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**Datasheet for the decision
of 7 June 2019**

Case Number: T 0799/17 - 3.3.05

Application Number: 02710558.4

Publication Number: 1357999

IPC: B01D53/64, B01D53/02,
B01J20/04, B01J20/16, B01J20/12

Language of the proceedings: EN

Title of invention:
A METHOD FOR THE REMOVAL OF MERCURY FROM A GAS STREAM

Patent Proprietor:
CDEM Holland B.V.

Opponent:
NOx II International, Ltd.

Headword:
Mercury removal / CDEM

Relevant legal provisions:
EPC Art. 54
RPBA Art. 13(1)

Keyword:
Novelty - main request (no)
Late-filed auxiliary requests - admitted (no)

Decisions cited:

G 0003/14, T 0711/90, T 1126/97, T 0990/07, T 1993/07,
T 0304/08, T 1095/09, T 0134/11, T 0391/11, T 1354/11,
T 1459/11, T 1931/14

Catchword:



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Case Number: T 0799/17 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 7 June 2019

Appellant 1: CDEM Holland B.V.
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
24 January 2017 concerning maintenance of the
European Patent No. 1357999 in amended form.**

Composition of the Board:

Chairman E. Bendl
Members: G. Glod
S. Fernández de Córdoba

Summary of Facts and Submissions

- I. The appeals of the patent proprietor (appellant 1) and of the opponent (appellant 2) lie from the decision of the opposition division that found that European patent EP 1 357 999 B1 meets the requirements of the EPC in amended form on the basis of the then auxiliary request 5.
- II. The only document cited in the impugned decision of relevance to the present decision is:

D4: O. Rentz and Ch. Martel, Analyse der Schwermetallströme in Steinkohlefeuerungen - Einfluß der Kohlesorte und des Lastzustandes-; Deutsch-Französisches Institut für Umweltforschung Universität Karlsruhe (TH); June 1998.
- III. With the statement of grounds of appeal, appellant 1 kept the set of claims as granted as its main request and filed 11 auxiliary requests.
- IV. In reply to appellant 2's statement of grounds of appeal, appellant 1 filed 10 auxiliary requests on 28 September 2017.
- V. In the communication under Article 15(1) RPBA, the board had the preliminary non-binding opinion that auxiliary requests labelled ninth and tenth auxiliary requests possibly overcame the objections to novelty based on D1 and D4.
- VI. On 3 April 2019 appellant 1 submitted new auxiliary requests 1 to 10.

Claim 1 of the main request (patent as granted) is as follows:

"1. A method for the removal of mercury from a gas stream, characterized in that at a temperature above 230 °C the gas stream is contacted with a sorbent that as the active component is comprised of a mixture of substantially silica-alumina compounds and/or calcium compounds, wherein said calcium compounds comprise calcium carbonate and/or calcium oxide."

Claim 1 of the first auxiliary request is as follows (different wording from main request underlined):

"1. A method for the removal of mercury from a gas stream, characterized in that adding a sorbent to the gas stream, at a temperature above 230 °C contacting the gas stream with the sorbent that as the active component consists of a mixture of substantially silica-alumina compounds and/or calcium compounds, wherein said calcium compounds comprise calcium carbonate and/or calcium oxide, and removing mercury from the gas at said temperature by chemisorbing of the mercury in the gas stream by the active component of the sorbent."

In claim 1 of the second auxiliary request the underlined feature, different from the first auxiliary request, was included:

"1. A method for [...] comprise calcium carbonate and/or calcium oxide, and removing >10% of the mercury from the gas at said temperature [...]."

In claim 1 of the third auxiliary request the underlined feature, different from the second auxiliary request, was included:

"1. A method for [...] in the gas stream by the active component of the sorbent, with the proviso that the sorbent is not fly ash from an incineration process."

In claim 1 of the fourth auxiliary request the underlined amendment, different from the third auxiliary request, was made:

"1. A method for [...] consists of a mixture of substantially silica-alumina compounds and/or calcium compounds, [...]."

In claim 1 of the fifth auxiliary request the underlined feature, different from the fourth auxiliary request, was included:

"1. A method for [...] at a temperature above 230 °C and below 800 °C, preferably below 600 °C, more preferably below 550 °C, contacting the gas stream with [...]."

In claim 1 of the sixth auxiliary request the underlined and crossed out amendments, different from the fifth auxiliary request, were made:

"1. A method for [...] at a temperature above 300 °C and below 800 °C, ~~preferably below 600 °C, more preferably below 550 °C,~~ contacting the gas stream with a the sorbent [...]."

In claim 1 of the seventh auxiliary request the underlined feature, different from the sixth auxiliary request, was included:

"1. A method for [...], with the proviso that the sorbent is not fly ash from an incineration process, wherein said calcium compounds comprise 60 - 70% of calcium carbonate and 40 - 30% of calcium oxide."

In claim 1 of the eighth auxiliary request the underlined feature, different from the seventh auxiliary request, was included:

"1. A method for [...] wherein said calcium compounds comprise 60 - 70% of calcium carbonate and 40 - 30% of calcium oxide, and wherein the sorbent comprises kaolin, that may or may not be in the dehydrated form of meta kaolin."

In claim 1 of the ninth auxiliary request the underlined feature, different from the eighth auxiliary request, was included:

"1. A method for [...], that may or may not be in the dehydrated form of meta kaolin, wherein the sorbent is reusable."

In claim 1 of the tenth auxiliary request the underlined feature, different from the ninth auxiliary request, was included:

"1. A method for [...] wherein the sorbent is reusable, and it comprises the step of activating the sorbent by means of an oxidator."

VII. Oral proceedings took place on 7 June 2019.

VIII. The arguments of appellant 1 relevant to the present decision can be summarised as follows:

A method was different from a process. A method related to a systematic plan for doing something. None of the cited documents related to such a plan, and certainly not in a systematic manner.

D4 should not be admitted, since its teaching was ambiguous. The references in D4 to Zygarlicke and Galbreath were confusing and contradictory. It mentioned that sorption on fly ash was caused by porous carbon particles, which meant that it was not the fly ash that was considered to cause sorption, but the carbon in the fly ash. The disclosure on page 40 relating to the article of Zygarlicke and Galbreath referred to very different conditions than those claimed. In particular, HCl and Cl₂ were present. These substances certainly influenced the characteristics of the other compounds present. Only a quantitative relationship between Hg and CaO was found, but no explanation about the mechanism was given. It was not shown that the disclosure in D4 correctly reflected the original disclosure of the Zygarlicke and Galbreath publication of 1998. Furthermore, D4 did not disclose that gaseous mercury was removed and it did not relate to an active component as claimed. The combination of features of claim 1 was not directly and unambiguously derivable from D4.

It was clear from claim 1 that "for the removal of mercury from a gas stream" implied that mercury had to sorb the active component that was a mixture of silica-alumina compounds and/or calcium compounds.

The auxiliary requests should be admitted in view of T 391/11, T 1993/07, T 1126/97, T 990/07 and T 134/11. These requests were a response to the newly raised objections under points 8.1 to 8.3 and 9.1 to 9.4 of the communication under Article 15(1) RPBA.

It was evident from the overall disclosure that the sorbent was actually added. This was not limited to specific ways of adding or providing the sorbent.

The term "substantially" had already been present before and could not signify a lack of clarity. There was no difference whether it was used with "comprising" or "consisting". "Consisting of a mixture of substantially..." only meant that the main part (at least 51%) of the active sorbent was a mixture of silica-alumina compounds and/or calcium compounds as indicated in paragraph [0012]. "Substantially" was widely used in patents and only excluded the presence of impurities in both the process and the sorbent preparation.

Chemisorbing was obtained by choosing the sorbent and the operating conditions (temperature and contact time) such that mercury can chemically sorb to the active sites.

The claim requests submitted in reply to appellant 2's statement of grounds of appeal on 28 September 2017 had never been withdrawn and were still on file.

IX. The arguments of appellant 2 relevant to the present decision can be summarised as follows:

There was no difference between a process and a method.

It was not shown that the passage on page 40 of D4 did not correctly reflect the disclosure of the cited Article of Zygarlicke and Galbreath. D4 unambiguously disclosed that said Article related to the sorption of mercury to calcium oxide present in fly ash and was therefore anticipating the novelty of claim 1 of the patent as granted.

The auxiliary requests of 3 April 2019 should not be admitted, since the communication under Article 15(1) RPBA did not contain any new objections, but was only based on objections that have been known for a long time. These requests contained features taken from the description and were clearly not allowable, since they gave rise to objections under Articles 123(2) EPC and 84 EPC. "Adding" in combination with "contacting" was only disclosed for a fixed bed or for the dispersion (page 9, lines 29 to 32 as originally filed), so claim 1 contained an intermediate generalisation. The introduction of the expression "consisting" lead to a problem of clarity in view of the presence of the wording "of substantially". The expression "chemisorption" was already under debate before the opposition division with respect to Articles 123(2) and 84 EPC. Chemisorbing was a result to be achieved, but it was not clear how this result could be achieved at all temperatures for all sorbents claimed, since figure 1 of the patent showed that even with the specific sorbent used in that example physical sorption was still relevant at temperatures of around 300°C. In addition, it was only disclosed for this particular sorbent.

It was evident from the wording of appellant 1's letter of 3 April 2019 that the auxiliary requests submitted therewith were supposed to replace the auxiliary

requests previously on file. Appellant 2 was not really prepared to discuss the auxiliary requests of 28 September 2017. It would be unfair if the patent proprietor was allowed to discuss requests that he had withdrawn.

- X. At the end of the oral proceedings before closing the debate, the chairman established the requests as follows:

Appellant I (patent proprietor) requested that the decision under appeal be set aside and that the patent be maintained as granted (main request). Alternatively it requested maintaining the patent on the basis of one of the first to tenth auxiliary requests, filed with the submission of 3 April 2019, or on the basis of one of the requests filed with the submission of 28 September 2017.

Appellant 2 requested that the decision be set aside and that the patent be revoked.

Reasons for the Decision

Main request - Patent as granted

1. Claim construction
 - 1.1 As is evident from case law, the technical character of a method is determined (Case Law of the Boards of Appeal of the EPO, 8th edition, 2016, I.A.1.4.3) by the use of technical means. The EPC does not make a distinction between a method claim and a process claim. Process claims belong to the category of method claims (see T 1931/14, Reasons 2.2). This is also in line with

the fact that both terms are called "Verfahren" in German (see Articles 53(c) and 64(2) EPC).

1.2 In the present case the purpose of the method "for the removal of mercury from a gas stream" is considered to be a technical effect which inevitably arises when carrying out the steps of the claimed method. Such a technical effect has no limiting effect on the claim because it is not suitable for distinguishing the claimed method from a known one that does not have that purpose (see T 1931/14, Reasons 2.2.4). In particular, the purpose of the claimed method is not a functional technical feature thereof, as would be the case with a use claim (see T 304/08, Reasons 3.3.2).

1.3 Claim 1 only indicates that the gas stream is contacted with a sorbent, thereby resulting in the removal of mercury from the gas stream. This does not necessarily involve the active addition of a sorbent to the gas stream since such a step is not present in the claim. Claim 1 also does not indicate what "active" relates to and does not exclude, in view of the wording "is comprised", that the sorbent only contains small amounts of a mixture of substantially silica-alumina compounds and large amounts of an undefined component. Calcium compounds are not mandatory in claim 1 of the main request. Claim 1 does not state that mercury is sorbed to silica-alumina compounds. The active component only needs to comprise these components while the sorbing species could be a different part of the sorbent. Claim 1 does not include a step of sorbing mercury to silica-alumina compounds and does not provide any details on the sorption mechanism. Furthermore, the degree of removal is not defined at all and it is evident from Figure 1 that it is far from

100%. The presence of other compounds in the gas is also not excluded by the wording of claim 1.

2. Article 54 EPC

D4 was submitted during the opposition period and, relied on by the opposition division in the impugned decision and by appellant 2 in the notice of appeal. It is part of the proceedings.

Appellant 1 asked to have D4 disregarded. The board understands that appellant 1 considered D4 to contain deficiencies and mistakes, so it was not to be regarded as prior art (Case Law of the Boards of Appeal of the EPO, 8th edition, 2016, I.C.4.9.).

The critical passage of D4 on page 40 relates to an article of Zygarlicke and Galbreath from 1998 and was used by the opposition division in the impugned decision (Reasons 5.2.4). It was thus appellant 1's task to show that the opposition division was incorrect in its findings. There is no evidence that the summary of the cited publication given in D4 is not in line with the real disclosure of the publication. Simply alleging that D4 was ambiguous, did not correctly reflect the cited publication and that its disclosure was therefore not enabling is not sufficient without providing evidence such as the original cited publication.

Therefore, there is no reason to disregard D4.

D4 discloses that said article established that calcium oxide (CaO) present in the fly ash was responsible for sorbing gaseous mercury. These results are based on sampling carried out at temperatures of 200 to 250°C.

The value of 250°C is explicitly disclosed and there is no reason why the sampling should have been done at higher temperatures than when contacting CaO with mercury. Taking into consideration the above claim construction (see point 1.3), the board concurs with the opposition division's position. D4 anticipates the novelty of the subject-matter of claim 1 of the main request.

Consequently, the main request must fail.

First auxiliary request

3. Article 13(1) RPBA

This request was submitted on 3 April 2019, i.e. approximately two months prior to the oral proceedings before the board. Its admission is at the board's discretion (Article 13(1) RPBA).

- 3.1 The purpose of the communication of a board of appeal pursuant to Article 15(1) RPBA is to prepare for the oral proceedings and it is not an invitation to the parties to make further submissions or to file further requests (T 1459/11, Reasons 3.3). In the present case the communication did not contain any new objections, but only gave the board's preliminary and non-binding opinion based on the parties' submissions. In particular, the interpretation of the claim construction given in points 8.1 to 8.3 of the communication was mainly based on appellant 2's submission (see statement of grounds of appeal, point 5) and the impugned decision (point 5.2.1, second paragraph), while points 9.1 to 9.4 of the communication are also based on appellant 2's submission (see statement of grounds of appeal, points

6.1 to 6.4) and the impugned decision (points 5.1 to 5.2.4), with due consideration of appellant 1's submissions of 24 May 2017 and 28 September 2017.

Thus, the present case differs from T 1354/11 cited by appellant 1, where the objection leading to an amendment was raised for the first time in the board's communication (reasons 11.1.3).

- 3.2 It is established jurisprudence (Case Law of the Boards of Appeal of the EPO, 8th edition 2016, IV.E.4.2.2, page 1130 of the English version), that a request filed after the grounds of appeal may be admitted and considered at the board's discretion if the amended request is clearly or obviously allowable.

Clearly or obviously allowable means that it must be immediately apparent that the amendments made address the matter raised effectively without creating new issues (Case Law of the Boards of Appeal of the EPO, 8th edition 2016, IV.E.4.2.5, first paragraph). In the present case the features are taken from the description, which means that it should be easy to recognise which part of the description the features originate from and that they were not taken out of context. Their meaning should be immediately clear to the skilled person.

- 3.3 Amended claim 1 of this request is not clearly or obviously allowable for the following reasons:

- 3.3.1 Firstly, it is not unambiguous whether the addition of the sorbent to the gas stream and the contacting with the gas stream is disclosed without further limitation of the contacting and/or the addition. The passage on page 4 of the application as filed (lines 1 to 15)

discusses the addition of an oxidator and sorbent. Page 5, lines 14 to 17 relates to a specific sorbent, while page 9, lines 29 to 32 discloses a fixed bed or dispersion of the sorbent. Furthermore, page 10, lines 12 to 27 relates to the addition at various positions or to the amount to be added. It is not directly apparent that these passages allow a generalisation as present in claim 1, so that the requirements of Article 123(2) EPC are not clearly met.

3.3.2 Secondly, the replacement of "is comprised" by "consists" presents a problem of clarity that would be open to an objection (G 03/14, reasons 81). The use of the wording "consist" generally excludes the presence of other components than those listed (T 711/90, Reasons 2). In the present case, however, the presence of the word "substantially" leaves the intended composition of the mixture open. Only the main part of the mixture has to be made of silica-alumina compounds and/or calcium compounds while the remaining part is undefined. This interpretation of "substantially" is also in line with paragraph [0012] where the word "mainly" is used. Therefore, it cannot be argued that "substantially" is only meant to exclude undefined impurities. As a consequence, the use of the word "consisting" with the word "substantially" is contradictory in the present context, since on the one hand the active component is supposed to only contain a defined mixture while on the other hand the mixture can contain additional undefined components. Additionally, in claim 1 of auxiliary request 1 (as well as auxiliary requests 2 and 3) it is not clearly defined whether the combination "consists [...] substantially" refers to only the "silica-alumina compounds" or also to the "calcium compounds". In other words the question arises whether the "or calcium compounds" option of "consists

of a mixture of substantially silica-alumina compounds and/or calcium compounds" necessitates that only calcium compounds are present as the active component, or whether other active compounds may be present as well. The above problems of clarity are caused by the amendment since the original wording "is comprised" did allow the inclusion of other components.

The definition of the active component is critical, since part of appellant 1's argument related to the concept of "chemisorbing" to the active component, which was considered to be a key difference from what was described in the prior art. Thus, this apparent problem cannot be considered "*de minimis*".

The board is aware that the expression "consisting essentially of" is generally accepted, but this is not synonymous with the expression used in the present case. By using "consisting essentially of" the "claimed composition does not contain additional components not specified in the claim which would affect the essential characteristics of the claimed composition" (T 1095/09, Reasons 6). In the present case the mixture can contain additional undefined components that could influence the sorption properties.

3.3.3 Thirdly, chemisorbing is disclosed in the application as filed for "such a sorbent" (page 3, line 19), which is the sorbent defined in the preceding paragraph. It is not immediately apparent that the chemisorption is supposed to work with any type of sorbent covered by claim 1. This is also evident from Figure 2 which relates to a specific sorbent (page 5, lines 14 to 17) and shows that at temperatures of around 300°C chemical and physical sorption are equally important. The generalisation of the original passage in claim 1 is

not clearly allowable under Article 123(2) EPC. Furthermore, chemisorbing is considered to be the result of the process conditions (temperature, contacting time, type of sorbent) that make it possible to ensure that mainly chemisorption and not physical sorption occurs. Claim 1 does not contain any features that relate to this, and thus there is a problem of clarity.

This issue relating to chemisorbing cannot come as a surprise to appellant 1, since it was already discussed before the opposition division (see impugned decision, Reasons 7).

3.4 The decisions cited by appellant 1 do not alter this conclusion. T 391/11 is different from the present case in that that board raised new issues in its communication pursuant to Article 15(1) RPBA (T 391/11, Reasons 5). T 134/11 concerned Article 12(4) RPBA (Reasons 3.3) and dealt with a request that was allowable (Reasons 6). T 1993/07 confirms the position taken by the board (see Reasons 4.4.3). This also applies to T 1126/97 (Reasons 3.1.1). T 990/07 does not relate to late-filed requests.

3.5 Consequently, the board is using its discretion to the effect that the first auxiliary request is not admitted into the proceedings.

Second to tenth auxiliary requests

4. Article 13(1) RPBA

The amendments made in these requests do not alter the conclusion reached for the first auxiliary request, since the apparent objections under Articles 123(2) EPC

and 84 EPC remain valid. The critical wording of claim 1 of the first auxiliary request prevails in the second to tenth auxiliary requests. The additional amendments do not help to overcome all these deficiencies. Consequently, none of these requests are clearly or obviously allowable, and thus they are also not admitted into the proceedings.

5. Auxiliary requests filed with the submission of 28 September 2017

After the chairman had announced at the oral proceedings that the auxiliary requests filed with the submission of 3 April 2019 were not to be admitted into the proceedings since they were not clearly or obviously allowable, appellant 1's representative indicated that it considered that the auxiliary requests filed with the submission of 28 September 2017 were still on file. In reply to the chairman's explicit question appellant 1 confirmed in the oral proceedings that it considered no other requests than the main request, auxiliary requests 1 to 10 filed with the submission of 3 April 2019 and the said requests of 28 September 2017 on file.

The board does not concur with appellant 1's arguments concerning the latter requests since the auxiliary requests filed on 3 April 2019 replaced the auxiliary requests previously on file. This is evident from the submission of 3 April 2019 where on page 1 it is stated "*we request that the requests are dealt with in the following order*" and then the main request and first to tenth auxiliary requests as filed are indicated giving some explanation as to how they differ from the previous requests. It is not stated that the previously filed auxiliary requests would have to be renumbered

and would be lower ranked than the ten auxiliary requests filed with the submission of 3 April 2019. It is also indicated that "*the Requests in their current order, clearly converge*" (last line of page 1), which would not be the case if the requests filed previously were still maintained. This is also in line with point 11 of that letter (page 13), where it is stated "*It is requested to maintain the patent as Granted, or in the alternative, to deal with the Requests in the order as presented.*" No reference to previously presented requests is made.

This interpretation was also not objected to by appellant 1 when the chairman at the beginning of the oral proceedings established the initial requests of the parties. Therefore, it is unambiguous that the auxiliary requests filed with the submission of 28 September 2017 were replaced by the auxiliary requests filed on 3 April 2019.

Consequently, the auxiliary requests filed with the submission of 28 September 2017 are not part of the proceedings.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



C. Vodz

E. Bendl

Decision electronically authenticated