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Datasheet for the decision of 15 April 2021

Case Number: T 0182/18 - 3.3.10

Application Number: 05742057.2

Publication Number: 1751245

IPC: C09K5/04, C09K3/30, C08J9/14, A61K9/12, A61L9/16

Language of the proceedings: EN

Title of invention:
AZEOTROPE-LIKE COMPOSITIONS OF TETRAFLUOROPROPENE AND HYDROFLUOROCARBONS

Patent Proprietor:
Honeywell International Inc.

Opponents:
Mexichem Fluor S.A. de C.V.
ARKEMA France
ACEA European Automobile Manufacturers Association

Headword:

Relevant legal provisions:
EPC Art. 123(2), 123(3), 100(b), 111(1)

Keyword:
Amendments - allowable (yes)
Insufficiency of disclosure (no)
Appeal decision - remittal to the department of first instance (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

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

Case Number: T 0182/18 - 3.3.10

D E C I S I O N
of Technical Board of Appeal 3.3.10
of 15 April 2021

Appellant: (Patent Proprietor)	Honeywell International Inc. 115 Tabor Road Morris Plains, NJ 07950 (US)
Representative:	Crooks, Elizabeth Caroline Kilburn & Strode LLP Lacon London 84 Theobalds Road London WC1X 8NL (GB)
Respondent: (Opponent 1)	Mexichem Fluor S.A. de C.V. Eje 106 (sin número) Zona Industrial C.P. 78395 San Luis Potosi, S.L.P. (MX)
Representative:	Potter Clarkson The Belgrave Centre Talbot Street Nottingham NG1 5GG (GB)
Respondent: (Opponent 2)	ARKEMA France 420 Rue d'Estienne d'Orves 92700 Colombes (FR)
Representative:	Bandpay & Greuter 30, rue Notre-Dame des Victoires 75002 Paris (FR)
Respondent: (Opponent 3)	ACEA European Automobile Manufacturers Association Avenue des Nerviens 85 B-1040 Brussels (BE)
Representative:	Tostmann, Holger Carl Wallinger Ricker Schlotter Tostmann

Patent- und Rechtsanwälte Partnerschaft mbB
Zweibrückenstrasse 5-7
80331 München (DE)

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted on 9 November 2017 revoking European patent No. 1751245 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chair P. Gryczka
Members: R. Pérez Carlón
F. Blumer

Summary of Facts and Submissions

I. The appellant (patent proprietor) lodged an appeal against the decision of the opposition division revoking European patent No. 1 751 245.

II. Three notices of opposition had been filed on the grounds of added subject-matter, insufficiency of disclosure), and lack of novelty and inventive step (Articles 100(a), 100(b) and 100(c) EPC).

III. The opposition division concluded that the claimed invention was not sufficiently disclosed for it to be carried out by a person skilled in the art. The available evidence substantiated serious doubts on whether mixtures required by claim 1 of the main request before it were azeotropic-like. These doubts jeopardised the credibility of the data of Example 4 on the compositions of claim 1 of auxiliary request 8, which is the appellant's main request in these appeal proceedings.

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

"An azeotrope-like composition comprising trans-1,3,3,3-tetrafluoropropene (transHFO-1234ze) and 1,1,1,2,3,3,3-heptafluoropropane ("HFC-227ea"), which consists essentially of from 1 to 40 weight percent HFC-227ea and from 60 to 99 weight percent of transHFO-1234ze."

V. The arguments of the appellant as far as relevant to the present decision were as follows.

Claim 1 of the main request found a basis on page 12,

lines 8-10 of the application as originally filed. There was no mention in this passage of the feature "effective amounts" and thus no need to include it in claim 1. Claim 2 found a basis on page 12, lines 10 to 16. Claims 3 to 9 also found the required basis, since the application as originally filed disclosed every composition as suitable for every used disclosed therein.

The data in example 4 of the patent in suit showed that mixtures having the components and amounts required by claim 1 of the main request had a boiling point which was below that of the pure components. This showed that these mixtures were azeotropic-like, as required by claim 1. ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) recognised azeotropic mixtures R-505A and R-505B as falling under claim 1, corroborating the results of example 4 of the patent. There was no evidence which showed that these results were faulty. Every composition having the components and amounts required by claim 1 was azeotropic-like and thus the claimed invention was sufficiently disclosed for it to be carried out.

VI. Respondents 1 to 3 (opponents 1 to 3) argued essentially as follows.

The main request, filed as auxiliary request 13 with the statement of grounds of appeal, should not be admitted into the proceedings. The requests filed in appeal represented a "fishing expedition" attempting to probe whether the patent contained any patentable subject-matter.

Claim 1 of the main request contained added subject-matter. Claim 1 as originally filed included the limitation "effective amounts", which indicated that not every composition having the components defined in claim 1 was azeotropic-like. This limitation was however not a feature of claim 1 of the main request.

The value of pressure in kiloPascal in claim 2 was not included with a decimal and thus did not find the required basis in the application as originally filed.

Claims 3 to 9 arose from a double selection on one side among the compositions disclosed and on the other side among the intended uses and thus also represented added subject-matter.

The data in example 4 of the patent were unreliable. The respondent's data had proven other embodiments of claim 1 of the patent as granted faulty, since no azeotrope-like compositions were formed. This inevitably cast doubts on example 4. These doubts were further supported by the difference between the boiling point of transHFO-1234ze experimentally obtained and that of the literature.

In addition, claim 1 allowed further components in the composition which should not affect the azeotropic-like behaviour of the mixture. Determining which other components could also be part of the composition without disrupting the azeotrope-like behaviour was an undue burden for the skilled person.

Lastly, even if it were to be considered that the data of example 4 proved the existence of an azeotropic composition within the claimed area, it could not be concluded that any of the compositions close to that

azeotrope were azeotropic-like in view of the lack of information on the dew curve.

VII. The board issued a communication dated 23 July 2020 including its preliminary view. It informed the parties that, if the claimed invention were to be found sufficiently disclosed and did not contain added subject-matter, it was inclined to remit the case to the opposition division for further prosecution.

VIII. Respondent 3 informed the board that it would not be attending the oral proceedings, which took place on 15 April 2021.

IX. The final requests of the parties were as follows:

- The appellant requested that the decision under appeal be set aside and the case be remitted to the opposition division for further examination on the basis of the main request or of the first auxiliary request, both requests filed with a letter dated 2 December 2020.

- The respondents requested that the appeal be dismissed.

  If the appeal were not dismissed, respondent 1 requested that the case be remitted to the opposition division. Respondent 2 requested that the board examine all the outstanding issues of the case.

X. At the end of the oral proceedings, the decision was announced.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. Admissibility in the appeal proceedings

2.1 Respondent 3 requested that none of the auxiliary requests which include the present main request filed with the appellant's statement of grounds of appeal be admitted into the proceedings. It argued that the filing of these requests attempted to probe whether the patent application contained any patentable subject-matter.

2.2 The main request in these appeal proceedings was filed well in advance of the oral proceedings before the opposition division and renumbered as auxiliary request 8 during them. It was examined in the decision under appeal (see point 5). It was filed as auxiliary request 13 with the statement of grounds of appeal following the requirements of Article 12(1) RPBA 2020. Therefore the board sees no reason why this request should not be admitted into the proceedings.

2.3 Even if that were not the case, restricting claim 1 of the patent as granted to only one of its four embodiments, in the preferred relative amounts of the required components, does not amount to a "fishing expedition" for patentable matter, as alleged by respondent 3.

3. Amendments

3.1 Claim 1 relates to azeotrope-like compositions which consist essentially of defined amounts of two specific

components.

Claim 1 as originally filed included the feature "effective amounts" of the required components. This feature limited the originally claimed composition by including only those amounts of the required components required for obtaining azeotropic-like mixtures.

The respondents argued that, by omitting this feature, claim 1 of the main request went beyond the disclosure of the application as originally filed.

3.2 However, claim 1 finds the required basis on page 12, lines 8-10 of the application as originally filed. This passage does not include any reference to "effective amounts".

3.3 Claim 2 relates to a composition according to claim 1 having a boiling point of from -17°C to -19°C at a pressure of "about 99 kPa (14.4 psia)".

Respondent 2 argued that the value in kiloPascal without decimals did not correspond to the original 14.4 psia, which included one.

The application was drafted using Imperial Units (psia) which needed conversion to SI units following Rule 49(10) EPC.

The value 14.4 psia, lacking further information on the associated error, is linked to an uncertainty of 0.1 psia, which corresponds to 0.7 kPa. For this reason, 99 kPa is a better SI equivalent to the original value 14.4 psia than 99.3 kPa.

3.4 Claims 3 to 9 relate to products comprising the composition of claim 1 (a blowing agent, a foamable composition, a sprayable composition; claims 3, 4 and 6), to a foam obtainable by means of said composition (claim 5), to methods for cooling and heating an article by means of the composition of claim 1 (claims 7 and 8) and to the use of said composition as a propellant (claim 9).

The respondents argued that claims 3 to 9 did not find a basis in the application as originally filed. These claims resulted from a double selection among the disclosed compositions and the disclosed uses.

3.5 The original application discloses a number of compositions. Compositions comprising, preferably consisting essentially of, transHFO-1234ze and HFC-227ea are a particularly preferred embodiment (pages 11-12). A number of mixtures of these two components are disclosed in Example 4.

The application as originally filed disclosed uses, products and methods comprising or employing the compositions of the claimed invention. The application does not disclose that only some of the compositions could be suitable for some of the uses.

The board fails to see what new information is provided to the skilled reader by claims 3 to 9.

3.6 Claims 1 to 9 of the main request thus find a basis in the application as originally filed (Article 123(2) EPC).

3.7 The respondents raised no objection with respect to Article 123(3) EPC and the board sees no reason to

raise any on its own motion.

4. **Sufficiency of disclosure**

4.1 Claim 1 relates to an azeotrope-like composition comprising trans-1,3,3,3-tetrafluoropropene (transHFO-1234ze) and 1,1,1,2,3,3,3-heptafluoropropane (HFC-227ea), which consists essentially of from 1 to 40 weight percent HFC-227ea and from 60 to 99 weight percent of transHFO-1234ze.

4.2 The requirements of sufficiency of disclosure are met if the claimed invention can be performed by a person skilled in the art without undue burden, using common general knowledge and having regard to the information in the patent in suit (Case Law of the Boards of Appeal, 9th edition 2019, II.C.1).

4.3 It was undisputed that the skilled person can obtain a mixture of the two components in the relative amounts required by claim 1.

The issue under dispute is whether, by doing so, the skilled person could reliably obtain azeotropic-like compositions.

4.4 According to the patent in suit [0017] azeotropic-like compositions are constant boiling or essentially constant boiling. The composition of the vapour formed during boiling or evaporation is identical, or substantially identical, to the original liquid composition. With boiling or evaporation, the liquid composition changes, if at all, only to a minimal or negligible extent.

4.5 Example 4 of the patent in suit discloses the boiling point of five compositions according to claim 1 at a pressure of 14.44 psia, which is slightly below atmospheric. It also discloses the boiling point of pure transHFO-1234ze at that pressure.

The boiling point of all the compositions of example 4 which are according to claim 1, namely those of the second to sixth entries of Table 4, is lower than the boiling point of pure transHFO-1234ze. It is also inevitably lower than the boiling point of pure HFC-227ea, which is the less volatile of the two components.

Example 4 thus shows low-boiling azeotropic behaviour within the mixtures of transHFO-1234ze and HFC-227ea required by claim 1.

There is no experimental evidence on file contradicting this finding.

4.6 It is undisputed that R-515A is a mixture classified as azeotropic by the ASHRAE falling within claim 1 (point 4.27 of the statement of grounds of appeal, point 3.4 of respondent 2's reply).

The appellant further argued in its letter dated 2 December 2020 (points 5.54 and 5.55) that a second mixture according to claim 1, designated R-515B, was also recognised by ASHRAE.

There is thus available evidence corroborating the results of example 4 of the patent.

4.7 It is thus credibly shown that there is at least one azeotrope within the compositions of claim 1 of the

main request.

It is common ground that azeotropes are an embodiment of azeotropic-like mixtures, following the definition in [0017] of the patent.

4.8 Two situations can be envisaged.

If, as alleged by the appellant, every composition having the relative amount of transHFO-1234ze and HFC-227ea required by claim 1 is an azeotrope-like composition, the skilled person does not need any information beyond the relative amounts of the mixture's components in order to put the claimed invention into practise.

If, as alleged by the respondents, not every composition having the components and amounts required by claim 1 is azeotropic-like, the skilled person is able to check whether such mixture has or not the required behaviour upon boiling. The parties found no difficulties in carrying out these experiments for other mixtures, see for example page 16 of respondent 2's reply to the grounds of appeal, relating to evidence provided during the proceedings. No difficulty is thus expected for the mixtures of claim 1.

4.9 The board thus concludes that the claimed invention is sufficiently disclosed for it to be carried out by a person skilled in the art, regardless of whether or not every composition having the components and relative amounts in claim 1 is necessarily an azeotrope-like composition.

4.10 The respondents argued that the feature azeotrope-like had no meaningfully boundaries which could allow the

skilled person to reproduce the invention.

However, paragraph [0017] discloses what the patent contemplates as azeotrope-like (see point 4.4), namely those whose liquid composition changes, if at all, only to a minimal or negligible extent upon boiling or evaporation. The boundaries of the claim are arguably not precise, but they are not so meaningless that the skilled person could not reproduce the invention.

4.11 The respondents argued that the patent needed to disclose not only the bubble point but also the mixtures' dew point in order to credibly show that the compositions of example 4 were azeotropic-like.

However, if the bubble point line has a minimum lower than the boiling point of the more volatile of the components of the composition, it can be reasonably assumed that a minimum boiling azeotrope is formed. As already mentioned, no evidence to the contrary is available on file. This argument is thus not convincing.

Even if the bubble point curve alone could not show azeotropic-like behaviour for non-azeotropic mixtures and their dew point were required, determining it, if needed be, falls within the skills of the person of the art.

4.12 The respondents also argued that the measurement error in example 4 was very high, in particular having regard to the boiling point of transHFO-1234ze, -18.124°C at 14.44 psia, which should have been -19,36°C at that pressure according to the literature. In addition, the results obtained did not exactly correlate with a curve (see figure on point 3.3 of the grounds of appeal).

Since the data provided for other embodiments of claim 1 as granted was faulty, the data of example 4 could not be considered accurate enough to show the alleged azeotrope-like behaviour.

It is not disputed that the boiling point of pure transHFO-1234ze obtained in Example 4 is not accurate. However, this lack of accuracy could have its origin on a systematic error. It does not necessarily imply that each measurement is linked to an uncertainty of ± 1.2°C. For this reason, it does not put into question the boiling point's reduction with respect to the pure component. The respondents argument is thus not convincing in this respect.

It is also not disputed that the points obtained in example 4 of the patent do not exactly correlate to a curve. However, this is to be expected from experimental data. Values perfectly fitting a curve are seldom the direct result of experiments.

4.13 The respondents further argued that there was a large amount of error sources in the method used in example 4 of the patent. There was no evidence in the patent that any specific measure was taken in order to avoid them, for example by keeping pressure constant.

However, there is no evidence on file that the experiments of the patent disregarded that measures, either. The skilled person is aware of the change of boiling points at different pressures, and would have expected the experiments of the patent to have been taken that into account. This argument is also not convincing.

4.14 The respondents argued that the patent did not identify the composition of any measured azeotrope, did not disclose its purity or that of the components, and did not compare boiling points using a differential ebulliometer. Also for that reason it did not show the presence of azeotropes or azeotrope-like behaviour.

Even if example 4 does not provide the exact composition of the azeotropic binary mixture of transHFO-1234ze and HFC-227ea, it gives enough information to show that it exists, by measuring a boiling temperature of the mixture below that of any of the individual components. Finding the precise position of that azeotrope is, however, possible for the person of the art following the steps mentioned, as it have been used by the respondents themselves during the proceedings. This argument is thus not convincing.

4.15 The respondent also argued that the effect shown in example 4 was, if present, negligible, and could well fall within the measurement error. Also for this reason the available data did not suffice in order to disclose the claimed invention.

Indeed the temperature decrease shown in the patent is less than 0.7°C. However, the well-known ethanol/water azeotrope boils at 0.2°C less than ethanol. The difference measured is thus not necessarily negligible. There is no evidence on file which could show that 0.7°C is lower than the measurement error. This argument is also not convincing.

4.16 The respondents argued that claim 1, despite the wording "consisting essentially of" could contain further components [0023], [0018], [0044]. The composition of claim 1 could contain merely 1% of

HFC-227ea. The amount of additional components could thus be comparable to that of HFC-227ea in the composition. Finding out which of those mixtures could have azeotrope-like behaviour represented an undue burden for the person of the art.

However, the patent in suit discloses binary mixtures according to claim 1, at least some of which are azeotrope-like. Further components should not disrupt that behaviour. The respondents acknowledge that only compounds of comparable volatility to transHFO-1234ze and HFC-227ea could influence the behaviour of the mixture upon boiling. The list of further components is thus not endless. Checking what compositions have the required behaviour does not represent an undue burden for the person of the art.

4.17 The respondents argued that every non-azeotropic mixture necessarily fractionated upon distillation, including those very close to an azeotrope. The patent should have provided further information in order to show that those points close to an azeotrope had the required azeotrope-like behaviour.

However, even if not every mixture having the components and amounts required by claim 1 were azeotropic-like, the skilled person can determine without undue burden what compositions have that behaviour for the reasons already given.

4.18 Lastly, the respondents argue that azeotropic behaviour was not predictable. The patent could not relate to an invention which was merely speculative at the filing date.

However, the board considers that the data provided in

example 4 of the patent shows that compositions having the components and relative amounts defined in claim 1 have the allegedly unpredictable azeotropic properties. The argument that the claimed subject-matter related to a speculative filing cannot thus be followed.

4.19 The board concludes that the claimed invention is sufficiently disclosed for it to be carried out by a person skilled in the art.

5. Evidence filed with letter dated 2 December 2020

Respondent 1 requested that the evidence filed by the appellant with a letter dated 2 December 2020 not be admitted into the proceedings.

As the board has arrived at the conclusion that the claimed invention is sufficiently disclosed without resorting to that evidence, it does not need to decide on its admissibility.

6. Remittal

6.1 The appellant and respondent 1 requested remittal of the case to the opposition division if the claimed invention was considered sufficiently disclosed. Respondent 2 asked the board to decide on all the grounds of opposition in view of the proceedings' length.

6.2 The decision under appeal did not deal with all the grounds for opposition, but only with the issues of added subject-matter and sufficiency of disclosure.

Since the the primary object of the appeal proceedings is to review the decision under appeal in a judicial

manner (Article 12(2) RPBA 2020), it is not the function of an appeal board to consider and decide upon grounds for opposition for the first time during appeal proceedings. This is a special reason according to Article 11 RPBA 2020 upon which a board may remit a case.

The board decides thus to remit the case to the opposition division for further prosecution (Article 111(1) EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division for further prosecution.

The Registrar: The Chair:

C. Rodríguez Rodríguez P. Gryczka

Decision electronically authenticated