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**Datasheet for the decision  
of 28 January 2021**

**Case Number:** T 0825/16 - 3.2.06

**Application Number:** 06011736.3

**Publication Number:** 1731729

**IPC:** F01N3/28, B01D53/94

**Language of the proceedings:** EN

**Title of invention:**

Holding and sealing material for use in a catalyst to clean gaseous emission

**Patent Proprietor:**

IBIDEN CO., LTD.

**Opponent:**

3M Innovative Properties Company

**Headword:**

**Relevant legal provisions:**

RPBA Art. 12(4)  
RPBA 2020 Art. 13(1)  
EPC Art. 54, 56

**Keyword:**

Novelty - Main request (no), Auxiliary request 1 (yes)  
Late-filed argument - prima facied highly relevant - admitted  
(yes)  
Inventive step - auxiliary request 1 (yes)

**Decisions cited:**

G 0001/95

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

Boards of Appeal of the  
European Patent Office  
Richard-Reitzner-Allee 8  
85540 Haar  
GERMANY  
Tel. +49 (0)89 2399-0  
Fax +49 (0)89 2399-4465

Case Number: T 0825/16 - 3.2.06

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.06**  
**of 28 January 2021**

**Appellant:** 3M Innovative Properties Company  
(Opponent) P.O. Box 33427  
Saint Paul MN 55133-3427 (US)

**Representative:** Bergen, Katja  
Office of Intellectual Property Counsel  
3M Deutschland GmbH  
Carl-Schurz-Str. 1  
41453 Neuss (DE)

**Respondent:** IBIDEN CO., LTD.  
(Patent Proprietor) 1, Kanda-cho 2-chome  
Ogaki-shi, Gifu 503-8604 (JP)

**Representative:** Hoffmann Eitle  
Patent- und Rechtsanwälte PartmbB  
Arabellastraße 30  
81925 München (DE)

**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
8 February 2016 concerning maintenance of the  
European Patent No. 1731729 in amended form.**

**Composition of the Board:**

**Chairman** M. Harrison  
**Members:** M. Hannam  
A. Jimenez

## Summary of Facts and Submissions

I. An appeal was filed by the appellant (opponent) against the interlocutory decision of the opposition division in which it found that European patent No. 1 731 729 in an amended form met the requirements of the EPC. The appellant requested that the decision be set aside and the patent be revoked in its entirety.

II. The following documents, referred to by the appellant in its grounds of appeal, are relevant to the present decision:

D1 JP-A-2002 38379 (translated into English)  
D2 JP-A-08 174687 (translated into English)  
D3 WO-A-2005/021945  
D5 WO-A-2006/088733  
D7 US-A-2003/0104189  
D9' Zeon Corporation catalogue 'Latex', November 1998  
D11 Japanese standard JIS K 6830, April 1996  
D12 3M Laboratories, Experimental Report by Toshiyuki Watanabe of 20 May 2016

III. In its letter of response to the grounds of appeal the respondent (patent proprietor) requested that the appeal be dismissed or, in the alternative, that the patent be maintained according to one of auxiliary requests 1 to 3. It also argued that the experimental report D12 lacked credibility.

IV. In a further letter of the appellant dated 1 March 2017, the following experimental reports were filed:

D12a 3M Laboratories, Experimental Report by Toshiyuki

Watanabe of 14 February 2017

D13 3M Laboratories, Experimental Report by Kerstin Rosen of 12 January 2017

V. In a letter dated 31 August 2018, the respondent filed new auxiliary requests 1 to 3 to replace those previously on file and requested that D12, D12a and D13 not be admitted into the proceedings.

VI. The Board issued a summons to oral proceedings and a subsequent communication containing its provisional opinion, in which it *inter alia* questioned the novelty of the subject-matter of claim 1 of the main request and indicated that the subject-matter of claim 1 of auxiliary request 1 seemingly met the requirement of Article 123(2) EPC.

VII. Oral proceedings were held by video conference before the Board on 28 January 2021. The final requests of the parties were as follows:

The appellant requested that the decision under appeal be set aside and the patent be revoked.

The respondent requested that the appeal be dismissed (main request) or that the patent be maintained in amended form according to auxiliary request 1 filed with letter of 31 August 2018.

VIII. Claim 1 of the main request reads as follows:

"A holding and sealing material which is configured to be set between a catalyst carrier and a shell covering the outside of the catalyst carrier in a catalytic converter for purifying an exhaust gas comprising: a mat-like material formed by arranging inorganic

fibers in a mat shape; and  
an organic binder with a glass transition point  $T_g$  ( $^{\circ}\text{C}$ )  
of less than or equal to  $5^{\circ}\text{C}$  which is attached to the  
mat-like material,  
wherein a flying ratio of the inorganic fibers is less  
than or equal to 0.15 wt.%."

Claim 1 of auxiliary request 1 reads as for claim 1 of  
the main request with the following features appended:

"the flying ratio is measured by an impact test using a  
device according to Japanese Industrial Standards  
K6830-1996.26 low temperature resistant test.26 .2 test  
device impact testing machine, wherein the impact test  
is conducted by giving an impact to a test sample  
having a sample size of 100mm x 100mm on the condition  
of angle of impact  $90^{\circ}$  and the number of impact 1  
time."

IX. The appellant's arguments relevant to the present  
decision may be summarised as follows:

Main request

The novelty objection based on D5 should not be  
excluded. This novelty objection to the subject-matter  
of the present claim 1 was raised to identical subject-  
matter albeit as claim 5 of the main request before the  
opposition division, and the decision was also based on  
it. The objection was therefore presented in the  
proceedings before the opposition division and should  
thus be taken into account by the Board (Article 12(4)  
RPBA 2007).

The subject-matter of claim 1 lacked novelty over D5.  
Claim 1 failed to indicate any method for measuring the

flying ratio. The description of the patent did not limit claim 1; the quoted test used for an embodiment was not the only recognised test. Any known and technically reasonable method to measure the flying ratio could thus be used to anticipate the claimed flying ratio of less than or equal to 0.15 wt%. Even the test equipment mentioned in the patent in paragraph 0057 which related to D11, allowed impact angles up to 135° to be used, such that the test in D5 was evidently reasonable as an applicable test to a skilled person.

#### Auxiliary request 1

The subject-matter of claim 1 failed to meet the requirement of Article 123(2) EPC. The details of the impact test method included in claim 1 were originally disclosed in lines 20 to 25 of page 20 of the application as filed which was part of the detailed disclosure of embodiment 2. All the samples of embodiment 2 had a binder content of 1 wt% which, being omitted from claim 1, extended its subject-matter beyond that originally filed.

As regards the novelty of the subject-matter of claim 1, the feature defining a flying ratio of the inorganic fibers to be less than or equal to 0.15 wt.% was a result to be achieved and could thus not be used to distinguish the claimed subject-matter over the prior art.

D5 implicitly disclosed all features of claim 1 as evidenced by the experimental reports D12/D12a. The appellant's arguments alleging that the material tested in D12/D12a did not correspond to that in D5 was a change of case and should not be admitted. Even if admitted, the discrepancies between the materials of

D12/D12a and D5 were not of such a nature that they would make the flying ratio results unrepresentative.

Considering the novelty of the subject-matter of claim 1 over D5 alone, the 30° impact angle test on samples having 3.5% LX816 binder content were so low (0.002 wt% - see Table 2) compared to the upper point of the claimed range which was 0.15% that the skilled person would have no doubt that the material according to D5 was a material within the scope of claim 1, even though the result in claim 1 was based on a test resulting in a higher energy delivery compared to the test used in D5. Page 18, lines 13 to 15 also stated that as the amount of binder was increased, shedding could be 'prevented' and that this was 'well-known in the art'.

D1 also anticipated the subject-matter of claim 1. The patent itself indicated a direct link between the binder glass transition temperature and the flying ratio of the material (see e.g. para. [0012]). Should other factors contribute to the measured flying ratio of the material, these were not disclosed in the patent such that the skilled person was unable to carry out the invention contrary to Article 83 EPC. With D1 disclosing the binder LX 874 with a Tg of -31°C, the claimed flying ratio must inherently be disclosed by the material of D1 too. Even though D1 disclosed significant compression of the mat thickness prior to immersing in the binder, the percentage of binder in the mat of D1 (13%) was significantly greater than that of the patent (maximum of 1.5 wt% - see para. [0045]) which would considerably limit the flying ratio.

D13 should be admitted since it reliably tested the flying ratio of the material of D1. The higher density and lower mat thickness in D13 compared to D1 cancelled



each other out such that a comparable flying ratio would result.

The subject-matter of claim 1 also lacked novelty over D2 or D3. Each of these documents disclosed a binder with the claimed glass transition temperature and therefore also inherently disclosed the claimed range of flying ratio.

The subject-matter of claim 1 also lacked an inventive step when starting from D7 and combining with the technical teaching of D3. Despite D7 calculating the flying ratio using the drop test, this would provide comparable results to the 90° impact angle test of claim 1. Even so, D7 failed to disclose the binder glass transition point temperature and the specific flying ratio test method, such that the technical problem to be solved could be seen as 'how to reduce the flying ratio'. Preventing the scattering of inorganic fibres from a catalyst carrier retaining system was seen as desirable in D3 (see page 2, lines 14 to 15) such that the skilled person would consult D3 to find a solution to the posed problem, on page 14 of which Nipol LX816 with a glass transition point of -10°C was disclosed as an appropriate binder material. Adopting this binder into the holding and sealing mat material of D7 would thus lack an inventive step in the light of the problem to be solved.

- X. The respondent's arguments relevant to the present decision may be summarised as follows:

Main request

The novelty objection based on D5 should be excluded. The opponent did not raise a novelty objection to the

subject-matter of claim 1 of the present main request before the opposition division (claim 1 of auxiliary request 1 before it). It was only raised against a previous request. The objection based on D5 could and should have been raised at that time and thus should be excluded under Article 12(4) RPBA 2007.

D5 failed to unambiguously disclose the claimed flying ratio. The description of the patent clearly indicated a 90° impact angle to be used when testing flying ratio using the JIS K-6830 standard. With only a 30° impact angle used in D5 the results could not be compared and so D5 could not anticipate the claimed flying ratio. If any test method could be used to determine the flying ratio, rather than that described in detail in the patent, the parameter would be meaningless. Although paragraph 0057 of the patent did not explicitly specify an angle of 90°, the tests in paragraph 0096 were carried out in the patent using this angle.

#### Auxiliary request 1

The subject-matter of claim 1 met the requirement of Article 123(2) EPC. There was no link between the flying ratio test method and e.g. the quantity of binder in the tested mat, even if the method was disclosed in detail only in relation to a specific embodiment of the invention.

D12/D12a should not be admitted since the mats produced for testing therein were fundamentally different to that of D5 which they were intended to replicate. In addition to the different order in which the cutting and binder impregnating steps were carried out, the mats of D12/D12a *inter alia* had surface densities, thicknesses and temperatures/conditions, under which

they were dried, which were very different to the mat of D5. The mats of D12/D12a were thus not representative of the mat of D5 and could not be used to confirm or otherwise that the flying ratio of D5 met the claimed range.

As regards novelty with respect to D1, this disclosed a significant compression of the mat from 20mm to 3.0mm such that it was not possible to unambiguously say that the flying ratio would therefore meet the claimed flying ratio range of less than or equal to 0.15 wt.%. The technical feature 'flying ratio' was used to characterise the mat material rather than a full list of all factors affecting flying ratio being claimed. Should the appellant raise an objection under Article 83 EPC, agreement for this fresh ground for opposition to be examined would not be given.

D13 should not be admitted since it failed to accurately replicate example 2 of D1. The fiber mat base material of D13 was not unambiguously the same as that used in D1, nor was at least the density of the mat reflective of that disclosed in D1 due, at least, to the D13 alumina fiber mat being needle punched which would affect both the density and the inter-linking, and thus the flying ratio, of the fibres in the mat. Thus, in failing to replicate the mat in example 2 of D1 even closely, let alone unambiguously, the flying ratio results in D13 *prima facie* lacked relevance.

As regards the novelty objections based on D2 and D3, even if these documents each disclosed a binder with the claimed glass transition temperature parameter, that did not unambiguously result in the disclosed mat therefore also exhibiting the claimed flying ratio.

The subject-matter of claim 1 involved an inventive step. It was not possible to conclude that the drop test used for measuring the flying ratio in D7 would provide comparable results to the 90° impact test of the Japanese standard. Based on the differentiating features over D7, the problem to be solved could be seen as 'how to reduce fibre scattering'. D3 (see page 3, line 13 onwards) aimed to reduce the stuffing load by selectively applying binder to the mat rather than to reduce the flying ratio of the mat. Any modification to D7 based on D3 was thus motivated only with the benefit of hindsight of the present invention.

## **Reasons for the Decision**

### **Main request (patent in the amended form found allowable by the opposition division)**

1. Novelty
  - 1.1 Admittance of novelty objection based on D5
    - 1.1.1 The objection to the novelty of the subject-matter of claim 1 of the main request with respect to D5 was presented by the appellant in its statement of grounds of appeal. Claim 1 of the present main request corresponds to claim 1 of auxiliary request 1 as found to meet the requirements of the EPC by the opposition division. As pointed out by the respondent, in accordance with the minutes of oral proceedings, D5 was not used to object to the novelty of the subject-matter of claim 1 of auxiliary request 1 before the opposition division. However, D5 was used to object to the novelty

of the subject-matter of claim 5 of the (then) main request before the opposition division, which found the objection not to be persuasive (see page 6 of the decision under appeal). Claim 1 of auxiliary request 1 before the opposition division however corresponded exactly to claim 5 of the main request before it. The parties thus knew the opposition division's opinion on the novelty objection with respect to D5 of the subject-matter of claim 1 of auxiliary request 1.

1.1.2 Whilst the respondent's argument that a novelty objection based on D5 against the subject-matter of claim 1 of auxiliary request 1 not being raised can be acknowledged, the novelty of the very same subject-matter with respect to D5 had already been decided upon by the opposition division in the foregoing main request. Raising the same objection again, when the opposition division's opinion on this precise objection was known, would essentially have been an unnecessary repeat of an objection for which the outcome had already been decided.

1.1.3 The Board thus finds that the objection to the novelty of the subject-matter of claim 1 of the present main request with respect to D5 was indeed raised before the opposition division and the decision was also based on it.

1.1.4 The Board did thus not exercise its discretion under Article 12(4) RPBA 2007 to hold the objection of lack of novelty over D5 inadmissible.

1.2 Novelty of the subject-matter of claim 1 over D5 alone

The subject-matter of claim 1 lacks novelty over D5

(Article 54(1) and (3) EPC).

- 1.2.1 D5 discloses all features of claim 1 as follows (the references in parentheses referring to D5:

A holding and sealing material (Example 2 with LX816 binder; see page 18) which is configured to be set between a catalyst carrier and a shell covering the outside of the catalyst carrier in a catalytic converter for purifying an exhaust gas (see page 1, lines 5 to 14) comprising:

a mat-like material (see page 15, lines 4 to 7) formed by arranging inorganic fibers in a mat shape; and an organic binder (see page 15, lines 7 to 10) with a glass transition point  $T_g$  ( $^{\circ}\text{C}$ ) of less than or equal to  $5^{\circ}\text{C}$  (specifically LX816, see Table 2 on page 18) which is attached to the mat-like material, wherein a flying ratio of the inorganic fibers is less than or equal to 0.15 wt.% (see Table 2, Fiber Shedding wt% for LX816 binder; 0.028 wt% for 0.5 wt% binder; 0.002 wt% for 3.5 wt% binder).

- 1.2.2 The respondent's only argument concerning novelty over D5 is that the patent description specifically indicated which test conditions to use when measuring the flying ratio defined in claim 1, and that this was different to D5, such that the test in D5 at  $30^{\circ}$  impact angle did not result in the claimed flying ratio defined in claim 1. This is however not accepted, as explained below.

- 1.2.3 First, the scope of a claim should usually be interpreted as broadly as technically reasonable, recourse being made to the description only when interpretation of claimed features is necessary. In the present case, flying ratio is a well understood

parameter such that no reference to the description is necessary in order to interpret it. Further, even if the skilled person were to have cause to resort to the description for a definition, the description does not describe flying ratio only with respect to the test using a 90° impact angle. Instead, a 90° angle impact test is mentioned in relation to embodiments which were tested in that way (see paragraph 0096 of the patent), but in its more general disclosure (see e.g. paragraph 0057) the description is unspecific as to how the test equipment (which notably allows angular impacts from many different angles up to 135° - see D11 Fig. 14) might be used, and does not for example specify solely an impact angle of 90°. It thus follows that, as claim 1 itself fails to define the test method to be used when determining the flying ratio, the skilled person may choose from any appropriate known method for testing the claimed parameter. Such methods include not only the Japanese standard detailed in the patent using a 90° impact angle but also the same method using the same equipment with a 30° impact angle (as used in D5, page 16, line 8 *et seq*) or even, for example, the drop test detailed in [0051] of D7. The Japanese standard with a 30° impact angle used in D5 thus provides perfectly valid flying ratio results for comparison with those defined in claim 1 of the main request.

- 1.2.4 The respondent's further argument that, if any method could be used to determine the flying ratio, the parameter would be meaningless does not change the above finding. The scope of claim 1 is broad enough to include any reasonable and appropriate known flying ratio test to be used to measure it. The test used in D5 with a 30° impact angle is just such a test, the respondent having notably failed to show either that such a 30° impact angle was outside of the options for

testing disclosed in the Japanese standard or that it was an inappropriate test for determining the flying ratio of a material.

- 1.2.5 Therefore the subject-matter of claim 1 of the main request lacks novelty (Article 54(1) and (3) EPC). The main request is consequently not allowable.

**Auxiliary request 1**

2. Article 123(2) EPC

The subject-matter of claim 1 of auxiliary request 1 meets the requirement of Article 123(2) EPC.

- 2.1 Even though the details of the flying ratio test method adopted into claim 1 are taken from the disclosure of a specific embodiment of the invention, there is no link between the impact test itself and the specific materials tested. The test described is not limited in its applicability to materials with a binder content of 1 wt.% nor indeed is it limited to any particular type of binder, nor is any reason seen by the Board as to why this should be the case. Although the appellant also referred generally to 'other features' (see the appellant's submission of 1 March 2017, item 2,1) which would be present in the test samples, these were not further specified and the Board can also not see any other features which would specifically link the test to the explicitly mentioned sample materials. Even though it is originally disclosed as part of a particular embodiment of the invention, the skilled person would unambiguously see the test method as being relevant to all materials of the invention where flying ratio is to be established.



2.2 Thus the subject-matter of claim 1 of auxiliary request 1 meets the requirement of Article 123(2) EPC.

3. Novelty

3.1 Novelty over D5 alone

The subject-matter of claim 1 of auxiliary request 1 is novel over D5 alone (Article 54(1) and (3) EPC).

3.1.1 Regarding the appellant's contention that the feature defining a flying ratio of the inorganic fibers to be less than or equal to 0.15 wt.% was a result to be achieved, this is not accepted.

3.1.2 The flying ratio of a fibrous material defines a physical property of the material in the form of a parameter which can be reliably established with recognised tests such as, for example, the Japanese standard repeatedly referred to in the present patent (see paras. [0057], [0096]) and on file as D11. As such, the flying ratio of a material is a defined technical feature of the material, even if other technical features of the material (such as fibre diameter - see para. [0005] of the patent - and binder glass transition point - see para. [0015]) have an influence on the magnitude of the parameter.

3.1.3 The flying ratio is thus a technical feature of the claimed holding and sealing material.

3.1.4 D5 fails to disclose:

- the use of the 90° impact angle defined in the flying ratio test of claim 1; and
- the material flying ratio being less than or equal to 0.15 wt%.

Contrary to the arguments of the appellant, the Board has insufficient evidence to conclude from D5 alone that the 30° impact angle test used in D5 unambiguously results in the claimed flying ratio of less than or equal to 0.15 wt%. Even using the LX816 binder with a Tg of -10°C at a binder content of 3.5 wt% (see example 2 of D5) it is not possible to unequivocally conclude that this would result in a flying ratio, when tested with a 90° impact angle according to claim 1, meeting that defined in claim 1.

- 3.1.5 The appellant's argument extrapolating from the very low fibre shedding in Table 2 in order to conclude that the material according to D5 was a material within the scope of claim 1 is not persuasive. Whilst the Board accepts that the test results in D5, Table 2 at 3.5 wt% binder content indeed give a strong indication in favour of the appellant's argument, this nevertheless relates only to a probable scenario, rather than something which is implicit or unambiguous. The effects of an energy impact which is 7.5 times greater than that in D5 (as argued by the respondent in its written submissions of 25 October 2016, paragraph 2.2.2) can also not simply be extrapolated from results at a 30° impact test to arrive at a value necessarily falling within the claim. Likewise, the mentioned prevention of fibre shedding in D5 resulting from the information in Table 2, can also only be understood to be the case necessarily in relation to the 30° angle impact test.
- 3.1.6 The subject-matter of claim 1 of auxiliary request 1 is thus novel over D5 alone (Article 54(1) and (3) EPC).
- 3.2 Novelty over D5 in the light of the experimental reports D12/D12a

- 3.2.1 A further novelty objection based on D5 and raised against this request by the appellant relies on the content of experimental reports D12/D12a to show that, even using a 30° impact angle test, the flying ratio disclosed in D5 would necessarily meet the claimed flying ratio range of 'less than or equal to 0.15 wt%' resulting from the claimed test at a 90° impact angle.
- 3.2.2 Prior to oral proceedings before the Board, the respondent had argued that the experimental data of D12/D12a did not faithfully reproduce the procedure for manufacturing the mats of D5. This was argued to be due to the steps of impregnating and cutting the mats to size for testing in D5 being reversed in the mat test samples prepared in D12/D12a.
- 3.2.3 At oral proceedings before the Board, the respondent for the first time brought forward new facts to question the validity of D12/D12a in reproducing the results in D5. Being a change of the respondent's complete case (see Article 12(3) RPBA 2020), the admittance of this change to the respondent's appeal case had to be considered (Article 13(1) RPBA 2020).
- 3.2.4 The new facts brought forward by the respondent concern discrepancies between the mat of D12/D12a and that of the LX816 binder sample tested in D5 which it is supposed to reproduce. These discrepancies concern *inter alia* the mat surface densities, their thicknesses and the temperatures/conditions under which they were dried.
- 3.2.5 These newly identified discrepancies between the mats of D5 and D12/D12a can *prima facie* be seen to have a direct relationship to the previously raised objection i.e. the potential effects on the flying ratio of a mat

through the order in which impregnating and cutting steps were carried out. Furthermore, these discrepancies are seen to *prima facie* be of such fundamental importance to the resultant flying ratio of a mat, and thus on the attack based on D5, that the Board exercised its discretion under Article 13(1) RPBA 2020 to admit the respondent's change of appeal case.

- 3.2.6 After announcing the admittance of this change to the respondent's appeal case, the Chairman specifically asked the appellant if it wished to reconsider its requests in the light of this development. The appellant explicitly declined to avail itself of this opportunity.
- 3.2.7 As to the substance of the identified discrepancies between the mats of D12/D12a and D5, the appellant's arguments fail to convince the Board that these discrepancies would not affect the validity of the measured flying ratio in D12/D12a as being representative of D5.
- (a) As regards the different mat thicknesses in D5 and D12/D12a, even though flying ratio is calculated as a wt% of the total mat weight, it cannot be dismissed that a different mat thickness could reasonably have an influence on the ease with which fibres can be broken and/or released from the mat structure, even when held in the mat with a binder.
- (b) The appellant's argument that the mat starting density of D12/D12a was different to that of D5 since the precise mat of D5 was no longer available on the market, is no justification for therefore being able to accept the flying ratio results of D12/D12a to be representative of those produced in

D5.

(c) The different temperatures used for drying the binder can equally not be dismissed as not having an influence on the flying ratio of the mat. Even if the primary purpose of the heating step is to dry the mat (as alleged by the appellant), different temperatures can plausibly affect the resultant flying ratio due to binder dissolution possibly starting at temperatures greater than 155°C. The risk of deleterious effects on the binder are specifically stated in paragraph [0039] of the patent. Likewise, greater cross-linking and thus less motility of the binder at higher drying temperatures can result (see also para. [0042] of the patent). It may also be noted that D5 includes a 2-step drying process (see page 15) including a further drying step in a cylindrical dryer, which was also not used in D12/D12a.

Thus, it cannot be concluded that the above discrepancies between the mat manufactured in D12/D12a from that disclosed in D5 would not affect the resultant flying ratio of the mat.

3.2.8 The appellant's further argument that, at 3.5 wt% binder content and the resultant very low flying ratio (see Example 2 and Table 2 of D5), the influence of mat thickness, density and drying conditions on flying ratio would not be so great as to increase the flying ratio beyond the claimed range is not accepted. It is not denied that greater wt% binder content in a mat can reasonably contribute to lowering the flying ratio (see e.g. Table 2 of D5 and the reduction in Fibre Shedding resulting from a 3.5% binder content vs a 0.5% content), yet no evidence has been provided and it is

not possible to unequivocally conclude that this effect would outweigh that of the other physical attributes influencing the flying ratio of the mat discussed in point 3.2.7 above.

3.2.9 The experimental results disclosed in D12/D12a are thus found to lack relevance with regard to establishing whether the flying ratio disclosed in D5 meets the claimed range of 'less than or equal to 0.15 wt.%' in claim 1.

3.2.10 As regards the reasons for the Board to decide not to exclude D12 from the proceedings under Article 12(4) RPBA 2007 and to admit D12a into the proceedings under Article 13(1) RPBA 2020, these are not relevant to, and so are not detailed in, the present decision.

3.2.11 Following from the conclusion in point 3.2.9 regarding D12/D12a lacking relevance, D5 thus fails to disclose the use of a 90° impact angle defined in the flying ratio test of claim 1 and thus the claimed flying ratio of less than or equal to 0.15 wt%. The subject-matter of claim 1 of auxiliary request 1 is thus novel over D5, even in the light of the experimental reports D12/D12a (Article 54(1) and (3) EPC).

3.3 Novelty over D1

The subject-matter of claim 1 of auxiliary request 1 is novel over D1 (Article 54 EPC).

3.3.1 D1 discloses (see Example 2 on page 15; page 14, lines 9 and 22 to 25) the following features of claim 1:

A holding and sealing material (see D1, para. [0001]) which is configured to be set between a catalyst

carrier and a shell covering the outside of the catalyst carrier (suitability confirmed e.g. in para. [0006]) in a catalytic converter for purifying an exhaust gas comprising:

- a mat-like material formed by arranging inorganic fibers in a mat shape (page 14, line 9); and
- an organic binder (LX874; page 14, lines 22 to 25) with a glass transition point  $T_g$  ( $^{\circ}\text{C}$ ) of less than or equal to  $5^{\circ}\text{C}$  ( $-31^{\circ}\text{C}$ ; see D9', page 6/9) which is attached to the mat-like material.

3.3.2 The appellant's argument that the claimed flying ratio was inherently disclosed by the material of D1 since this explicitly disclosed the claimed binder glass transition point is not accepted. While paragraph [0012] of the patent does indicate that a low glass transition point can 'suppress a break of the inorganic fibres', this does not mean that it eliminates all fibre breaks irrespective of the mat preparation conditions. Indeed, as already indicated with respect to e.g. weight percent of binder present (see point 3.2.8 above), the flying ratio of a material is not unambiguously down to binder glass transition point alone. As also argued by the respondent in this regard, despite solely the technical feature of flying ratio being used to characterise the mat of claim 1, it cannot be excluded that further manufacturing factors influence the flying ratio, such as quantity of binder in the mat, drying conditions and compression of the mat during manufacture.

3.3.3 The appellant opined that, if further factors other than glass transition point were to influence the flying ratio achieved, the patent failed to disclose the invention sufficiently clearly and completely for the skilled person to carry it out. It is noted that

such an objection under Article 83 EPC was not raised before the opposition division nor indeed, being first mentioned in the letter of 1 March 2017, was it part of the appellant's complete appeal case.

- 3.3.4 At oral proceedings before the Board the appellant referred to this objection under Article 83 EPC once more. With reference to G1/95, the Chairman indicated that the Board had no power to examine a fresh ground for opposition without the agreement of the patentee (respondent) and that this was tantamount to bringing the opposition ground under Article 100(b) EPC on this issue against the subject-matter as granted. It was also a change of appeal case and the Board pointed out that it was unlikely to be admitted. The respondent indicated that agreement to the introduction of the fresh ground for opposition would not be forthcoming, in reaction to which the appellant indicated that it would no longer pursue this objection.
- 3.3.5 As regards the novelty objection based on D1, the appellant's further contention that the compression of the mat thickness in D1 was not greater than that implicit from the patent does not allow the corollary to be drawn that the flying ratio of D1 will necessarily meet the claimed range. The skilled person would reasonably anticipate mat compression to break some of the inorganic fibres comprised in the mat and that a greater compression would result in greater fibre breakage (see e.g. para. [0041] of the patent). The resultant broken fibres would thus also arguably be less constrained in the mat structure due to their shorter lengths, even after immersion in the binder. A definitive answer to this has however not been presented by either party such that the Board is unable to unambiguously conclude that the holding and sealing



material of D1 would inherently meet the claimed flying ratio of less than or equal to 0.15 wt%.

3.3.6 The appellant's argument that the glass transition point of LX874 binder was so low that implicitly the claimed flying ratio range would be met by example 2 of D1 is not accepted. Lacking an explicit indication of the flying ratio achieved by the specific material of example 2 of D1, it is impossible to unambiguously say that the presence of the LX874 binder in the material would unequivocally result in the flying ratio falling within the claimed range.

3.3.7 The appellant's further contention that the high binder percentage in the mat of D1 would considerably limit the flying ratio, while certainly possible, can again not be definitively ascertained.

3.3.8 It thus follows that, lacking an unambiguous disclosure in D1 of at least the claimed flying ratio, the subject-matter of claim 1 is novel over D1.

#### 3.4 Admittance of D13

3.4.1 Having been filed by the appellant after its statement of grounds of appeal, D13 constitutes an amendment to the appellant's appeal case and the admittance of D13 is at the discretion of the Board under Article 13(1) RPBA 2020. Of importance in this regard is the *prima facie* relevance of D13 to the novelty argument based on D1.

3.4.2 D13 was filed to provide experimental evidence that example 2 of D1 (upon which the novelty objection based on D1 is based - see point 3.3 above) indeed disclosed the claimed flying ratio. To this end, example 2 of D1

was reworked and tested for flying ratio using the Japanese standard defined in claim 1.

3.4.3 The respondent indicated several differences between the mat tested in D13 and that disclosed in D1. These included the basic mat material itself, the mat density before compression, the degree of compression to which it was subjected and the material of D13 being needle punched. As to the appellant's argument that the higher density/lower mat thickness parameters in D13 compared to D1 cancelled each other out such that a comparable flying ratio would result, this is indeed a possibility but, again, not inherently the case. Similarly, needle punching a material may increase inter-linking of fibres in the mat which would reasonably be expected to reduce the flying ratio compared to the same material not having undergone needle punching. Thus, whilst it is indeed possible that the differences between the material of D13 and D1 would not affect the flying ratio, without evidence to this point, this is mere conjecture. The required standard for an objection of novelty is that all features of claim 1 are unambiguously disclosed in a single document. With D13 not testing a clearly comparable material to that of D1, it is not possible to unequivocally say that the flying ratio results achieved for D13 are indicative of the material of example 2 of D1. The results of the tests of D13 are thus not relevant for the novelty objection based on D1.

3.4.4 Lacking *prima facie* relevance, the Board exercised its discretion not to admit D13 into the proceedings (Article 13(1) RPBA 2020).

3.5 Novelty over D2 or D3

3.5.1 Both D2 (see in particular paras. [0030] and [0031]) and D3 (see page 14, line 25 to page 15, line 2) disclose a holding and sealing material according to claim 1, save for the feature directed to the claimed flying ratio being less than or equal to 0.15 wt%.

3.5.2 As regards the appellant's argument that the respective binders in D2 and D3 each met the claimed glass transition temperature parameter and that the claimed flying ratio range was therefore inherently met, this is not accepted.

3.5.3 D2, similarly to D1 (see point 3.3.5 above; the appellant's entire argument regarding lack of novelty over D2 essentially relied on reference to its arguments with respect to D1), discloses a significant compression of the inorganic fiber mat from 20mm to 4.5mm after immersion in the organic binder and during the drying step (see D2 para. [0031]) such that it is not possible to definitively conclude that the mat would exhibit the claimed flying ratio due to possible fibre breakage through the compression.

3.5.4 As for D3, despite disclosing the use of Nipol LX816 binder with a glass transition temperature of  $-10^{\circ}\text{C}$ , it cannot be definitively concluded that the resultant holding and sealing material would therefore meet the claimed flying ratio range; it is indeed possible that it would, however this is not unambiguously the case.

3.5.5 It thus follows that the subject-matter of claim 1 is novel over the disclosures of both D2 and D3.

3.6 In summary therefore, the subject-matter of claim 1 is novel (Article 54 EPC).

4. Inventive step

The subject-matter of claim 1 involves an inventive step (Article 56 EPC).

4.1 D7 discloses (see 'Invention Product 1' in para. [0053]) a mat-like material of crystalline alumina fibers and a thickness of 25mm to which an organic binder of an emulsion latex is attached at an amount of 1 wt%. When subjected to the drop test (see detail in para. [0051]) the rate of weight decrease of the mat-like material is 0.002%. The specific latex binder used is however not disclosed. The Board thus finds that D7 fails to disclose the following features of claim 1:

- the organic binder has a glass transition point of less than or equal to 5°C; and
- the flying ratio of the inorganic fibers is less than or equal to 0.15 wt.% when measured with the quoted Japanese standard test method.

4.2 With the binder glass transition point having a major influence on flying ratio and it being desirable to reduce the flying ratio in order to maintain a safe working environment during assembly, the objective technical problem to be solved may be seen as 'to find a suitable binder material' for the sealing mat in D7.

4.3 Whilst D3 does indeed disclose the binder Nipol LX816 known by the skilled person to have a glass transition point within the range defined in claim 1, there is nothing in D3 which would guide the skilled person in the light of the objective problem to be solved to select this binder. D3, as also argued by the

respondent, is primarily directed to facilitating insertion of a catalyst carrier retaining member wrapped around the catalyst carrier into the casing of the catalytic converter (see page 3, lines 13 to 32) and so would not be considered by the skilled person in relation to a suitable binder composition in relation to flying ratio. The selection of the Nipol LX816 binder from D3 for modification of the holding and sealing mat material of D7 would therefore appear to be motivated solely through knowledge of the claimed invention, rather than any teaching of D3 with regard to the objective problem.

- 4.4 Even considering the alternative objective problem cited by the appellant and the respondent as being 'to further improve the flying ratio of the mat material', D3 also fails to provide the skilled person with the claimed solution. Firstly, the drop test used in D7 to measure the flying ratio cannot unambiguously be seen to provide comparable results to the Japanese standard test used in claim 1. Thus, whether the claimed flying ratio would even be an improvement over that disclosed in D7 remains unknown based on the evidence on file. Nonetheless, D3 cannot anyway provide guidance to the skilled person as to what modification of D7 is required since, as already indicated in point 4.3 above, D3 is primarily directed to facilitating insertion of a catalyst carrier retaining member wrapped around the catalyst carrier into the casing of the catalytic converter and so would not be considered by the skilled person in relation to improving the flying ratio of the material through selection of a binder with a glass transition point in the claimed range.

- 4.5 In summary therefore, when starting from D7 and wishing to solve the objective technical problem, the skilled person would not be guided by D3 to the claimed solution without the exercise of an inventive step (Article 56 EPC).
- 4.6 Based on the evidence and arguments put forward by the appellant, the Board cannot conclude that the subject-matter of claim 1 is obvious. The subject-matter of claim 1 of auxiliary request 1 thus involves an inventive step (Article 56 EPC).
5. The Board thus finds the subject-matter of the claims of auxiliary request 1 to meet the requirements of the EPC. The Board avails itself of its power under Article 111(1) EPC to remit the case back to the opposition division for the description to be adapted to the amended claims.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside
2. The case is remitted to the opposition division with the order to maintain the patent as amended in the following version:
  - Claims 1 and 2 according to auxiliary request 1 filed on 31 August 2018,
  - and a description to be adapted.

The Registrar:

The Chairman:



D. Grundner

M. Harrison

Decision electronically authenticated