claim 1, alternative A, is essentially based on independent claim 4 as originally filed, wherein the expression "**consisting essentially of sintered equiaxed non-faceted alpha alumina particles having a particle size less than 1 micron**" has been replaced by "**of a high-density polycrystalline phase consisting of submicron equiaxed  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> crystallites**", wherein the density value of "90%" has been replaced by "95%", and to which the indication of a "**hardness of at least 18 GPa**" has been added (emphasis added).

4.3 The appellant did not dispute that the original application contains no **literal** disclosure of abrasive grits having - in combination - all the properties recited in claim 1, alternative A, and more particularly

- (i) an abrasive grit of a polycrystalline phase consisting of submicron, equiaxed  $\alpha$ -alumina crystallites and impurities in the sense of claim 1 (for the proper construction of "consisting of" and "impurities" see item 3. here above),
- (ii) a density of greater than 95% of the theoretical density, and
- (iii) a hardness of at least 18 GPa.

Concerning the original disclosure of such grits, the appellant relied on the original application taken as a whole, but more particularly on claims 4, 6 and 7, examples IV, II and X, page 1, lines 2 to 5, page 2, lines 30 to 34, page 3, lines 3 to 6, page 7, lines 14 to 26, page 7, line 27 to page 8, line 2, and the passage on page 11, lines 2 to 6. More particularly, it argued that the skilled person would read the information given in examples II, IV and X in combination with the general indications concerning structure, hardness and density of the grits as given in original claims 4, 6 and 7 and on the original description pages 7,8 and 11, this combination disclosing the claimed grits.

4.4 The board is, however, convinced that neither these parts nor any other parts of the original disclosure, or combinations thereof, can constitute a basis for the present amended claim 1. As will appear from the following reasons, an abrasive grit with the combined features (i), (ii) and (iii) has not been originally disclosed.

4.4.1 In the original application, a polycrystalline phase consisting of exclusively submicron and equiaxed  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>

crystallites was not generally presented as being a key feature of the invention, even less in combination with the remaining features of (i), (ii) and (iii). In most of those parts of the original application wherein the alumina crystallite size in the final grits is addressed, language such as "containing" (claims 1 and 8, page 3, line 4), "consisting essentially" (claims 4 and 6), "mainly" page 6, line 21) or "having" (page 11, line 4) is used. Original claim 6 refers to grits consisting of an alumina matrix and a secondary particulate material, see also page 4, lines 9 to 11, which do not, therefore, fall under claim 1. Moreover, in view of the expression "consisting essentially of", the matrix need not consist exclusively of submicron equiaxed alumina crystallites. Example I mentions the presence of "rare blocky shapes about 5 micron in diameter", example III mentions a "cellular appearance", and according to examples V to IX "lath-like coarse crystals" occur in the final grits at firing times of more than one minute. Nevertheless, grits fired for up to five minutes, and hence comprising substantial amounts of coarser particles (see the table on page 7, right column) were originally labelled as "preferred", although the presence of coarse particles was "believed to be less desirable" (see page 7, lines 10 to 13). Examples II and X are silent about the shape and size of the alumina crystallites.

- 4.4.2 In fact, the only explicit mention of grits with an alumina phase **consisting** of equiaxed and submicron  $\alpha$ -alumina crystallites is to be found in example IV (see table on page 7, first row of data) and in original claim 7. The grits defined in original claim 7 do, however, explicitly comprise an additional spinel matrix component (MgO being the only spinel former mentioned in the application) and cannot, therefore,

form a basis for claim 1, alternative A. On the other hand, the grits obtained according to example IV do not comprise coarse alumina particles, but their specific density and hardness values are not indicated. These values cannot be regarded as being implicitly disclosed as the inevitable result of performing the experimental procedure described, as will become apparent from the following discussion of the disclosure provided by example IV.

#### 4.4.3 Example IV

Concerning the experimental procedure relied upon, the description of examples IV to IX refers back to "the general procedure of example I", but neither the separate addition of a magnesium compound nor the nature of the milling media are explicitly addressed. The board therefore holds that the description of the experimental procedure used in example IV is ambiguous as to whether a magnesium compound is added to the starting material or not. The contradictory opinions concerning this issue as expressed by the appellant itself during the oral proceedings support the position taken by the board. Moreover, the exact firing regime, and in particular the heat-up times used to reach the firing temperature, are not indicated such as e.g. in example X.

Assuming that a magnesium compound has been separately added in accordance with the general procedure of example I, the grits obtained would contain about 5% MgO and could not support a claim directed to alternative A. Assuming, on the other hand, that the magnesia containing milling media of example I (see page 5, line 37 to page 6, line 3) were used, the skilled person would also expect the presence of crystal growth inhibiting magnesium components in more than trace amounts in the final grits, as indicated in

example X (page 9, lines 23 to 26). Again, example IV could not support a claim directed to alternative A. Assuming further in the appellant's favour that magnesia had not been added, either separately or by means of the milling media debris, the fact remains that the hardness and density values of the grits are not indicated. The board holds that the description passages cited by the appellant are too general and may not, therefore, be used to complete the specific information given in example IV for the following reasons:

- The passage on page 2, lines 30 to 34 does not address the total absence of crystal growth inhibitors such as magnesia, but merely mentions that strong abrasive bodies may be obtained without the (deliberate) **addition** of magnesia (i.e. as a compound). Moreover the passage is silent about the hardness and density values that may be obtained in that case, and does not exclude the presence of coarser and/or non-equiaxed alumina crystals.
  
- The board concurs with the respondents in that the term "having" cannot be understood to be as narrow in meaning as the expression "consisting of". Hence, the passage on page 11, lines 2 to 6 does not - as suggested by the appellant during oral proceedings - necessarily refer to the total absence of crystal growth inhibitors such as magnesia and does not exclude the presence of at least some coarser non-equiaxed alumina crystals. The expression "high-purity  $\alpha$ -alumina bodies" as used in this passage, does not - according to the appellant's own definition of the term "impurities" - exclude the presence of non-negligible amounts of magnesia.

- The passage on original page 7, line 27 to page 8, line 2 merely states some ranges concerning the hardness to be obtained. Preferably, the hardness of the grits should be at least 18 GPa, but the value of 16 GPa is mentioned as a lower limit in the case of "alumina without additions". This passage does not disclose a discrete hardness value, let alone a value of 18 GPa or more, for the specific grits of example IV. Neither does this passage exclude the presence of at least some coarser and/or non-equiaxed alumina crystals.

Moreover, from the table relating to examples IV to IX, it emanates that grits not comprising lath-like coarser particles could only be obtained with a firing time of 1 minute at 1400°C, the heat-up time used to reach the firing temperature not being indicated. Example IV merely illustrates explicitly that an increased firing time leads to crystal growth, as generally mentioned on page 4, lines 23 to 24. The one minute firing time of example IV is very short in comparison to the firing times used in the other examples, see e.g. 30 minutes in example I, 60 minutes in example II, up to 60 minutes in examples VI to IX, and 15 minutes in example X. As pointed out by respondent 02 during the oral proceedings, an expert would rather assume that the grits obtained with a firing time of only one minute would not be fully sintered, or at least not sintered to a high density and hardness. Information concerning the time used to reach the firing temperature of 1400°C (in example X, 15 minutes are used to raise the temperature from 450°C to 1400°C) is missing, although the importance thereof in the sintering of the material cannot be neglected in view of the very short firing time at 1400°C. Hence, even when assuming in the appellant's favour that example IV does not disclose the addition of any magnesia, the

information disclosed therein, even when read in conjunction with the more general description passages referred to above, is not sufficient to clearly establish that **both** a high hardness and an exclusively submicron polycrystalline alumina phase were obtained in the total absence (but for insignificant traces) of crystal growth inhibitors, and in particular of magnesia.

Summarising, no preference was given originally to grits consisting exclusively of submicron alumina crystallites and/or being magnesia-free but for insignificant traces. On the other hand, a hardness value of more than 18 GPa was only mentioned as a preferred lower limit of a range in a broader context concerning various types of grits. The disclosure of example IV is incomplete in terms of the experimental conditions used (addition/absence of magnesia, nature of milling media and firing regime). Examples II and X, which do lead to grits with hardness values above 18 GPa, rely on relatively long firing times, which, on the other hand, are shown to go along with increased crystal growth. Hence, the board holds that a skilled person could not clearly and unambiguously take from the specific but incomplete example IV, even in view of the mentioned description passages, and even assuming that no magnesia was present, that the grits obtained according to this example would implicitly have a hardness of at least 18 GPa and a density of at least 95%. In this respect it is also to be observed that claim 7 of the original application explicitly refers to a product comprising exclusively submicron equiaxed  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> crystallites, and having a hardness of at least 18 GPa, but only in the presence of a spinel matrix.

4.4.4 Examples II and X are the only ones which do clearly not rely on the **separate** addition of a magnesium

compound. Both examples II and X also specify a hardness of at least 19 GPa for the abrasive grits obtained. However, they do not comprise any indication concerning the microstructure thereof, i.e. the absence of coarse alumina particles as required by alternative A of claim 1. According to the experimental procedures used in both examples II and X, the raw material is subjected to a pre-firing/calcination at 450°C for 16 hours, followed by firing at 1400°C for 60 minutes and 15 minutes, respectively.

During the oral proceedings, the appellant submitted that in the absence of specific statements pointing to the contrary, as in examples I and V-IX, the skilled person would infer from the description that the grits of examples II and X would not comprise coarser or non-equiaxed crystals. The board does not accept this argument in view of the fact that - irrespective of the differences in the pre-firing times and temperatures used - the actual firing times at 1400°C are much longer in these examples than the one used in example IV, the only example explicitly disclosing the absence of coarse particles. The board therefore holds that in view of crystal growth induced by extended heating, see page 4, lines 23 to 24 and page 6, lines 30 to 34, the skilled reader would rather expect the obtained grits of both examples to contain substantial amounts of crystallites being larger than 1 µm and/or non-equiaxed with such extended firing times.

According to example X (Run No. 9498), the milling was carried out as according to example I with alumina media and the final grits are explicitly stated to contain 0.14% MgO, assumed to originate from the milling media, see page 9, lines 14 to 26. Since the grits obtained in example X, run 9498 contain magnesia in an amount that cannot be qualified as being at an impurity level (see item 3.4 here above), they do not



exemplify alternative A of claim 1.

According to example II, the milling media comprise 1,74% MgO and 1,74% SiO<sub>2</sub> (see page 5, line 35 to page 8, line 2). Although the presence of magnesia in the final grits is not addressed in example II, the skilled person would assume that the final grits, due to the desired media abrasion in the milling step (see e.g. page 3, lines 13 to 15, and example X, page 9, lines 23 to 25) would also contain magnesia in more than negligible trace amounts, MgO being qualified in the description as a "most useful" additive, having a well known "grain" or crystal growth suppressing or inhibiting effect, see page 4, lines 1 to 4 and page 11, lines 9 to 26. Moreover, whereas example X specifies the heat-up time from the calcination temperature of 450°C to the firing temperature of 1400°C, example II does not. In the board's view, this heat-up time cannot be neglected in view of the very short firing time to be observed for obtaining grits free of coarse particles (see example IV). Hence, assuming in the appellant's favour - although highly unlikely - that magnesia is not introduced in a grain growth suppressing amount into the final grits of example II during the milling step, the experimental conditions (firing regime, i.e. heat-up time) are not disclosed in a sufficiently clear and unambiguous manner that would justify the assumption that the grits obtained implicitly do not contain coarse crystals.

Summarising, examples II and X do not, implicitly and/or explicitly, disclose abrasive grits not comprising non-negligible amounts of magnesia that could be considered as impurities, and not containing alumina crystallites being larger than 1 µm and/or being non-equiaxed. Even in the context of the total information comprised in the whole application as filed, these two examples do not constitute a clear and

unambiguous disclosure of all the combined features of claim 1, alternative A.

- 4.4.5 The appellant's arguments submitted during the oral proceedings are not convincing for the reasons indicated here below:

Concerning the results of examples I, II, IV to IX and X, he submitted that these would clearly show that it was feasible and intended to produce grits not comprising any blocky shapes. The blocky shapes referred to in example I were believed to be due to contaminations in the form of larger abraded fragments, emanating from the outer layer of the milling media when used for the first time. With this outer layer being abraded, the problem of blocky contaminations no longer occurred according to examples II, IV to IX and X. This information cannot, however, be considered in assessing the disclosure of the application as filed since it was not presented as such in the latter. More particularly, the nature of the "contamination" referred to in example I is not indicated in example I, see in particular page 5, lines 22 to 23. Moreover, the appellant's own expert stated that such contaminations, emanating from the milling media, were "difficult to control".

The appellant, referring to the description as originally filed, page 9, line 27 to page 10, line 20, then argued that it was indicated there that this particular problem could be dealt with by using milling water rather than milling the gel itself. The board however takes the view that neither this passage, nor the following passages on page 10, lines 21 to 30, which refer to the use - as seed particles - of a settled suspension of high purity alumina mixed with water, of commercial fine  $\alpha$ -alumina powders, or of fine alumina generated by milling very high purity alumina,

using such alumina itself as a milling medium can contribute to or constitute the disclosure of grits according to claim 1, alternative A. Concerning the alternative using milled water, the board concurs with the respondents in that a skilled person would expect magnesia from the milling media debris to be present in the milled water in the same way as in a milled gel, the method thus leading to grits containing magnesia, see page 10, lines 18 to 20. Moreover, neither this method nor the methods generally referred to on page 10, lines 21 to 30 explicitly exclude the presence of blocky and/or lath-like alumina crystals in the finished products. The latter methods, referring to the use of high-purity alumina powders, are only addressed in a general way, without clear indications concerning the process conditions, and in particular the firing regime applied. The properties of the products that may be obtained by using such seed particles are not specifically mentioned. All the passage says is that such seed particles were effective in producing "the dense finely crystallised product of the invention". Considering that according to the application as filed, the meaning of "the invention" encompassed grits having a hardness as low as 16 GPa and densities as low as 90% (page 7, line 27 to 30) and "consisting essentially", but not exclusively, of submicron alumina crystallites, the skilled reader does not get from these passages any detailed information concerning the preparation of grits according to claim 1, alternative A.

- 4.5 For these reasons, the board is convinced that a skilled person reading the entire application as originally filed would not, without having to make assumptions requiring the knowledge of the invention as now claimed, gather from it that the preparation of abrasive grits according to the claimed alternative A was initially envisaged. In the description of the experimental procedures, the skilled person would not

perceive any clear and unambiguous teaching directed to the preparation of such grits. Hence, the board holds that grits with the combination of features defining alternative A of claim 1 according to the main request could not be clearly and unambiguously derived from the application as originally filed. Such grits thus constitute subject-matter extending beyond the content of the application as filed in the sense of Articles 100(c) and 123(2) EPC. Hence, the main request cannot be allowed.

5. Auxiliary request

In comparison to claim 1 of the main request, claim 1 of the auxiliary request is further limited by the incorporation of features relating to the size of the  $Al_2O_3$  crystallites. Nevertheless, irrespective of these additional features, claim 1 of the auxiliary request is still directed, in one alternative, to grits fulfilling the combined criteria of absence of coarser alumina particles, absence of magnesia present as spinel and hardness of at least 18 GPa, as in alternative A of claim 1 according to the main request. For the same reasons as stated above concerning the main request, the board holds that grits with these combined properties cannot be clearly and unambiguously derived from the application as originally filed. This finding is not affected by a reference to the size of the submicron crystallites obtained. These grits constituting subject-matter extending beyond the content of the application as filed in the sense of Articles 100(c) and 123(2) EPC, the auxiliary request cannot be allowed either.


Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairman

  
U. Bultmann



  
R. Spangenberg