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**Datasheet for the decision  
of 12 March 2026**

**Case Number:** T 0378/24 - 3.3.02

**Application Number:** 21745647.4

**Publication Number:** 3980161

**IPC:** B01D53/04, B01D53/047,  
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**Language of the proceedings:** EN

**Title of invention:**

METHOD AND SYSTEM FOR PRE-PURIFICATION OF A FEED GAS STREAM

**Applicant:**

Praxair Technology, Inc.

**Relevant legal provisions:**

EPC Art. 54(3), 87(1), 88(2), 88(3)

**Keyword:**

Priority - partial priority (yes)  
Novelty - (yes)

**Decisions cited:**

G 0002/98, G 0001/15



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Case Number: T 0378/24 - 3.3.02

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.02**  
**of 12 March 2026**

**Appellant:** Praxair Technology, Inc.  
(Applicant) 10 Riverview Drive  
Danbury, CT 06810 (US)

**Representative:** Grundner, Sebastian  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 11 September  
2023 refusing European patent application No.  
21745647.4 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** M. O. Müller  
**Members:** P. O'Sullivan  
L. Bühler

## Summary of Facts and Submissions

I. The appeal of the applicant (hereinafter appellant) lies from the decision of the examining division to refuse European patent application 21 745 647.4.

II. The following document was *inter alia* cited during examination proceedings:

D5: EP 3 957 384 A1

III. The decision under appeal is *inter alia* based on the main request submitted with letter dated 14 September 2022.

According to the decision, the subject-matter of claims 1, 3, 4, 5, 9, 14, 15 and 16 of the main request lacked novelty over document D5, which was prior art pursuant to Article 54(3) EPC.

IV. In a communication pursuant to Article 15(1) RPBA, the board provided its preliminary considerations, including the conclusion that the subject-matter of the claims of the main request was novel over D5. In relation to the appellant's main request submitted with the statement of grounds of appeal, the board furthermore stated that it saw no justification for remittal of the case to an examining division in a different composition to that involved in the decision under appeal.

V. With letter dated 10 November 2025, the appellant withdrew the request to remit the case to an examining division in a different composition to that involved in

the decision under appeal, and submitted a new main request, set out below.

VI. With letter dated 20 November 2025, oral proceedings scheduled for 11 December 2025 were cancelled.

VII. Requests relevant to the present decision

The appellant requested that the decision under appeal be set aside and that the case be remitted to the examining division for further prosecution on the basis of:

- the set of claims of the main request submitted on 14 September 2022 and refiled with the grounds of appeal,
- the corresponding description submitted with the grounds of appeal, and
- the drawings of the application as filed.

VIII. For the relevant party submissions, reference is made to the reasons for the decision set out below.

## **Reasons for the Decision**

Main request - Novelty, Article 54(3) EPC

1. According to the decision under appeal, the subject-matter of claims 1, 3, 4, 5, 9, 14, 15 and 16 of the main request lacked novelty over D5, which was state of the art pursuant to Article 54(3) EPC. Patent document D5 (erroneously denoted "D4" in the appellant's statement of grounds of appeal) was introduced into

examination proceedings by the examining division with the communication dated 31 January 2023.

- 1.1 The present application was filed on 30 June 2021 and claims priority from US 202063067539P filed on 19 August 2020 and from US 202117361395 filed on 29 June 2021. The latter priority document filed on 29 June 2021 is irrelevant to the present appeal, and therefore reference in the following to "the priority document" in relation to the present application refers exclusively to US 202063067539P filed on 19 August 2020.
- 1.2 D5 was filed on 6 August 2021 and also claims priority from US 202063067539P filed on 19 August 2020 as well as from US 202117231648 filed on 15 April 2021.
2. Priority entitlement - Article 87(1) EPC
  - 2.1 According to the decision under appeal, the claims of the main request were not entitled to the priority date of 19 August 2020. The effective date of these claims was therefore 29 or 30 June 2021 (29 June 2021 being the filing date of the second application from which priority was claimed, US 202117361395). On the other hand, D5 was entitled to the priority date derived from US 202117231648, and hence had an effective date of 15 April 2021. Since this date was before the effective date of the present application, D5 was state of the art pursuant to Article 54(3) EPC.
  - 2.2 According to the decision under appeal (point 13.1 of the reasons), there was no basis in the priority document for the subject-matter of claims 1-16 of the main request. Claim 1 did not find basis in the priority document *inter alia* due to certain differences

between claim 1 of the priority document and claim 1 of the main request (decision, point 13.1). Similar considerations applied to independent claim 14 of the main request. It was also concluded *inter alia* that Enlarged Board of Appeal decision G 1/15 relating to partial priorities did not apply. Specifically, G 1/15 related to a situation in which different alternative subject-matters were disclosed, i.e. separated by "OR" in the relevant claims (point 13.2.5 of the reasons). This situation did not apply to the subject-matter underlying the claims of the main request. Hence, it was unnecessary to address whether claim 1 of the main request encompassed alternative subject-matter, some entitled to priority and some not, as was proposed by the appellant.

- 2.3 The Board first observes that the appellant has not disputed that D5 discloses subject-matter anticipating the subject-matter of claims 1 and 14. The decisive issue is therefore whether this subject-matter is entitled to the claimed priority date of the application.
- 2.4 Only if this question is answered in the affirmative would this subject-matter have as its effective date the filing date of the priority document, namely 19 August 2020. In that case, D5 could not constitute state of the art pursuant to Article 54(3) EPC for this subject-matter, since neither of its claimed priority dates, 15 April 2021 and 19 August 2020, is earlier than that effective date.
3. The application of G 1/15 to the entitlement to priority

- 3.1 In accordance with G 1/15 and as explained in the following, the decisive issue is whether the subject-matter encompassed by the claims of the main request and corresponding to the novelty-destroying disclosure of D5 is entitled to the claimed priority date.
- 3.2 In this regard, the board disagrees with the interpretation of G 1/15 set out in the decision under appeal. For entitlement to partial priority pursuant to Article 88(3) EPC, G 1/15 does not require a claim to spell out alternatives comprised within the claim as such, or to comprise the conjunction "or" separating alternatives therein.
- 3.3 The referral leading to G 1/15 was prompted by divergent interpretations of Enlarged Board of Appeal opinion G 2/98, in particular of the passage in point 6.7 of the Reasons according to which:
- "the use of a generic term or formula in a claim for which multiple priorities are claimed in accordance with Article 88(2) EPC, second sentence, is perfectly acceptable under Articles 87(1) and 88(3) EPC, **provided that it gives rise to the claiming of a limited number of clearly defined alternative subject-matters**"*  
(emphasis added by the board)
- 3.4 Certain decisions issued subsequent to G 2/98 construed this latter requirement ("*provided that...*") restrictively and denied partial priority where such alternatives were not explicitly defined (see G 1/15, point 2 of the reasons).
- 3.5 This approach was expressly rejected by the Enlarged Board in G 1/15. Specifically, the order of G 1/15

explicitly states that no such limitations or conditions apply in this respect:

*"Under the EPC, entitlement to partial priority may not be refused for a claim encompassing alternative subject-matter by virtue of one or more generic expressions or otherwise (generic "OR"-claim) provided that said alternative subject-matter has been disclosed for the first time, directly, or at least implicitly, unambiguously and in an enabling manner in the priority document. **No other substantive conditions or limitations apply in this respect.**"* (emphasis added by the board)

3.6 Further guidance is provided in point 6.4 of the reasons:

*"In assessing whether a subject-matter within a generic "OR" claim may enjoy partial priority, the first step is to determine the subject-matter disclosed in the priority document that is relevant, i.e. relevant in respect of prior art disclosed in the priority interval ... The next step is to examine whether this subject-matter is encompassed by the claim of the application or patent claiming said priority. If the answer is yes, the claim is de facto **conceptually divided into two parts**, the first corresponding to the invention disclosed directly and unambiguously in the priority document, the second being the remaining part of the subsequent generic "OR"-claim not enjoying this priority but itself giving rise to a right to priority, as laid down in Article 88(3) EPC."* (emphasis added by the board)

3.7 It follows that according to G 1/15, it is not necessary for alternatives within a claim to be

individually spelt out or syntactically separated by "or"; it suffices that the claim can be conceptually or mentally divided into different subject-matters.

3.8 Applying the principles set out in G 1/15 to the present case, independent claims 1 and 14 of the main request can be **conceptually divided** into two sets of alternative subject-matters, namely:

- a first set corresponding to conceptual alternatives encompassed by the claim which are directly and unambiguously disclosed in the priority document and
- a second set corresponding to the remaining alternatives encompassed by the claim but not directly and unambiguously disclosed in the priority document.

The first set of alternatives is entitled to the claimed priority date, while the second set of alternatives is **not** entitled to the claimed priority date.

3.9 It follows that partial priority can be acknowledged for the subject-matter of independent claims 1 and 14 insofar as said subject-matter is conceptually encompassed by the claims and directly and unambiguously disclosed in the priority document.

3.10 Hence, in the present case, for D5 to be relevant state of the art pursuant to Article 54(3) EPC, the novelty-destroying subject-matter disclosed in D5 must fall into the second set of alternatives conceptually falling within the scope of independent claims 1 and 14

of the main request as set out above, namely those alternatives not entitled to the priority date.

4. Claim 1

Independent claim 1 reads as follows:

*"A method of purifying a feed stream to reduce the hydrogen and carbon monoxide impurities present in the feed stream, the method comprising the steps of:*

*(a) passing the feed stream through at least one layer of adsorbent configured to remove water and carbon dioxide from the feed stream and yield a dry feed stream substantially free of water and carbon dioxide;*

*(b) passing the dry feed stream through a first layer of manganese oxide and copper oxide containing catalyst configured to remove at least some of the carbon monoxide and hydrogen from the dry feed stream and produce a first intermediate effluent stream;*

*(c) passing the first intermediate effluent stream through a first intermediate layer disposed downstream of the first layer of manganese oxide and copper oxide containing catalyst, the first intermediate layer configured to remove at least carbon dioxide from the first intermediate effluent stream and produce a second intermediate effluent stream; and*

*(d) passing the second intermediate effluent stream through a second layer of manganese oxide and copper oxide containing catalyst disposed downstream of the first intermediate layer and configured to remove at least hydrogen from the second intermediate effluent stream to yield third intermediate effluent stream;*

*wherein the first intermediate layer comprises a molecular sieve layer or a layer of alumina."*

- 4.1 As stated above, the appellant did not contest that D5 discloses subject-matter encompassed by claim 1 of the main request. Nevertheless, the exact nature of the disclosure of D5 needs to be established to determine whether the alternative subject-matter of claim 1 corresponding to this disclosure falls into the first or second set of alternative subject-matters set out above.
- 4.2 The relevant disclosure in D5
  - 4.2.1 According to the examining division, the relevant novelty-destroying embodiment of D5 was disclosed in paragraphs [0002], [0014] - [0016], [0024] - [0027], [0038] and figure 1 of D5 (contested decision, point 13.4).
- 4.3 Paragraph [0002]

According to paragraph [0002] of D5, the invention relates *inter alia* to a method for removing impurities from a feed gas stream, and more particularly to a method for removing water, carbon dioxide, hydrogen, and carbon monoxide. This corresponds to the method set out in the introductory part of claim 1 of the main request (lines 1 to 3), with the exception that it includes the removal of carbon dioxide.
- 4.4 Paragraph [0014]
  - 4.4.1 The method set out in paragraph [0014] of D5 comprises:

- (a) passing the gas stream substantially free of carbon dioxide and water through a first catalyst layer comprising a mixture of manganese and copper oxides configured to remove at least some of the carbon monoxide and hydrogen from the gas stream and produce a first intermediate effluent (paragraph [0014], lines 34-37);
- (b) passing the first intermediate effluent through an adsorbent layer disposed downstream of the first catalyst layer, the adsorbent layer configured to remove water and carbon dioxide from the intermediate effluent and produce a second intermediate effluent (paragraph [0014], lines 37-39); the adsorbent layer is preferably a molecular sieve or a layer of alumina, or both (paragraph [0016], final sentence)
- (c) passing the second intermediate effluent through a second catalyst layer disposed downstream of the adsorbent layer, the second catalyst layer configured to remove at least hydrogen from the second intermediate effluent to yield an intermediate purified stream (paragraph [0014], lines 39-41);

4.4.2 This disclosure does not amount to a method according to claim 1 of the main request. In particular, step (a) in paragraph [0014], the first step of the method, corresponds to step (b) of claim 1 of the main request. The method described in paragraph [0014] of D5 therefore does not disclose a step corresponding to step (a) of claim 1, let alone a step which would conceptually fall within the scope of step (a) of claim 1. Specifically, D5 fails to disclose passing the feed stream through at least one layer of adsorbent

configured to remove water and carbon dioxide from the feed stream so as to yield a dry feed stream substantially free of water and carbon dioxide.

4.4.3 Hence, paragraph [0014] of D5 does not amount to a direct and unambiguous disclosure of a method according to claim 1 of the main request.

4.5 Paragraph [0015]

4.5.1 Paragraph [0015] relates to a pre-purification vessel. Assuming, for the sake of argument, that this disclosure can be mapped onto the method features of claim 1, the following applies.

4.5.2 The pre-purification vessel of paragraph [0015] comprises:

- (i) a first purification section,
- (ii) a second purification section disposed downstream of the first purification section, and
- (iii) a third purification section disposed downstream of the second purification section.

4.5.3 In contrast to the disclosure in paragraph [0014] of D5 addressed above, "the first purification section" (i) of the pre-purification vessel of paragraph [0015] comprises at least one layer of adsorbent configured to remove water and carbon dioxide from the compressed feed air stream and yield a dry feed air stream substantially free of water and carbon dioxide. This step is encompassed by step (a) of claim 1 of the main request.

4.5.4 The second purification section (ii) comprises:

- a first catalyst layer comprising a mixture of manganese and copper oxides configured to remove at least some of the carbon monoxide and hydrogen from the dry feed air stream and produce a first intermediate effluent, corresponding to step (b) of claim 1 of the main request,
- an adsorbent layer disposed downstream of the first catalyst layer, the adsorbent layer configured to remove water and carbon dioxide from the first intermediate effluent and produce a second intermediate effluent, corresponding to step (c) of claim 1 of the main request,
- and a second catalyst layer disposed downstream of the adsorbent layer, the second catalyst layer configured to remove at least hydrogen from the second intermediate effluent to yield an intermediate purified air stream.

4.5.5 The second catalyst layer of the second purification section (ii) is however not encompassed by step (d) of claim 1. Specifically, step (d) of claim 1 of the main request *inter alia* requires passing the second intermediate effluent stream "through a second layer of **manganese oxide** and **copper oxide** containing catalyst". In contrast, the final step in the second purification section (ii) in paragraph [0015] is silent as to the nature of the catalyst. Detail concerning the second catalyst layer is provided in subsequent paragraph [0016] (sentence bridging pages 4 and 5), which stipulates that the second catalyst layer is most preferably a noble metal based catalyst, such as a **mixture of palladium and aluminium oxide**. The board

notes in this regard that the claims of D5 also indicate this catalyst mixture as preferred (see e.g. claims 4 and 5 in relation to the method and claims 12 and 13 in relation to the claimed "pre-purification vessel").

- 4.5.6 Consequently, even assuming that the features of paragraphs [0015] and [0016] which relate to a pre-purification vessel could be read onto the features of claim 1 of the main request related to a method, it does not amount to a direct and unambiguous disclosure of a method encompassed by claim 1 of the main request.
- 4.5.7 Hence paragraphs [0002] and [0014] to [0016] fail to disclose a method encompassed by claim 1 of the main request.
- 4.6 Paragraphs [0024] to [0027] and figure 1
- 4.6.1 These paragraphs concern the pre-purification vessel of the invention of D5, depicted in figure 1. For the sake of argument, it can be assumed that this disclosure related to the pre-purification vessel can be read onto the method features of claim 1.
- 4.6.2 In contrast to the disclosures in paragraphs [0014] to [0016], the disclosure in paragraphs [0024] to [0027] of D5 includes a third "hopcalite" catalyst layer (paragraph [0026]), which corresponds to the second catalyst layer in step (d) of claim 1 of the main request. Since hopcalite is a mixture of manganese oxide and copper oxide, the catalyst in this step falls within the scope of claim 1, step (d).
- 4.6.3 Crucially however, the board notes that the text of paragraphs [0024] to [0027] is **identical** to the text in

paragraphs (00031) to (00034) of the priority document of the present application.

4.6.4 Therefore, even accepting that this subject-matter falls within the scope of claim 1 of the main request, it is nevertheless directly and unambiguously disclosed in the priority document.

4.6.5 Consequently, in accordance with G 1/15, the disclosure in paragraphs [0024] to [0027] and figure 1 of D5 corresponds to a conceptual alternative encompassed by claim 1 of the main request which is entitled to the priority date of the priority document. As set out above, this priority date is earlier than, or identical to, the priority dates of D5. Accordingly, even assuming that this disclosure in D5 itself benefits from its claimed priority, it does not constitute state of the art under Article 54(3) EPC with respect to this conceptual alternative of claim 1 of the main request.

4.7 Claim 14

4.7.1 Independent claim 14 of the main request reads as follows:

*"A pre-purification unit for purifying a feed stream to reduce the hydrogen and carbon monoxide impurities present in the feed stream, the pre-purification unit comprising:*

*at least one layer of adsorbent configured to remove water and carbon dioxide from the feed stream and yield a dry feed stream substantially free of water and carbon dioxide;*

*a first layer of manganese oxide and copper oxide containing catalyst configured to remove at least some of the carbon monoxide and hydrogen from the dry feed stream and produce a first intermediate effluent stream;*

*a first intermediate layer disposed downstream of the first layer of manganese oxide and copper oxide containing catalyst, the first intermediate layer configured to remove at least carbon dioxide from the first intermediate effluent stream and produce a second intermediate effluent stream;*

*a second layer of manganese oxide and copper oxide containing catalyst configured to remove at least hydrogen from the second intermediate effluent stream to yield a third intermediate effluent stream; and*

*one or more further layers of adsorbent configured to remove water and carbon dioxide from the third intermediate effluent stream yield [sic] a purified stream substantially free of at least water, carbon dioxide, carbon monoxide and hydrogen."*

- 4.7.2 Similarly to claim 1 of the main request, this claim also requires that the second layer is a manganese oxide and copper oxide containing catalyst. Hence, for the same reason as provided for claim 1 above, paragraphs [0002] and [0014] to [0016] of D5 do not disclose an embodiment encompassed by claim 14 of the main request.
- 4.7.3 Similarly, even on the assumption that the pre-purification unit disclosed in D5 in paragraphs [0024] to [0027] represents an embodiment encompassed by claim 14 of the main request, as set out above for claim 1,

this subject-matter is disclosed in an identical manner in the priority document of the present application.

Consequently, for the same reason as provided above in relation to this conceptual alternative of claim 1, claim 14 of the main request is entitled to the priority date of the present application, such that D5 is not state of the art pursuant to Article 54(3) EPC for this alternative.

4.7.4 No other subject-matter disclosed in D5 is apparent to the board which, following the above assessment in line with G 1/15, would represent state of the art pursuant to Article 54(3) EPC relevant to the novelty of the claims of the main request.

4.7.5 In conclusion, the subject-matter of independent claims 1 and 14 and, by extension, dependent claims 2 to 13 and 15 and 16 is novel over D5.

4.8 The decision under appeal is therefore to be set aside.

5. Remittal - Article 111 EPC and Article 11 RPBA

As set out above, the appellant requested that the decision under appeal be set aside and that the case be remitted to the examining division for further prosecution.

5.1 In the present case, the decision under appeal in relation to the main request was solely based on a finding of lack of novelty pursuant to Article 54(3) EPC. Since further requirements of the EPC were not part of the decision, they do not form the

basis for appeal proceedings in accordance with Article 12 RPBA.

- 5.2 Consequently, in line with the appellant's main request, the board decides to remit the case to the examining division for further prosecution.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the examining division for further prosecution on the basis of:
  - the set of claims of the main request submitted on 14 September 2022 and refiled with the grounds of appeal,
  - the corresponding description submitted with the grounds of appeal, and
  - the drawings of the application as filed.

The Registrar:

The Chairman:



U. Bultmann

M. O. Müller

Decision electronically authenticated