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**Datasheet for the decision
of 22 February 2006**

Case Number: T 1029/99 - 3.3.07

Application Number: 88202577.8

Publication Number: 0320033

IPC: B01D 71/02

Language of the proceedings: EN

Title of invention:

Composite ceramic micropermeable membrane, process and apparatus for producing such membrane

Patentee:

HOLLAND INDUSTRIAL CERAMICS BV

Opponent:

-

Headword:

Ceramic membrane/HOLLAND INDUSTRIAL

Relevant legal provisions:

-

Relevant legal provisions (EPC 1973):

EPC Art. 52(1), 54(1)(2), 56, 113(1)

Keyword:

"Main request, 1st, 2nd, 4th and 5th auxiliary requests - admitted into proceedings (no)"

"3rd auxiliary request - inventive step (no)"

Decisions cited:

G 0009/91, T 0150/82, T 0487/89, T 0815/93, T 0047/94

Catchword:

No reasons exist to exercise Boards's discretion in favour of allowing requests into the proceedings at a late stage where

the requests contain new additional claims, or amended claims where the amendments do not serve to remove a ground of opposition (points 1 to 4, 6 and 7).



Case Number: T 1029/99 - 3.3.07

D E C I S I O N
of the Technical Board of Appeal 3.3.07
of 22 February 2006

Appellant: HOLLAND INDUSTRIAL CERAMICS BV
(Patent Proprietor) Postbus 397
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Representative: van Westenbrugge, Andries
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
18 August 1999 concerning maintenance of
European patent No. 0320033 in amended form.

Composition of the Board:

Chairman: S. Perryman
Members: P. Gryczka
B. ter Laan

Summary of Facts and Submissions

- I. The appeal by the patent proprietor is directed against the interlocutory decision issued in writing on 18 August 1999, of the Opposition Division which refused the main request before it but found that the auxiliary request met the requirements of the EPC. This was the second decision by the Opposition Division, following remittal of the case in decision T 47/94 of Board of Appeal 3.4.2 which set aside the first decision dated 26 October 1993 of the Opposition Division revoking the patent.
- II. The patent was granted on the basis of a set of 21 claims containing product claim 1 and claims 2 to 7 dependent thereon, and process claim 8 and claims 9 to 21 dependent thereon. Claims 1, 6, 7, 8 and 20 as granted read follows:

"1. A microporous membrane comprising a porous ceramic support and a microporous inorganic layer, wherein the microporous layer is firmly bound to the geometric outer surface of the porous support and has a predetermined average pore diameter between 20 nm and 1 μ m, characterized in that the microporous layer is substantially spanning the pores of the support, with a sharp transition between the microporous layer and the porous support, and being essentially free of pinholes.

6. The membrane of any of claims 1-5, characterized in that the porous support consists essentially of alpha alumina.

7. A microporous membrane comprising the membrane of any of claims 1-6 and one or more subsequent layers bound to the microporous layer, at least one subsequent layer having a lower average pore diameter than the preceding layer.

8. A process of producing a microporous membrane according to claims 1-7 by coating a ceramic support with a microporous layer forming suspension and heating the coated support, characterized in that, before the coating, the affinity between the porous support and the microporous layer forming suspension is lowered such that penetration of the suspended particles into the internal structure of the porous support is substantially prevented, while wetting of the surface of the porous support during coating is not prevented.

20. A process of any of claims 8 to 19, characterized by comprising a plurality of coating steps, each step being followed by at least partial drying of the coated support."

III. Two oppositions were filed in which revocation of the patent was requested on the grounds of insufficiency of disclosure, lack of novelty and lack of inventive step (Article 100(a) and (b) EPC), the first opposition being only against the product claims 1 to 7, the second against all claims. Documents considered including the following:

D1/P: "New Ceramic Filter Media for Cross-Flow Microfiltration and Ultrafiltration", J.Guillot et al., April 1986, an article from Ceraver, Ceramic Membranes Department PO Box 113, 65001 Tarbes (France)

D6/I: FR-A-2 502 508.

IV. At the oral proceedings on 6 October 1993 before the Opposition Division, the proprietor asked for maintenance of the patent on the basis of two requests with claims amended compared to the granted claims (for ease of comprehension, the Board has indicated additions compared to the respective granted claim in bold and underlined, deletions by striking out and some unchanged passages by dots):

Claim 1 of the main request read:

"1. A composite microfiltration ~~microporous~~ membrane ~~comprising~~ consisting of a porous ceramic support having a pore size larger than 0.1 μm up to 50 μm and a microporous inorganic layer, wherein ...(as claim 1 as granted)"

Claim 1 of the subsidiary request read:

"1. A composite microfiltration ~~microporous~~ membrane ~~comprising~~ consisting of a porous ceramic support having a pore size larger than 0.1 μm up to 50 μm and a microporous inorganic layer, wherein the microporous layer is firmly bound to the geometric outer surface of the porous support and has a predetermined average pore diameter between 20 nm and 1 μm , characterized in that the porous support consists at least partly of alpha-alumina, and the microporous layer is substantially spanning the pores of the support, with a sharp transition between the microporous layer and the porous support, and being essentially free of pinholes."

In its first decision issued in writing on 26 October 1993, the Opposition Division revoked the patent finding that since all the features of the composite microfiltration membrane according to claim 1 of the main request before it were to be found in both D6/I and D1/P, and all the features of the composite microfiltration membrane according to claim 1 of the auxiliary request before it, including that of the support consisting at least partly of alpha-alumina were to be found in D1/P, these claims lacked novelty and neither request was allowable under Articles 52(1) and 54(1)(2) EPC.

- V. The Proprietor appealed against the above decision requesting that the patent be maintained on the basis of a set of 20 claims filed with the statement of grounds for appeal dated 22 March 1994. Claims 2 to 14 of this set were process claims dependent on process Claim 1, and claims 16 to 19 were membrane claims dependent on independent Claim 15 to a composite microfiltration membrane. Claims 1, 13, 15 and 20 of this set of claims read as follows (for ease of comprehension, the Board has indicated additions compared to the respective granted claim in bold and underlined, and deletions by striking out):

"1 8. A process of producing a ~~microporous~~ **composite microfiltration** membrane according to ~~claims 1-7~~ **consisting of a porous ceramic support and a microporous inorganic layer, wherein the microporous layer is firmly bound to the geometric outer surface of the porous support, has a predetermined average pore diameter between**

20 nm and 1 μm , and is substantially spanning the pores of the support, with a sharp transition between the microporous layer and the porous support, the membrane being essentially free of pin-holes, by coating a ceramic support having a pore size up to 50 μm with a microporous layer forming suspension and heating the coated support, characterized in that, before coating, the affinity between the porous support and the microporous layer forming suspension is lowered such that penetration of the suspended particles into the internal structure of the porous support is substantially prevented, while wetting of the surface of the porous support during coating is not prevented."

~~20~~ 13. The process of any of claims ~~8 to 19~~ 1-12, characterized by comprising a plurality of coating steps, each step being followed by at least partial drying of the coated support.

"15 ~~1~~. A microporous composite microfiltration membrane ~~comprising~~ consisting of a porous ceramic support having a pore size of larger than 0.1 μm up to 50 μm and a microporous inorganic layer, wherein the microporous layer is firmly bound to the geometric outer surface of the porous support, has a predetermined average pore diameter between 20 nm and 1 μm , ~~characterized in that the microporous layer~~ and is substantially spanning the pores of the support, with a sharp transition between the microporous layer and the porous support, wherein the porous support consists at least partly of alpha-alumina, and

wherein the membrane is essentially free of pin-holes and is obtainable by the method according to one of claims 1-14.

20 7. A microporous composite multi-layer membrane comprising the membrane ~~of~~ according to any of claims ~~1-6~~ 15-19 and one or more subsequent layers bound to the microporous layer, at least one subsequent layer having a lower average pore diameter than the preceding layer and having pore diameters between 0.5 and 100nm.

VI. In decision T 47/94 of 16 January 1995, Board of Appeal 3.4.2 remitted the case to the Opposition Division for further prosecution, on the basis that the product claims which led to the refusal by the Opposition Division were no longer requested, so that the reasons given in that decision no longer applied to the request put forward (see point V. above). The question whether the process claims were patentable had not been examined by the Opposition Division, nor had it been faced by product-by-process claims. The arguments by the respondents that the claims now put forward did not differ significantly from the claims already found unallowable could be considered by the Opposition Division, so it was appropriate for the Board of Appeal to make the remittal without offering any opinion on the claims other than drawing attention to the useful summary of Board of Appeal decisions concerning product-by-process claims contained in Case Law of the Boards of Appeal of the European Patent Office 1987-1992, Section II B 6, pages 62 to 64.

VII. In a communication dated 5 October 1995 the Opposition Division indicated its provisional view that *inter alia* the admissibility of product claims 15 to 20 as

remitted by decision T 47/94 was doubtful, and that the product claims were not novel over D1/P and other documents.

VIII. Opponent 02 withdrew its opposition with letter dated 28 October 1996. By communication dated 29 October 1996, the Opposition Division indicated that it would continue the opposition proceedings of its own motion even if both opponents withdrew.

IX. On 20 May 1998 the proprietor submitted a set of 15 claims as new main request and a set of 14 claims as auxiliary request. By letter dated 4 June 1998, the proprietor withdrew its request for oral proceedings before the Opposition Division in case the latter accepted either of the requests contained in the letter of 20 May 1998. Opponent 01 withdrew its opposition with letter dated 17 July 1998. In each of these requests claims 1 to 14 corresponded to claims 1 to 14 of the request remitted by decision T 47/94 (see point V. above). The additional claim 15 of the main request read as follows:

"15. A composite microfiltration membrane **obtained by the method of any one of claims 1-14.**" (emphasis added by the Board).

X. With the interlocutory decision issued in writing on 18 August 1999, the Opposition Division decided that the auxiliary request (process claims 1 to 14) met the requirements of the EPC.

With regard to the main request, the Opposition Division came to the conclusion that the subject-matter of product-by-process claim 15 lacked novelty in view of the products disclosed in document D6/I for the following reasons:

In the first decision of the Opposition Division issued in writing on 26 October 1993, a microfiltration membrane presenting the features now defined in claim 15 but without reference to its process of preparation had been found to lack novelty over the membrane disclosed in document D6/I. However, the fact that the membrane was obtained by the process in accordance with the patent in suit and not by the process disclosed in document D6/I did not introduce any distinguishing characteristic to the membrane itself. The allegation, unsupported by any kind of evidence, that the membranes disclosed in document D6/I would, because of the method used in D6/I, present more failures connected to the presence of pinholes than would be the case when using the method of claim 1, could not be accepted. Also the degree and quality of the "spanning of the pores", of the "sharpness of transition" and of the penetration of the coating into the support of the membranes made in accordance with the process of D6/I were comparable to those of the membranes using the process referred to in claim 15 of the main request. In addition, whether the product-by-process claim 15 was defined by the wording "product obtained" or "product obtainable" was irrelevant for the assessment of the patentability of the product as such, as indicated in decision T 487/89. Thus claim 15 lacked novelty over D6/I.

XI. On 28 October 1999, the proprietor (appellant) filed a notice of appeal against the above decision and paid the corresponding fee on the same day. With the statement setting out the grounds of appeal dated 20 December 1999, the appellant filed three sets of claims as main request, first and second auxiliary requests.

Claim 1 is the same in each of the main request, first and second auxiliary requests, and differs from claim 1 as remitted in decision T 47/94 and allowed in the decision under appeal as follows:

"1. A process of producing a microporous composite microfiltration membrane comprising ~~consisting~~ of a porous ceramic support ... is not prevented."

(For ease of comprehension the Board has shown additions underlined in bold, deletions struck through, and some unchanged passages by ...)

XII. In a communication dated 27 September 2005, annexed to the summons to attend oral proceedings, the Board expressed its preliminary and non-binding opinion inter alia on the following points:

(a) Process claim 1 as requested on appeal was broader than the claim 1 which was before Appeal Board 3.4.2, and then considered by the Opposition Division in the decision under appeal, in that in line one "consisting of " had been changed to "comprising". In decision G 9/91 (OJ EPO 1993, 408) the Enlarged Board of Appeal stated that the purpose of the appeal procedure was mainly to give

the losing party the possibility of challenging the decision of the Opposition Division on its merits. Putting forward a broader process claim 1 on appeal than before the Opposition Division was not compatible with this purpose, and in the view of the board amounted to an abuse of procedure.

- (b) Further, in view of the claims remitted for further prosecution in the earlier appeal decision T 47/94 of Board 3.4.2 in this matter, putting forward now a broader process claim 1 than remitted by that decision for further prosecution violated the principle of res judicata.
- (c) The preliminary view of the board was thus that none of the requests put forward on appeal could be allowed into the procedure as they all contained such a broadened claim 1.
- (d) A claim to a product on the lines of claim 15 as remitted for further prosecution in the earlier appeal decision of Board 3.4.2, would not be open to the above procedural objections, though its substantive patentability would need examination by the board.

XIII. With a letter dated 20 January 2006 the appellant filed four sets of claims as third to sixth auxiliary requests.

Third auxiliary request

Process claims 1 to 14 of the third auxiliary request are identical to the ones upon which decision T 47/94

had been based (see point V. above). Product claim 15 read as follows:

"15. A composite microfiltration membrane obtained by the method of any one of claims 1-14, further comprising one or more subsequent microporous layers bound to the microporous layer, at least one subsequent layer having a lower average pore diameter than the preceding layer."

Fourth auxiliary request

The fourth auxiliary request contains 14 process claims, claim 1 reading:

"1. A process of producing a composite microfiltration membrane by coating a ceramic support having a pore size up to 50 μm with a microporous layer forming suspension and heating the coated support **and optionally binding one or more subsequent microporous layers to the microporous layer, at least one subsequent layer having a lower average pore diameter than the preceding layer,** characterized in that",

(For ease of comprehension the Board has shown additions compared to the claim 1 remitted by decision T 47/94 underlined in bold, and some unchanged passages by ...)

The fifth auxiliary request contains 15 process claims, the first 14 being identical claims 1-14 of the third auxiliary request. Claim 15 is an independent further process claim reading:

"15. A process of producing a composite microfiltration membrane consisting of a porous ceramic support and a microporous inorganic layer, wherein the microporous layer is firmly bound to the geometric outer surface of the porous support, has a predetermined average pore diameter between 20 nm and 1 μ m, and is substantially spanning the pores of the support, with a sharp transition between the microporous layer and the porous support, the membrane being essentially free of pin-holes, by coating a ceramic support having a pore size up to 50 μ m with a microporous layer forming suspension and heating the coated support **and applying one or more subsequent microporous layers to the microporous layer, at least one subsequent layer having a lower average pore diameter than the preceding layer,** characterized in that ..."

(For ease of comprehension the Board has shown additions compared to the claim 1 remitted by decision T 47/94 underlined in bold, and some unchanged passages by ...)

Sixth auxiliary request

The 14 process claims of the sixth auxiliary request correspond to the set of claims of the auxiliary request allowed by the decision under appeal.

XIV. The Appellants had argued in writing that:

- (a) The expression "consisting of" in claim 1 of the main, first and second auxiliary requests had been replaced by "comprising" so as to remove any doubt that a process involving

multiple coating steps resulting in a membrane having a porous support and a possibly sublayered microporous layer were also part of the claimed invention.

- (b) The product-by-process claim 15 in the third auxiliary request specified that the claimed microfiltration membrane comprised one or more subsequent layers. Since document D6/I did not disclose membranes with further layers, the claimed membrane was novel (Article 54 EPC). In addition, since the claimed membrane was defined by its process of preparation and said process involved an inventive step, the membrane *per se* also involved an inventive step (Article 56 EPC).

- (c) In claim 1 of the fourth auxiliary request and claim 15 of the fifth auxiliary request the expression "consisting of" was restored in the wording of the claim with respect to the composition of the membrane but the claim allowed optionally an additional process step resulting in a least one subsequent microporous layer.

XV. With a letter dated 13 February 2006, the appellant informed the Board that they would not attend the oral proceedings scheduled for 22 February 2006.

XVI. The appellant had requested in writing that the decision under appeal be set aside and that the patent be maintained on the basis of the claims of the main request, first auxiliary request or second auxiliary

request all submitted on 20 December 1999, or of the claims of the third, fourth or fifth auxiliary request submitted on 20 January 2006; and as sixth auxiliary request that the patent be maintained on the basis of claims 1 to 14 as maintained by the Opposition Division, which amounts to a dismissal of the appeal.

XVII. Oral proceedings took place on 22 February 2006 in the absence of the duly summoned appellant (Rule 71(2) EPC). At the end of the oral proceedings the decision of the Board was announced.

Reasons for the Decision

1. The appeal is admissible.

Main request and first and second auxiliary requests

2. It is a matter for the discretion of the Board concerned whether or not to admit new requests into the proceedings on appeal, the exercise of this discretion depending on whether or not an appropriate reason exists. If the amendment has been made to remove a ground of opposition this would be regarded as an appropriate ground. But lack of clarity is not a ground of opposition, and the reason stated by the appellant here, to change the wording from "consisting of" to "comprising of", namely a desire to clarify that multi-coating processes were part of the invention is not an appropriate reason for allowing into the proceedings a claim 1 so amended. Amendments in opposition and appeal proceedings should be kept to the minimum necessary,

and the desired claim version should be put forward at an early stage of the proceedings.

3. In the particular circumstances of the present case to seek to put forward a process claim 1 broader than the one put forward and remitted in the first appeal T 0047/94, and then decided on by the second decision of the Opposition Division is, in respect of the first appeal decision, going against the principle of *res judicata* as to what was to be subject of further examination. Further this amounts to an abuse of procedure because it deprives the Board of Appeal of having a decision of the Opposition Division on the particular claim version. It is not the purpose of appeal proceedings to afford the proprietor an endless opportunity to put forward and have considered different claim versions.
4. The main request, and the first and second auxiliary requests are thus not allowed into the proceedings.

Third auxiliary request

- 4.1 Process claims 1 to 14 of this request are identical to the process claims 1 to 14 remitted by Board 3.4.2, and found in conformity with the EPC. These process claims are thus not a subject that the Board needs to consider in this appeal.
- 4.2 The third auxiliary request contains additionally a product by process claim 15 which differs from the product-by-process claim 15 of the main request which was found to lack novelty in the decision under appeal, in that it specifies that the claimed composite

microfiltration membrane further comprises "one or more subsequent microporous layers bound to the microporous layer, at least one subsequent layer having a lower average pore diameter than the preceding layer."

- 4.3 The appellant did not contest the findings of the Opposition Division in the decision under appeal, i.e. that the product-by-process defined in claim 15 of the main request before the Opposition Division lacked novelty with regard to the membranes disclosed in document D6/I and the Board agrees with the reasoning of the Opposition Division on this question. The sole feature seen as distinguishing the membrane in accordance with present claim 15 from that disclosed in document DI/6 is the requirement that the membrane further comprises "one or more subsequent microporous layers bound to the microporous layer, at least one subsequent layer having a lower average pore diameter than the preceding layer".

5. *Inventive step*

- 5.1 The presence of an inventive step linked to the presence of further layers, which had been the subject-matter of granted claim 7, had been objected to by both opponents in their notices of opposition (opponent 01: notice of opposition dated 15 September 1992, last page; opponent 02: notice of opposition dated 18 September 1992, page 3, penultimate paragraph). The issue is therefore not raised for the first time in the proceedings and the Appellant had sufficient opportunity to take position on that point (Article 113(1) EPC).

5.2 Document D6/I can be considered as a starting point for the assessment of inventive step since it also refers to microfiltration membranes. D6/I discloses a membrane that contains the same porous ceramic support and an inorganic filtration membrane as the membrane according to present claim 15. The pore diameters of the layer responsible for the filtration in the filtration membranes according to D6/I range from 0,05 to 4 microns (50 to 4000 nm) (claim 3).

5.3 The patent-in-suit mentions that three-layer or multilayer membranes are especially useful when the desired pore size cannot satisfactorily be achieved with a two component membrane, for example when the desired pore size is below 20 nm (column 3, lines 55 to column 4, line 2). Thus, the technical problem to be solved vis-à-vis D6/I can be defined as to provide a filtration membrane with smaller pore sizes.

Example 3 of the patent specification describes a three-layers filtration membrane in which the pores have an average size of 2 nm. The Board is therefore satisfied that the technical problem as defined above is successfully solved by the composite microfiltration membranes in accordance with claim 15, which are characterized in that they contain one or more subsequent microporous layers bound to the microporous layer, at least one subsequent layer having a lower average pore diameter than the preceding layer.

5.4 It remains to be decided whether or not the proposed solution to that objective technical problem, namely

the membranes according to claim 15, is obvious in view of the state of the art.

5.5 Document D1/P, like the patent in suit, relates to a composite filtration media containing a porous ceramic support and a filtration membrane made of an microporous inorganic layer (first page, Abstract). D1/P discloses a membrane structure having two or more layers, the layers being bonded to each other, comprising a support having an average pore size diameter of 15 μm (Table 1). For microfiltration the membrane has an average pore size of from 0,2 to 5 μm (200 to 5000 nm)(Table 2) for ultrafiltration of from 40 to 1000 Å (4 to 100 nm) (Table 3). When more layers are present, the free surface of the membrane is formed by the layer with the finest porosity, which performs the separation (paragraph 3 - "The membrane"). This implies that the subsequent layer has a lower average pore diameter than the preceding layer.

5.6 Therefore, D1/P gives a clear directive on how to solve the technical problem underlying the patent in suit, namely by adding to the support and the microporous layer one or more subsequent microporous layers bound to the microporous layer, the subsequent layer having a lower average pore diameter than the preceding layer, thereby arriving at the claimed solution.

5.7 The Appellant argued that since the product of claim 15 was defined by the process of producing it, and this process was found to be inventive, the product would also be inventive (letter dated 20 December 1999, first page, last paragraph). This argument is not in accordance with the established case law of the Boards

of Appeal according to which a process feature can only contribute to the novelty of a product claim insofar as it gives rise to a distinct and identifiable characteristic of the product (see T 150/82 (OJ EPO 1984, 309) and T 815/93 point 4.3). That a process is new and inventive does not allow the deduction that any product made by this process is necessarily different from prior art products.

5.8 Claim 15, although incorporating features defining the process of its preparation, relates to the filtration membrane *per se*. Therefore, the membrane *per se* should fulfil all the requirements patentability and thus of inventive step in the lines of Article 52(1) and 56 EPC and for the reasons given above the membrane *per se* does not do so.

5.9 The subject matter of claim 15 of the third auxiliary request does not meet the requirements of Article 56 EPC, and the third auxiliary request must be refused.

Fourth auxiliary request

6. Compared to the process claim 1 remitted by decision T 0047/94 and underlying the decision under appeal, Claim 1 of this request introduces the optional feature "and optionally binding one or more subsequent microporous layers to the microporous layer, at least one subsequent layer having a lower average pore diameter than the preceding layer". Such an optional feature cannot remove any ground of opposition, but might raise new issues. The Board is not prepared to exercise its discretion in favour of allowing a request

with such a claim into the proceedings. The fourth auxiliary request is not allowed into the proceedings.

Fifth auxiliary request

7. Compared to the process claims 1-14 remitted by decision T 0047/94 and forming the subject matter of the auxiliary request allowed in the decision under appeal, the fifth auxiliary request seeks to add a further process Claim 15. The addition of such a process claim cannot remove any ground of opposition. The Board is not prepared to exercise its discretion in favour of the introduction of such a claim at such a late state of the proceedings. The fifth auxiliary request is not allowed into the proceedings.

Sixth auxiliary request

8. The 14 claims of the sixth auxiliary request are identical to the 14 claims underlying the decision under appeal and maintained by the Opposition Division. Therefore, the request of the appellant to maintain the patent on the basis of the claims of the sixth auxiliary requests amounts to requesting that the appeal be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

C. Eickhoff

S. Perryman