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Datasheet for the decision of 17 June 2025

Case Number: T 1559/23 - 3.3.03

Application Number: 16715043.2

Publication Number: 3274394

IPC: C08G65/40

Language of the proceedings: EN

Title of invention:
POLYMERIC MATERIALS

Patent Proprietor:
Victrex Manufacturing Limited

Opponent:
Evonik Operations GmbH

Relevant legal provisions:
EPC Art. 100(a), 100(c)
RPBA 2020 Art. 12(4), 13(1)

Keyword:
Late-filed evidence - admitted (yes)
Grounds for opposition - extension of subject-matter (no) - inventive step - (yes)

Decisions cited:
G 0003/89, G 0011/91, G 0002/10

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Case Number: T 1559/23 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 17 June 2025

Appellant: (Opponent)	Evonik Operations GmbH Rellinghauser Str. 1-11 45128 Essen (DE)
Representative:	Godemeyer Blum Lenze Patentanwälte Partnerschaft mbB - werkpatent An den Gärten 7 51491 Overath (DE)
Respondent: (Patent Proprietor)	Victrex Manufacturing Limited Victrex Technology Centre Hillhouse International Thornton Cleveleys, Lancashire FY5 4QD (GB)
Representative:	Gurun, Lara Victrex Manufacturing Limited Intellectual Property Department Victrex Technology Centre Hillhouse International Thornton Cleveleys FY5 4QD (GB)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 21 June 2023 rejecting the opposition filed against European patent No. 3274394 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	F. Rousseau
Members:	O. Dury
	W. Ungler

Summary of Facts and Submissions

I. The appeal is against the decision of the opposition division rejecting the opposition filed against European patent No. 3 274 394.

II. The following documents were *inter alia* cited in the decision under appeal:

D2: WO 2007/144610 A1
D3: WO 2007/144615 A1
D5: Polyether-Etherketon; https://www.rct-online.de/de/RctGlossar/detail/id/13
D6: Dichtungsmaterialien vielfältig und dicht, Exmar, https://www.exmar.de/index.php?id=612&L=6
D7: Dichtungshandbuch für die Prozessindustrie, Freudenberg Sealing Technologies, Freudenberg, 2016, pages 48-49
D8: Ked Seals: O-Rings und Dichtungen vom Spezialisten, PEEK, 22 August 2011 (The Wayback Machine; one page, filed with the notice of opposition)
D11: Low-temperature flexural dynamic measurements on PEEK, HTA and some of their carbon fibre composites, R. D. Adams and J. M. Gaitonde, Composite Science and Technology, 1993, 47, pages 271-287
D12: Emerging Membrane Technology for Natural Gas Dehydration, L. W. Smith, PoroGen Corporation, Natural Gas STAR Annual Implementation Workshop, 2009

III. As far as relevant to the present case, the following conclusions were reached in the decision under appeal:

- Claim 11 as granted did not extend beyond the content of the application as filed.

- The subject-matter of each of claims 1, 10 and 11 as granted involved an inventive step when document D12 was taken as the closest prior art.

For these reasons, none of the opponent's objections were successful and the opposition was rejected.

IV. The opponent (appellant) filed an appeal against the above decision.

V. Together with the rejoinder to the statement of grounds of appeal the respondent (patent proprietor) filed two sets of claims as auxiliary requests as well as the following documents:

D14: BS EN ISO 16903:2015 (introduction pages and pages 1-2)
D15: Liquefied natural gas - Wikipedia pages from 26 March 2015
D16: Wikipedia page for Kogalym, Siberia, retrieved on 25 January 2024

VI. With letter of 15 July 2024, the appellant filed further submissions as well as the following documents:

D17: US 2007/0256969 A1
D18: Phasendiagramm Methan

VII. The parties were summoned to oral proceedings and a communication pursuant to Article 15(1) RPBA was then

issued by the Board.

VIII. With letter of 4 April 2025 the respondent filed five sets of claims as additional auxiliary requests.

IX. The oral proceedings were held on 17 June 2025 in the presence of both parties.

X. **The final requests of the parties were as follows:**

(a) The appellant requested that the decision of the opposition division be set aside and the patent be revoked.

(b) The respondent requested that the appeal be dismissed (main request) or, in the alternative, that the patent be maintained in amended form on the basis of any of the first or second auxiliary requests filed with the rejoinder to the statement of grounds of appeal or to any of the third to seventh auxiliary requests filed with letter of 4 April 2025.

XI. Claims 1, 10 and 11 of the **main request (patent as granted)** read as follows (in claim 11, additions as compared to claim 22 of the application as filed are indicated in **bold,** deletions in ~~strikethrough~~):

"1. A liquid natural gas (LNG) assembly **characterised by** comprising a component which comprises a polymeric material (A) having a repeat unit of formula I:

-O-Ph-O-Ph-CO-Ph- I

wherein Ph represents a phenylene moiety; and

wherein said polymeric material (A) has a melt viscosity (MV) of at least 0.50 $kNsm^{-2}$ measured according to Test 1 as described herein."

"10. The use of a polymeric material (A) in a component in a LNG assembly wherein said polymeric material (A) has a repeat unit of formula (I):

-O-Ph-O-Ph-CO-Ph- (I)

wherein Ph represents a phenylene moiety; and

wherein said polymeric material (A) has a melt viscosity of at least 0.50 $kNsm^{-2}$ measured according to Test 1 as described herein."

"11. The use of a polymeric material (A) ~~for making a component for use in an environment in which the temperature is less than -50°C or in which the temperature may fall to less than -50°C, for example during the presence in said environment of said component, wherein~~ **in a component subjected to a temperature of less than -50 °C in use characterised in that** said polymeric material (A) has a repeat unit of formula (I):

-O-Ph-O-Ph-CO-Ph- (I)

wherein Ph represents a phenylene moiety; and

wherein said polymeric material (A) has a melt viscosity of at least 0.50 $kNsm^{-2}$ **measured according to Test 1 as described herein**."

XII. The parties' arguments, in so far as they are pertinent for the present decision, may be derived from the

reasons for the decision below. They were directed to the following issues:

(a) The admittance into the proceedings of documents D14 to D18.

(b) The question if claim 11 as granted extended beyond the content of the application as filed.

(c) The question of inventive step of the subject-matter of each of claims 1, 10 and 11 as granted when D12 was taken as the document constituting the closest prior art.

Reasons for the Decision

1. Admittance of documents D14 to D18

1.1 The respondent submitted documents D14 to D16 with the rejoinder to the statement of grounds of appeal and requested that these documents be admitted into the proceedings (rejoinder: page 3, fourth and fifth paragraphs). According to the respondent, the submission of these documents at the outset of the appeal proceedings was justified because, on reading the decision under appeal and the statement of grounds of appeal, it became clear to them that the disclosure of D12 had been misinterpreted by both the opposition division and the appellant. To demonstrate this, D14 to D16 were filed as evidence of common general knowledge regarding the meaning of the term "LNG" in the technical field of the patent in suit, which was an abbreviation for "liquefied natural gas" that was not to be confused with "natural gas liquids", so the

respondent.

In the absence of any request from the appellant to disregard documents D14 to D16 (in particular at the oral proceedings before the Board) and considering that the respondent's argument is reasonable in view of the wording of claims 1 and 10 as granted (which both contain the term "LNG"), as well as of e.g. points 15.1.1, 15.1.18 and 15.1.19 of the reasons of the decision under appeal (which either make reference to "LNG" or to the disclosure of D12, held to concern the use of PEEK for natural gas liquids in conditions of low temperatures), the Board considered that the submission of these documents at the outset of the appeal proceedings was the result of normal developments in appeal opposition proceedings, namely it constituted a timely and appropriate reaction to the decision under appeal. Therefore, the circumstances of the present case justified admitting these documents into the proceedings (Article 12(4) RPBA).

1.2 With letter of 15 July 2024, the appellant submitted documents D17 and D18, which were relied upon to refute the respondent's reading of D12, in particular in the light of D14 to D16 (see page 2, third and fourth paragraphs of this letter). Although the admittance of D17 and D18 was not objected to by the respondent (either in writing or during the oral proceedings before the Board), the Board considered that, since D14 to D16 were to be admitted, the same was to be done for D17 and D18 as a matter of fairness to the appellant. Therefore, the Board made use of its discretion to admit D17 and D18 into the proceedings (Article 13(1) RPBA).

1.3 In view of the above, documents D14 to D18 are all in the proceedings.

Main request (patent in suit)

2. Article 100(c) EPC

2.1 The appellant disagreed with the opposition division's finding that claim 11 as granted did not extend beyond the content of the application as filed, whereby the appellant's objection was related to the presence of the wording "in a component subjected to a temperature of less than -50 °C in use" in claim 11 as granted.

2.2 According to established case law, in order to assess if the subject-matter of (amended) claim 11 extends beyond the content of the application as filed, it has to be established whether after the amendments made the skilled person is presented with new technical information (see G 2/10: point 4.5.1 of the Reasons and Case Law of the Boards of Appeal of the EPO, 10th edition, 2022, II.E.1.1). To be allowable the amendments can only be made within the limits of what a skilled person would derive directly and unambiguously, using common general knowledge, and seen objectively and relative to the date of filing, from the whole of the documents as filed (G 2/10: point 4.2.1 of the Reasons, referring to G 3/89 and G 11/91).

2.2.1 In the Board's view, apart from the amendment directed to the addition of the method of determination of the melt viscosity, which was not objected to by the appellant, claim 11 as granted differs from claim 22 of the application as filed in that the wording "for making a component for use in an environment in which the temperature is less than -50°C or in which the

temperature may fall to less than -50°C, for example during the presence in said environment of said component" was replaced by the wording "in a component subjected to a temperature of less than -50 °C in use characterised in that" (see section XI above).

2.2.2 Although it is correct that there is no literal basis in the application as filed for the amended wording of claim 11 as granted that was objected to by the appellant, the Board shares the view of the opposition division that this amendment is directly and unambiguously derivable from the combination of the wording of claim 22 with the passages on page 2, line 28 and page 2, lines 12-21 of the application as filed (reasons: points 14.1.4 to 14.1.6). In particular, the Board is satisfied that the sentence on page 2, line 28 of the application as filed unambiguously discloses that the component (which comprises a polymeric material (A) having a repeat unit of formula (I) as defined on page 2, lines 14-21) is such that it can be exposed to a temperature of less than -50°C in use.

a) The appellant submitted that the "component" referred to on page 2, line 28 of the application as filed was disclosed therein only as part of an "assembly" or "apparatus". Therefore, according to the appellant, the omission of the "assembly" or "apparatus" in claim 11 as granted constituted an intermediate generalisation that extended beyond the content of the application as filed (statement of grounds of appeal: page 4, second to fourth paragraphs).

However, in the Board's view, the literal meaning of the term "component" (which is present in claim 22 as

well as in the passages on page 2, lines 12-21 and line 28) already defines a part or element of a larger whole, i.e. the term "component" implicitly imposes that it be part of an "assembly". Therefore, for that reason alone, the omission of the term "assembly" in claim 11 as granted does not lead to added-matter. Consequently, the application as filed provides a valid basis for the term "component" in claim 11 without the mandatory additional reference that it be part of an "assembly". On that basis, the appellant's objection related to the absence of a reference to an "apparatus" is moot. Furthermore, although it is correct that "said component" on page 2, line 28 of the application as filed refers to the embodiment on page 2, lines 12-21, in which the "component" is part of an assembly or apparatus (see page 2, line 14 of the application as filed), the Board shares the view of the opposition division that the "component" mentioned therein would not be understood by the skilled person to be inextricably linked to said "assembly" or "apparatus". This would follow, in particular, from a reading of the application as filed as a whole, which, in the Board's view, is directed to articles as such that can suitably be used at very low temperatures (page 1, lines 1-6; page 2, lines 9-10; page 3, lines 4-6, read in connection with the preceding paragraph; page 6, lines 5-6 and 28-34; page 14, lines 12-16; page 16, line 27 to page 17, line 9; page 19, lines 15-20).

b) The appellant further submitted that there was no disclosure in the application as filed of the use of a polymeric material in a component that is subjected to a temperature of less than -50°C in use (statement of grounds of appeal: page 4, fifth paragraph).

However, in the sentence on page 2, line 28 of the

application as filed, it is expressly stated that "said component", which is made of the polymeric material described on page 2, lines 14-21, is "subjected to a temperature of less than -50°C in use". The Board considers that this passage, read in combination with claim 22 of the application as filed (see in particular the wording "The use of a polymeric material (A) for making a component for use in an environment in which the temperature is less than -50°C or in which the temperature may fall to less than -50°C, for example during the presence in said environment of said component"), provides a valid (though not explicit) support for the wording "use of a polymeric material (A) in a component subjected to a temperature of less than -50 °C in use" present in claim 11 as granted.

c) For these reasons, the appellant's objections are not persuasive.

2.2.3 The above conclusions were indicated in the Board's communication (section 5) and remained undisputed, in particular at the oral proceedings. Therefore, there is no reason for the Board to deviate from its preliminary considerations.

2.2.4 In view of the above, the appellant's arguments do not justify the Board overturning the decision of the opposition division that claim 11 as granted did not extend beyond the content of the application as filed (Article 100(c) EPC).

3. Article 100(a) and 56 EPC

3.1 Given that the arguments of both parties with respect to inventive step regarding independent claims 1 and 10

as granted were different from the ones with respect to independent claim 11 as granted, the assessment of inventive step for these claims is carried out separately below, whereby the Board finds it appropriate to deal first with claim 11 as granted.

Claim 11 as granted

3.2 Closest prior art

In agreement with the finding of the opposition division, it was common ground during the appeal proceedings that the disclosure of D12 was suitable to be taken as the closest prior art. In particular, the disclosure of PEEK-SEP modules comprising a PEEK membrane developed by the PoroGen company (D12: pages 12-14, whereby PEEK is the established abbreviation for "polyetheretherketone", see paragraph 5 of the patent in suit and the chemical formula on page 11 of D12) was seen to be particularly relevant and was considered by both parties as starting point for the assessment of inventive step.

3.3 Distinguishing feature(s)

3.3.1 The parties agreed that the subject-matter of claim 11 as granted differed from the disclosure of the PEEK-SEP module comprising a PEEK membrane according to D12 at least in that the polymeric material (A) defined therein should have a melt viscosity of at least 0.50 $kNsm^{-2}$ measured according to Test 1 as described in the patent specification, which was not disclosed in D12. The Board has no reason to be of a different opinion.

3.3.2 A point of dispute between the parties in their written submissions was directed to the question if D12 disclosed that the PEEK membrane of the PEEK-SEP module constituting the closest prior art was subjected to a temperature of less than -50°C in use as specified in claim 11 as granted.

a) In that regard, document D12 is primarily directed to the development of natural gas dehydration installations, in which an emerging membrane technology is provided as an alternative to the usual glycol absorption method (D12: pages 1 and 3-5). It was not disputed by the appellant, in particular at the oral proceedings before the Board, that there is no explicit disclosure in D12 of the PEEK-SEP module being used so that its PEEK membrane is subjected to a temperature of less than -50°C.

b) In the written proceedings, the appellant's line of argument was based on the disclosure on page 13 of D12 that the PEEK-SEP system according to D12 could be operated "in Liquid and Gas phases simultaneously", which, according to the appellant, implied that the PEEK membrane disclosed therein (pages 11-12) was/could be used with natural gas in its liquid state, i.e. at very low temperatures such as below -50°C (letter of 15 July 2024: page 2, third and fourth paragraph).

However, the Board shares the view of the respondent that it is derivable from the information provided in D12 that the PEEK SEP module disclosed therein could not operate unless water is in the form of a liquid, which would obviously not be the case at temperatures at which natural gas is in the liquid form (rejoinder: page 6, third paragraph). Moreover, considering the composition of natural gas, including its impurities

(see diagram in the left-hand top corner of page 14 of D12), it is not clear to the Board which component of natural gas could coexist (i.e. be present "simultaneously", as indicated in the passage of D12 relied upon by the appellant) in the gas form with methane present in a liquid state, which - as pointed out by the appellant - would require to operate at temperatures below the critical point of methane, i.e. below -83°C. In addition, the Board agrees with the respondent that the liquid phase referred to on page 13 of D12 (and relied upon by the appellant) would be understood by the skilled person to refer to the liquid components of natural gas indicated on page 13 of D12, including water (rejoinder: page 6, fourth paragraph). This view is in particular in line with the scheme on page 15 of D12 and the indication in this respect that water is removed "as a liquid" (D12: page 15, first bullet point; see rejoinder: page 6, third paragraph). In contrast thereto, there is no indication in D12 that the PEEK-SEP technology disclosed therein is related to natural gas/methane in its liquid state. This understanding of the term "can operate in Liquid and Gas phases simultaneously" is, according to the Board, further confirmed by the indication in D12 (pages 1, 3 and 15) that the PEEK-SEP modules disclosed therein were developed as an alternative to glycol absorption, which is a process in which natural gas is used as a gas phase (and not in its liquid state).

These considerations were indicated in the Board's communication (point 6.5.2, first paragraph, referring to section 6.2.2.e). Eventually, the appellant acknowledged at the oral proceedings before the Board that the use at a temperature of less than -50°C was a feature that effectively distinguished the subject-matter of claim 11 as granted from the disclosure on

page 13 of D12 related to the operation of the PEEK-SEP system according to D12 "in Liquid and Gas phases simultaneously". Therefore, there is no reason for the Board to deviate from its preliminary view.

c) An additional point of dispute between the parties was related to the question whether the disclosure of field tests in Kogalim, Siberia (D12: page 13, last paragraph), amounted to a direct and unambiguous disclosure of temperatures of less than -50°C according to claim 11 as granted. While the respondent considered that this was not the case, the appellant argued that it was, whereby both parties relied on the disclosure of D16 (rejoinder: page 7, sixth to eighth paragraphs; bottom of page 9, feature i); appellant's letter of 15 July 2024: page 2, last paragraph).

In the Board's view, the disclosure on page 13 of D12 relied upon by the parties is related to "field demonstrations", which is understood to mean that said disclosure is directed to tests performed over a limited period of time. However, there is no indication in D12 regarding how long this period lasted, nor at which period of the year these tests were carried out. In addition, D16 discloses that the lowest outdoor temperature in Kigalim is usually around -20°C/-40°C (bottom of page 1, "Climate"; table on page 2) and that a low of -62°C was recorded in 2006, which does not allow to conclude that the field tests mentioned on page 13 of D12 were necessarily conducted at an outdoor temperature of less than -50°C, contrary to the appellant's view. More important, it cannot be inferred from D12 that during these tests the separation taking place at the PEEK membrane of the module described therein necessarily took place at a temperature of less than -50°C which, for the reasons indicated in the

preceding paragraph (point 3.3.2.b), is not directly and unambiguously derivable from the whole disclosure of D12. For these reasons, the appellant's argument is rejected.

d) In view of the above, the Board agrees with the respondent that the requirement that the polymeric material is subjected to a temperature of less than -50°C in use is a further feature that distinguishes the subject-matter of claim 11 as granted from the disclosure of D12.

3.3.3 Therefore, the subject-matter of claim 11 as granted differs from the disclosure of the embodiment according to page 13 of D12 which is operated in liquid and gas phases simultaneously in that

- it is directed to a polymeric material (A) as defined therein which must have a melt viscosity of at least 0.50 $kNsm^{-2}$ measured according to Test 1 as described in the patent specification; and

- the polymeric material is subjected to a temperature of less than -50°C in use.

3.4 Problem effectively solved over the closest prior art

3.4.1 The respondent argued that the objective problem solved by claim 11 as granted resided in the use of a different component which was less brittle at cryogenic temperature and which was therefore suitable for components for use in a LNG assembly to reduce the risk of brittle fracture (rejoinder: page 9, penultimate paragraph to page 10, first to third paragraphs; oral proceedings before the Board). During the oral

proceedings before the Board, the respondent further put forward that it was derivable from paragraphs 103 and 104 of the patent in suit that this problem was solved since it had been shown in the patent in suit that PEEK EG3, which had a melt viscosity according to claim 11 as granted, exhibited improved mechanical properties as compared to the comparative PEEK of lower melt viscosity.

3.4.2 However, in the absence of any evidence on file of a fair comparison of the ductility/brittleness of a component made from a PEEK as defined in claim 11 as granted with the one of a component made from the specific PEEK according to the disclosure of D12 (namely the one developed by the PoroGen company and effectively used in the PEEK SEP modules disclosed therein), no improvement in terms of ductility/ brittleness of the PEEK according to claim 11 over the one according to D12 can be acknowledged. In this respect, it is pointed out that it was not shown, nor even argued by the respondent, that any of the PEEKs considered for comparison in the patent in suit were illustrative of the PoroGen's PEEK according to the disclosure of D12.

3.4.3 In addition, the examples and comparative examples of the patent in suit are considered by the Board to demonstrate that not all PEEKs exhibit identical behaviour at very low temperatures. In particular, although these examples may show that PEEK EG3 displays improved mechanical and ductile/brittleness properties at very low temperatures (-196°C) in comparison to another PEEK, namely (comparative) PEEK 450G (paragraphs 89-95, 103 and 104 of the patent in suit), it has to be taken into account that it is indicated in the patent in suit that PEEK EG3 was prepared using a

specific process (paragraph 96 of the patent in suit), whereby it is derivable from examples 1-4 of the patent in suit that the specific process employed to prepare PEEK EG3 resulted in a higher degree of purity than that achieved by another process (see paragraphs 78-85 of the patent in suit). To the contrary, there is no indication as to how comparative PEEK 450G was prepared. In addition, PEEK EG3 and (comparative) PEEK 450G have a melt viscosity of 0.65 $kNsm^{-2}$ and 0.45 $kNsm^{-2}$, respectively (page 5, lines 40-41 and page 9, lines 48-49 of the patent in suit), i.e. the melt viscosity value of PEEK 450G is significantly lower than the one of PEEK EG3 and is in particular lower than the requirement defined in claim 11 as granted. However, it can be derived from figure 1 of the patent in suit that PEEK with a melt viscosity in the range specified in claim 1 as granted may be obtained through a process that differs from the one used to prepare PEEK EG3. Therefore, the range of melt viscosity of claim 11 as granted does not constitute an implicit disclosure of a specific preparation process, i.e. it does not impose that a PEEK with a melt viscosity as defined therein must be prepared according to the process of the patent in suit that leads to high purity PEEK. In light of these considerations, the Board concurs with the appellant that the evidence contained in the patent in suit do not demonstrate that there is a causal link, even not a correlation, between the range of melt viscosity specified in claim 11 as granted and improved mechanical/brittleness properties at low temperature. Rather, in the Board's view, these examples could only serve as an indication that a higher purity in connection with a specific process might be the cause for the improved mechanical properties at low temperatures (statement of grounds of appeal: page 6, second and fifth paragraphs;

appellant's letter of 15 July 2024: page 4, second paragraph).

3.4.4 In view of the above, the Board considers that the data of the patent in suit are not suitable to demonstrate a causal link between the requirement in terms of melt viscosity defined in claim 11 as granted and an improvement in brittleness at very low temperature.

3.4.5 Therefore, taking into account the distinguishing feature related to the exposition at "a temperature of less than -50°C in use" (see points 3.3.2 and 3.3.3 above) and considering that according to established Case Law, the formulation of the technical problem should not contain pointers to the solution or partially anticipate the solution (Case Law, *supra*, I.D.4.2.1), the Board, in agreement with the appellant's line of argument during the oral proceedings before the Board, considers that the problem solved over D12 resides in the further use of a PEEK material.

3.5 Obviousness

3.5.1 The question to be answered is whether the skilled person, desiring to solve the problem(s) identified as indicated above, would, in view of the closest prior art, possibly in combination with other prior art or with common general knowledge, have modified the disclosure of the closest prior art in such a way as to arrive at the claimed subject matter.

3.5.2 In that respect, the line of argument of the appellant was that it would be obvious for the skilled person to solve the problem posed by making the membrane of the PEEK SEP module according to D12 with a PEEK according

to the disclosure of either D2 or D3, for which it was common ground that they had a melt viscosity in the range according to claim 11 as granted, instead of the PoroGen PEEK disclosed in D12. In particular, the skilled person knew on the basis of common general knowledge or on the basis of the disclosure of e.g. D5, D6, D8 or D11 that PEEKs were particularly well suited for uses at temperatures of less than -50°C (D5: middle of page 1; D6: penultimate paragraph on page 1; D8: second paragraph; D11: figure 1 and section "Conclusion" on page 283). On that basis, the skilled person would obviously consider using any known PEEK at temperatures in the range of claim 11 as granted, in particular the ones of D2 and D3, so the appellant.

a) In this respect, it was common ground that D2 and D3 both disclose PEEKs having a melt viscosity according to claim 1 as granted. Also the Board has no reason to depart from this view, in particular when considering the disclosure of the PEEKs in the experimental part of these documents together with the one of the same "Test 1" as the one of the patent in suit (compare paragraphs 56-57 of the patent in suit with either D2: page 3, lines 7-11; pages 24-25; table 1, page 31; table 2, page 33 or D3: page 13, lines 22-26; pages 20-21; table 1, pages 26-27 and table 2, pages 28-29).

b) However, as already indicated in section 3.3.2 above, the Board agrees with the respondent's view that there is no evidence on file showing that the PEEK membrane of the PEEK SEP modules disclosed in D12 is used at temperatures of less than -50°C, let alone that these modules could be operated at so low temperatures (rejoinder: page 7, third paragraph from the bottom; oral proceedings before the Board). In fact, all the

available evidence demonstrate the contrary: not only does D12 not explicitly disclose so low temperatures but it is even derivable from the disclosure of D12 as a whole that these modules should be operated at temperatures at which water is liquid, i.e. at temperatures significantly higher than -50°C. Therefore, as pointed out by the respondent at the oral proceedings before the Board, the skilled person would have, in order to arrive at the subject-matter of claim 11 as granted, to deviate from the teaching of D12 regarding the temperature at which the PEEK SEP modules disclosed therein should be operated, i.e. at a temperature that is incompatible with the operation of said membrane in order to separate water from the methane. In these circumstances, whatever document(s) is considered in combination with D12 (i.e. any of D2, D3, D5, D6, D8 and D11 that were relied upon by the appellant during the oral proceedings before the Board) the line of argument of the appellant does not allow, starting from the relevant disclosure of D12, to arrive in an obvious manner at the use of a polymeric material (A) in a component subjected to a temperature of less than -50°C in use according to claim 11 as granted. In the Board's view, these combinations of documents relied upon by the appellant can only be arrived at based on hindsight, which is not allowable. The same is also valid for any of the other prior art documents mentioned by the appellant in their written submissions, i.e. in the passage from the middle of page 9, line to the top of page 11 of the statement of grounds of appeal.

b) It is pointed out that the above conclusion is reached independently of the appellant's consideration that it was known in the art that PEEK may generally be used at low temperatures. What is decisive for the

Board's conclusion is indeed that D12 implicitly discloses that the PEEK SEP modules disclosed therein must necessarily be operated at temperatures significantly higher than -50°C.

3.6 In view of the above, the arguments of the appellant provide no cause for the Board to overturn the decision of the opposition division that the subject-matter of claim 11 as granted involves an inventive step when D12 is taken as the closest prior art.

Claims 1 and 10 as granted

3.7 Closest prior art

It remained undisputed during the appeal proceedings that the same disclosure of D12 than the one considered above for claim 11 as granted constituted a suitable starting point for the assessment of inventive step (D12: page 13 in combination with pages 11 and 12).

3.8 Distinguishing feature(s)

3.8.1 The parties agreed that the subject-matter of claims 1 and 10 as granted differed from the above indicated relevant disclosure of D12 at least in that the polymeric material (A) defined therein should have a melt viscosity of at least 0.50 $kNsm^{-2}$ measured according to Test 1 as described in the patent specification, which is not disclosed in D12. The Board has no reason to be of a different opinion.

3.8.2 The respondent submitted that the subject-matter of claims 1 and 10 as granted also differed from the disclosure of D12 in that it was directed to "a LNG assembly" (rejoinder: middle of page 6 to bottom of

page 7; page 8, third paragraph, feature i)).

a) In order to asses whether the respondent's view can be shared, it is first necessary to determine the meaning of the term "LNG assembly" in the context of granted claims 1 and 10. In a second step, it has to be examined if the disclosure of D12 relied upon by the appellant concerns such a LNG assembly.

Reading of the term LNG assembly

b) In this respect, it is correct that both the definition of the product according to claim 1 as granted or the one of the use according to claim 10 as granted refer to a LNG assembly, with claim 1 as granted stating in brackets that LNG means "liquid natural gas". In addition, according to paragraphs 1-2 of the patent specification, LNG is the abbreviation for "liquefied natural gas", which is a mixture of hydrocarbons, predominantly methane, but with varying levels of ethane, propane, butane and other naturally occurring gases found in natural gas, whereby LNG normally has a boiling temperature between -166°C and -57°C at atmospheric pressure. It is also derivable from paragraph 3 of the patent in suit, that LNG is associated with very low temperatures, where reference is made to an ISO standard (in its 2015 version), namely document D14. The latter also states that "LNG" stands for "liquefied natural gas", i.e. "colourless and odourless cryogenic fluid in the liquid state at normal pressure composed predominantly of methane which can contain minor quantities of ethane, propane, butane, nitrogen, or other components normally found in natural gas" (page 1, section 3.3). In these circumstances, the Board considers that the reference to LNG in claims 1 and 10 as granted would be

understood by the skilled person to mean that the subject-matter being claimed is related to the context of natural gas that has been cooled to its liquid state at very low temperature.

c) In addition, the term "assembly" in claims 1 and 10 as granted is not further limited by any other features mentioned in these claims and should, therefore, be read in its broadest meaning, which means that it encompasses any article/product constituted of more than one element.

d) In their letter of 16 May 2025 (page 4, last paragraph to page 5, third full paragraph), the appellant contested this reading of claims 1 and 10 as granted - which was indicated in the Board's communication (sections 6.2.2.b to 6.2.2.d) -, and argued that the Board's reading was too limited. In the absence of any clear definition of the term "LNG assembly" in the patent in suit, in particular in paragraphs 1 to 3 thereof that were relied on above, this term should be interpreted in a broader manner and encompassed therefore an apparatus such as the PEEK SEP module according to D12, so the appellant.

d1) However, in respect of claim 1 as granted, the above conclusion of the Board was reached considering that it is explicitly stated in claim 1 as granted that the term LNG stands for "liquid natural gas", which is a term that the skilled person would unambiguously consider as an alternative for "liquefied natural gas", i.e. natural gas in its liquid state. On that basis, the reference to paragraphs 1 to 3 of the patent specification only shows that this interpretation of claim 1 as granted is in line with the disclosure of the patent.

d2) Although claim 10 as granted does not contain the full wording "liquid natural gas" but only the abbreviation "LNG", the Board considers that there would give no reason for the skilled person to read this term in a different manner for claim 10 than for claim 1 as granted. In particular, it was not shown that the patent specification would provide any reason to do so. Therefore, the Board is satisfied that the term "LNG" in claim 10 as granted would also be understood by the skilled person to mean "liquid natural gas" (or its equivalent "liquefied natural gas").

d3) For these reasons, the arguments put forward by the appellant do not justify that the Board deviates from its preliminary considerations.

e) In view of the above, the term "LNG assembly" in claims 1 and 10 as granted is considered to mean that the subject-matter being claimed is related to any of such article/product constituted of more than one elements used e.g. for the production, treatment, transport or storage of natural gas in its liquid state. This reading, which was indicated in the Board's communication together with the fact that it is fully in line with the disclosure of paragraph 18 of the patent specification (see point 6.2.2.d of the communication), remained undisputed.

Does D12 disclose a LNG assembly?

f) As regards the disclosure of D12, for the reasons already indicated in section 3.3.2.a and 3.3.2.b above, the Board considers that this document does not directly and unambiguously disclose that the PEEK SEP

modules described therein are or even can be operated with natural gas in its liquid state, i.e. at very low/ cryogenic temperatures. Therefore, since there is no disclosure of liquid natural gas (LNG) in D12, the PEEK SEP module according to D12 does not constitute a "LNG assembly" according to claims 1 and 10 as granted, contrary to the appellant's view (letter of 16 May 2025: paragraph bridging pages 4 and 5 to page 5, third full paragraph; oral proceedings before the Board).

g) In view of the foregoing the Board considers that the PEEK SEP module according to D12 is not a LNG assembly in the sense of claims 1 and 10 as granted.

3.8.3 The following additional points regarding arguments put forward by the parties need also to be taken into account:

a) The interpretation of the term "LNG assembly" reached above imposes no limitation regarding where or how the component comprised therein (that is mentioned in claims 1 and 10 as granted) should be implemented and/or used. Considering that neither the wording of claims 1 and 10 as granted, nor the patent specification (see in particular the general disclosure of paragraph 18 thereof), indicate any limitation in that respect, the argument put forward by the respondent during the oral proceedings before the Board that "the component" according to claims 1 and 10 as granted was necessary in contact with liquefied natural gas and therefore subjected to low temperature is rejected.

b) Although it is concluded above that the PEEK SEP module according to D12 is not an "LNG assembly" in the

sense of claims 1 and 10 as granted, there is however no reason to exclude that such a module may be implemented as part of a LNG assembly, as put forward by the appellant (letter of 16 May 2025: paragraph bridging pages 6 and 7).

3.8.4 For these reasons, the subject-matter of claims 1 and 10 as granted differs from the disclosure of the embodiment according to page 13 of D12 which is operated in liquid and gas phases simultaneously in that

- the assembly is a liquid natural gas (LNG) assembly; and

- it is directed to a polymeric material (A) as defined therein, which must have a melt viscosity of at least 0.50 $kNsm^{-2}$ measured according to Test 1 as described in the patent specification.

3.9 Problem effectively solved over the closest prior art

3.9.1 The respondent argued that the objective problem solved by claims 1 and 10 as granted was to provide a polymeric material which was ductile and not brittle at cryogenic temperature and which was therefore suitable for components for use in a LNG assembly to reduce the risk of brittle fracture (rejoinder: page 8, penultimate paragraph).

3.9.2 However, as put forward by the appellant, such a problem can at most be relevant for polymeric materials that are actually exposed, when used, to very low temperatures (e.g. "at cryogenic temperature"). In this respect, the Board shares the appellant's view that claim 1 as granted defines only that the "component

which comprises a polymeric material (A)" mentioned therein should be part of said LNG assembly, which does not impose that said component is located in the assembly so as to be exposed to very low temperatures when the LNG assembly is operated (see point 3.8.3.a above). Rather, the component should only be such as to be part of a LNG assembly (statement of grounds of appeal: page 5, third and fourth paragraphs; letter of 15 July 2024: page 3, last paragraph). In these circumstances, the formulation of the problem effectively solved over D12 proposed by the respondent is not relevant for all the components defined in claims 1 and 10 as granted and, for that reason, is not appropriate.

3.9.3 In view of the above, the problem solved by the subject-matter of claim 1 as granted over D12 resides in the provision of a further natural gas assembly.

3.9.4 Similarly, the problem solved by claim 10 as granted lies in the use of another polymeric material (A) in a component of a natural gas assembly.

3.10 Obviousness

3.10.1 Regarding the obviousness of the solution in respect of claim 1 as granted, the appellant's objections were based on the combination of D12 with the disclosure of high melt viscosity PEEKs as disclosed in D2 or D3, taking into account that it was known from D5 to D8 or D11 that PEEKs could suitably be used at temperatures as low as -100°C (statement of grounds of appeal: page 7 to top of page 9; letter of 15 July 2024: page 4, fourth to seventh paragraphs).

3.10.2 The appellant's first line of argument was based on considering that the liquid natural gas (LNG) assembly specified in claim 1 as granted did not represent a distinguishing feature (statement of grounds of appeal: page 6, third full paragraph to page 9, third line; letter of 15 July 2024: fifth to seventh paragraphs; oral proceedings before the Board). However, since the Board arrived at the conclusion that the PEEK SEP module according to D12 is not a liquid natural gas (LNG) assembly (see section 3.8.2 above), it cannot be concluded on the basis of these arguments of the appellant why the skilled person starting from the PEEK SEP module described in D12 would arrive in an obvious manner at a LNG assembly and therefore at the subject-matter of operative claim 1. For that reason, these arguments cannot succeed.

3.10.3 In their letter of 16 May 2025 (page 5, last paragraph; page 6, fifth paragraph to page 7, third paragraph) and during the oral proceedings before the Board, the appellant further argued that it would be obvious to use a PEEK SEP module according to the relevant disclosure of D12 in any (preexisting) LNG assembly and to use, for making the membrane of this module, any known PEEK, such as the ones of D2 or D3, instead of the unspecified PEEK of D12. In that respect, the appellant in particular noted that D12 disclosed on pages 16 and 17 that the PEEK SEP modules could be implemented in processing plants/refineries for natural gas and sea gas platforms for the production, processing, storage or transportation of natural gas (letter of 16 May 2025: page 6, penultimate paragraph to top of page 7; oral proceedings before the Board).

a) However, even if the Board agrees with the appellant that it would be obvious to use a PEEK SEP module

according to the relevant disclosure of D12 in a preexisting LNG assembly e.g. as a purification apparatus for natural gas (see section 3.8.3.b above), there is no general teaching in D12 regarding the nature and/or the properties of the PEEK to be used for making the membrane of this module. In addition, it is derivable from the disclosure of D12 as a whole that the selection of a suitable PEEK material for making the membrane of this module is not trivial (see advantages and drawbacks/limitations of membranes mentioned in D12, pages 6 and 8-10) and that the PEEK that was developed by the PoroGen company was designed to meet some specific, stringent requirements (D12: pages 10 and 11; it is even indicated on page 11 that PoroGen is the only worldwide manufacturer of PEEK membranes). However, there is no evidence on file that the PEEK according to D2 or D3 relied upon by the appellant would be suitable for making membranes such as the ones of D12, let alone membranes that have the required properties. In these circumstances, the Board considers that the combination of documents relied upon by the appellant to arrive at the subject-matter of claim 1 as granted, in particular the combination of D12 with either D2 or D3, can only be arrived at based on hindsight, which is not allowable.

b) In the statement of grounds of appeal (paragraph bridging pages 8-9), the appellant put forward that to solve the problem of providing an alternative polymer/ PEEK which was suitable for a LNG assembly, the skilled person would consider that the minimum requirements to be met were related to the processability of this polymer to make components that could be installed somewhere or somehow in the LNG assembly.

However, this argument was put forward in order to show

that it would be obvious to solve a different objective problem to be solved (as compared to the one indicated above) and was not pursued/developed any further in the appeal proceedings (in particular at the oral proceedings before the Board) in view of the problem indicated in section 3.9.3 above. It is also not clear to the Board how this argument would render it obvious to modify the relevant disclosure of D12 so as to arrive at the subject-matter of claim 1 as granted with the aim to solve the problem posed. Therefore, this argument is rejected.

3.10.4 For these reasons, the arguments put forward by the appellant in appeal provide no cause for the Board to overturn the decision of the opposition division that the subject-matter of claim 1 as granted involves an inventive step when D12 is taken as the closest prior art.

3.10.5 Both parties agreed during the oral proceedings that their line of argument put forward for claim 1 as granted was equally valid for claim 10 as granted, so that the same conclusion regarding inventive step was bound to be reached for both claims (minutes, page 2, penultimate full paragraph). The Board has no reason to be of a different opinion. Therefore, also the subject-matter of claim 10 as granted involves an inventive step when D12 is taken as the closest prior art.

3.10.6 In view of the conclusions reached by the Board in respect of inventive step for independent claims 1, 10 and 11, the objections raised in writing against the dependent claims as granted (statement of grounds of appeal: bottom of page 15 to top of page 17) were not pursued by the appellant during the oral proceedings before the Board. These objections, which are based on

the obvious nature of the subject-matter of claims 1, 10 or 11 cannot succeed either.

4. As none of the objections put forward by the appellant against the main request is successful, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

N. Schneider F. Rousseau

Decision electronically authenticated