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**Datasheet for the decision
of 7 July 2022**

Case Number: T 1567/18 - 3.3.10

Application Number: 06737345.6

Publication Number: 1853679

IPC: C09K5/04, C09K3/30, C08J9/14

Language of the proceedings: EN

Title of invention:
COMPOSITIONS COMPRISING A FLUOROOLEFIN

Patent Proprietor:
The Chemours Company FC, LLC

Opponent:
ARKEMA FRANCE

Headword:
COMPOSITIONS COMPRISING A FLUOROOLEFIN / The Chempours Company

Relevant legal provisions:
EPC Art. 56
RPBA 2020 Art. 13(1), 13(2)

Keyword:

Inventive step - (no)

Amendment after summons - exceptional circumstances (no) -
cogent reasons (no)

Decisions cited:

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 1567/18 - 3.3.10

D E C I S I O N
of Technical Board of Appeal 3.3.10
of 7 July 2022

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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
17 April 2018 concerning maintenance of the
European Patent No. 1853679 in amended form.**

Composition of the Board:

Chairman P. Gryczka
Members: J.-C. Schmid
F. Blumer

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the interlocutory decision of the Opposition Division which found that the European patent No. 1 853 679 could be maintained on the basis of claims 1 to 14 of auxiliary request 1 filed during oral proceedings on 8 March 2018.

Claims 1, 13 and 14 of said request (hereinafter "main request") read as follows:

"1. A composition selected from the group consisting of: HFC-1225ye and HFC-32; HFC-1225ye, HFC-134a, HFC-152a and HFC-32; HFC-1225ye, HFC-134a, and HFC-32; HFC1225ye, HFC-134, and HFC-32; HFC-1225ye, HFC-32 and HFC-125; HFC-1225ye, HFC32 and CF₃I; HFC-1225ye, HFC-1234yf, HFC-32 and HFC-125; HFC-1225ye, HFC-1234yf, HFC-32, HFC-125 and CF₃I; HFC-1225ye, HFC-32, HFC-125 and HFC-152a; HFC-1225ye, HFC-32, HFC-125 and isobutane; HFC-1225ye, HFC-32, HFC-125 and propane; HFC-1225ye, HFC-32, HFC-125 and dimethylether; HFC-1225ye, HFC-32, CF₃I and dimethylether; HFC-1225ye, HFC-32, HFC-125 and CF₃I; and HFC-1225ye, HFC1234yf, HFC-32 and HFC-134a."

"13. A method for replacing a high GWP refrigerant in a refrigeration, air-conditioning, or heat pump apparatus, wherein said high GWP refrigerant is selected from the group consisting of R134a, R22, R123, R11, R245fa, R114, R236fa, R124, R12, R410A, R407C, R417A, R422A, R507A, R502, and R404A, said method comprising providing the composition of any of claims 1-4 to said refrigeration, air-conditioning, or heat

pump apparatus that uses, used or is designed to use said high GWP refrigerant.”

“14. A refrigeration, air-conditioning, or heat pump apparatus containing a composition as claimed in any one of claims 1-4.”

II. The respondent (patent proprietor) filed an appeal against said decision of the opposition division, but withdrew it during the oral proceedings before the board on 7 July 2022.

III. The appellant filed an opposition requesting revocation of the patent-in-suit in its entirety on the grounds of lack of novelty and inventive step (Article 100(a) EPC) and insufficiency of disclosure of the invention (Article 100(b) EPC). *Inter alia*, documents

- (1) JP-A-4 110 388, and its English translation (D1b),
- (2) WO-A-2004/037913 and
- (4) WO-A-2005/103188

were cited in the opposition proceedings.

IV. In the statement setting out the grounds of appeal, the appellant submitted that the subject-matter of the claims maintained by the opposition division lacked an inventive step starting from, *inter alia*, document (1) as the closest prior art and/or in the light of document (4).

V. The respondent refuted the appellant's arguments and argued that the claims of the then pending auxiliary request 1 maintained by the opposition division, filed as auxiliary request #10 in the appeal proceedings,

involved an inventive step. It also filed auxiliary requests #1 to #52.

VI. During the oral proceedings before the board held on 7 July 2022, the respondent withdrew the former main request to reject the opposition, as well as auxiliary requests #1 to #9, #18 to #23, #28 to #31 and #48 to #52 and filed a fresh auxiliary request #48.

VII. Claim 1 of auxiliary request **#11** and **#12** is identical to claim 1 as maintained by the opposition division.

Claim 1 of auxiliary request **#13** reads as follows:

"1. A composition selected from the group consisting of: HFC-1225ye and HFC-32; HFC-1225ye, HFC-134a, HFC-152a and HFC-32; HFC-1225ye, HFC-134a, and HFC-32; HFC-1225ye, HFC-134 and HFC-32; HFC-1225ye, HFC-32 and HFC-125; HFC-1225ye, HFC-32 and CF₃I; HFC-1225ye, HFC-32, HFC-125 and HFC-152a; HFC-1225ye, HFC-32, HFC-125 and isobutane; HFC-1225ye, HFC-32, HFC-125 and propane; HFC-1225ye, HFC-32, HFC-125 and dimethylether; HFC-1225ye, HFC-32, CF₃I and dimethylether; and HFC-1225ye, HFC-32, HFC-125 and CF₃I."

Claim 1 of auxiliary request **#14** reads as follows:

"1. A composition selected from the group consisting of: HFC-1225ye, HFC-32 and HFC-125; and HFC-1225ye; HFC-1234yf, HFC-32 and HFC-125."

Claim 1 of auxiliary requests **#15**, **#16** and **#17** reads as follows:

"1. A composition selected from the group consisting of: HFC-1225ye and HFC-32; HFC-1225ye, HFC-134a, and HFC-32; and HFC-1225ye, HFC-134, and HFC-32."

Claim 1 of auxiliary requests **#24 and #25** corresponds to claim 14 maintained by the opposition division containing a composition according to claim 1 of auxiliary request #10, now the main request.

Claim 1 of auxiliary request **#26** differs from claim 1 of auxiliary request #24 in that it comprises a composition according to claim 1 of auxiliary request #13.

Claim 1 of auxiliary request **#27** differs from claim 1 of auxiliary request #24 in that it contains a composition of claim 1 according to auxiliary request #15.

The method of claim 1 of auxiliary requests **#32 and #33** corresponds to the method of claim 13 maintained by the opposition division comprising providing a composition according to claim 1 of the main request.

The method of claim 1 of auxiliary requests **#34** differs from the method of claim #32 in that it provides a composition according to claim 1 of auxiliary request #13.

The method of claim 1 of auxiliary requests **#35** differs from the method of claim #32 in that it provides a composition according to claim 1 of auxiliary request #15.

The method of claim 1 of auxiliary requests **#36, #37, #38 and #39** differs from the method of claim 1 of

auxiliary request #32, #33, #34 and #35 respectively, in that the high GWP refrigerant to be replaced is selected from the group consisting of R134a, R22, R123, R245fa, R114, R236fa, R124, R410A and R407C.

The method of claim 1 of auxiliary requests **#40, #41, #42 and #43** differs from the method of claim 1 of auxiliary request #32, #33, #34 and #35, respectively, in that the high GWP refrigerant to be replaced is selected from the group consisting of R134a, R22, R410A and R407C.

Claim 1 of auxiliary requests **#44 reads as follows:**

"A composition selected from the group consisting of: a composition consisting of HFC-1225ye, HFC-32 and HFC-125; and a composition consisting of HFC-1225ye, HFC-1234yf, HFC-32 and HFC-125."

Claim 1 of auxiliary request **#45** differs from claim 1 of auxiliary request #24 in that it contains a composition according to claim 1 of auxiliary request #14.

Claim 1 of auxiliary request **#46** differs from claim 1 of auxiliary request #45 in that the apparatus is limited to a refrigeration and an air-conditioning apparatus.

The method of claim 1 of auxiliary requests **#47** differs from the method of claim 13 maintained by the opposition division in that it provides a composition according to claim 1 of auxiliary request #44.

The method of claim 1 of auxiliary requests **#48** (as filed during oral proceedings before the board) differs from the method of claim 1 of auxiliary request #47 in that the composition consisting of HFC-1225ye, HFC-1234yf, HFC-32 and HFC-125 is deleted.

VIII. The appellant (opponent) requested that the decision under appeal be set aside and the patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed (i.e. that the patent be maintained on the basis of the claim set that was found to be allowable by the opposition division and that was re-filed as auxiliary request #10 with the statement setting out the grounds of appeal), or that the patent be maintained on the basis of one of the following requests:

- auxiliary requests #11 to #17, #24 to #27 and #32 to #47, all as filed with letter dated 9 May 2019; and
- auxiliary request #48 as filed during oral proceedings before the Board.

IX. At the end of the oral proceedings the decision of the Board was announced.

Reasons for the Decision

Inventive step

Main request - claims maintained by the opposition division

Claim 1 of the main request relates to various compositions. It includes *inter alia* a composition of HFO-1225ye and HFC-32 and a composition of HFO-1225ye, HFO-1234yf, HFC-32 and HFC-125.

Composition of HFO-1225ye and HFC-32

1. *Closest prior art*

Document (1) relates to heat transfer fluid comprising hydrocarbonfluoroolefins (HFO) of the formula $C_3H_mF_n$ where m and n are integers of 1 to 5 with m+n equal to 5 (see document (1b), page 4, second paragraph), such as HFO-1234zf, HFO-1234ze or HFO-1234yf. The HFO of formula $C_3H_mF_n$ have excellent physical properties as heat medium for heat pumps and are balanced in terms of properties such as coefficient of performance, refrigeration power, condensation pressure and discharge temperature (see page 5, second paragraph).

Furthermore, document (1) teaches that the HFO can be mixed with at least one co-refrigerant chosen from the group consisting of HFCC-22, HFC-32, HFCC-124, HFC-125, HFC-134a, HFCC-142b, HFC-143a and HFC-152a (see paragraph crossing pages 5 and 6 of document (1b)). According to document (1), the refrigeration power of the HFO is increased when they are mixed with a low-boiling refrigerant (document (1b), page 5, penultimate paragraph).

The Board, in agreement with the parties and the opposition division considers that document (1) represents the closest prior art to the invention for the composition consisting of HFO-1225ye and HCF-32, which is comprised in the subject-matter of claim 1 of the main request.

2. *Technical problem*

The respondent defined the technical problem to be solved as the provision of a refrigerant composition having low global warming potential (GWP).

3. *Solution*

The proposed solution is the composition where the compound of formula $C_3H_mF_n$ is HFO-1225ye and is mixed with compound HCF-32.

4. *Success*

In view of the refrigerant properties of compositions of HFO-1225ye and HFC-32 shown in table 7 on page 24 and table 10 on page 28 of the patent in suit and the known GWP values of these two individual components, the board is satisfied that this technical problem has been solved by the claimed compositions.

5. *Obviousness*

5.1 The skilled person faced with the problem of providing refrigerant compositions having low GWP would be aware from document (2) that refrigerant HFO-1225ye, which is comprising within the generic formula $C_3H_mF_n$ of document (1b), has a low GWP (page 7, last line to page 8, line 9; example 1, table 1, first entry). He would thus consider a refrigerant comprising HFO-1225ye as an obvious solution. Furthermore, as document (1) teaches that the HFO can be mixed with a low boiling refrigerant such as HFC-32, for example for improving the refrigerant power, the skilled person would also consider a mixture of HFO-1225ye and HFC as an obvious solution to the problem of providing a refrigerant composition having low GWP. He would thus arrive at the

subject-matter of claim 1 of the main request without the exercise of inventive skill.

- 5.2 The respondent argued that the skilled person would have no incentive to provide a binary composition consisting of HFO-1225ye and HFC-32.

However, the choice of combining HFO-1225ye with specifically HFC-32 is neither critical nor purposive, because no particular effect has been shown to be associated with this combination. Thus, this option lies within the routine activity of the skilled person faced with the problem of providing an alternative heat transfer composition having low GWP. Nothing was submitted by the respondent from which the Board could reasonably conclude that the skilled person would have been discouraged from following the straight teaching of document (1) regarding to choice of HFO-1225ye as a compound of formula $C_3H_mF_n$ having low GWP and the combination with HFC-32 among the proposed low boiling co-refrigerants.

- 5.3 Accordingly the subject-matter of claim 1 of the main request lacks an inventive step in the light of document (1).

- 5.4 The heat transfer compositions of document (1) are disclosed as refrigerant compositions suitable to replace the presently widely used R-12, R-22, R-114 and R-502, and for use under the conditions adopted with these known refrigerant, specifically, at an evaporation temperature of from -20 to 10°C and a condensation temperature of from 30 to 60°C (see page 5 of document (1b), second part of the first full paragraph).

Accordingly, the subject-matter of claims 13 and 14 of the main request also lacks an inventive step with respect to document (1).

Composition of HFO-1225ye, HFO-1234yf, HFC-32 and HFC-125

This composition is not entitled to any of the priority dates of the contested patent. This is not contested. Therefore, document (4), published on 3 November 2005, represents a prior art pursuant to article 54(2) EPC for claimed subject-matter involving this composition.

6. *Closest prior art*

Document (4) discloses heat transfer compositions comprising HFO-1225yeZ and HFO-1234yf (see page 2, lines 3 to 7; claim 1). These compositions exhibit properties that make them advantageous for use as, or in refrigerant compositions (page 2, lines 24 to 26). In addition, these compositions exhibit low global warming potential and can be used in refrigeration system designed for use with existing refrigerant such as R22, HFC-134a, R410A, R404A or R507A (page 2, lines 8 to 18; page 18, lines 18 to page 20, line 19).

Document (4) furthermore teaches that the heat transfer compositions may include co-refrigerants, for example HFC-32 and HFC-125 (see page 21, lines 9 to 25).

This document represent the closest prior art to the invention for the claimed subject-matter involving this composition.

7. *Technical problem*

The respondent defined the technical problem to be solved as the provision of a further refrigerant composition having low global warming potential (GWP).

8. *Solution*

The proposed solution is the composition of claim 1 characterized in that it comprises HCF-32 and HFC-125 in addition to HFO-1225ye and HFO-1234yf.

9. *Success*

In view of the refrigerant properties of compositions of HFO-1225ye, HFO-1234yf, HFC-32 and HFC-125 shown in table 8 on page 26, lines 25 to 36 of the patent in suit and the known GWP values of the individual components, the board is satisfied that this technical problem has been solved by the claimed compositions.

10. *Obviousness*

10.1 The skilled person faced with the problem of providing further refrigerant to the compositions comprising HFO-1225yeZ and HFO-1234yf would consider the teaching of document (4) on page 21, lines 9 to 25 to add further co-refrigerants, for example HFC-32 and HFC-125.

The claimed composition consisting of HFO-1225ye, HFO-1234yf, HFC-32 and HFC-125, the refrigerant apparatus comprising this composition and the methods of replacing existing refrigerants, such as 134a, R22, R410A, R404A or R507A, by this composition, is thus obvious in the light of document (4).

10.2 According to the respondent, the skilled person would not arrive in an obvious way at the composition HFO-1225ye, HFO-1234yf, HFC-32 and HFC-125, since two selections from a long list were necessary to arrive at this composition.

However, no specific motivation is required to arbitrarily choose a particular embodiment from a host of embodiments to provide an alternative. Therefore, the person skilled in the art arrives at the composition consisting of HFO-1225ye, HFO-1234yf, HFC-32 and HFC-125 without exercising inventive skill.

10.3 The subject-matter of claims 1, 13 and 14 of the main request therefore also lacks an inventive step in the light of document (4).

Auxiliary requests #11 to #17, #24 to #27 and #32 to #47

11. The subject-matter of claims 1 of auxiliary requests #11 to #13, #15 to #17 comprises a composition of HFO-1225ye and HFC-32.

Accordingly, the subject-matter of claims 1 of these requests lacks an inventive step for the same reasons as claim 1 of the main request.

The subject-matter of claims 1 of auxiliary requests #24 to #27 encompasses a refrigeration apparatus comprising the composition of HFO-1225ye and HFC-32. Claims 1 of these requests lacks an inventive step for the same reasons as claim 14 of the main request.

The methods of claim 1 of auxiliary requests #32 to #43 also include the methods of providing a composition of HFO-1225ye and HFC-32. Claim 1 of these requests lacks

an inventive step for the same reasons as claim 13 of the main request.

The subject-matter of claims 1 of auxiliary request #11, #12, #14, #24, #25, #32, #33, #36, #37, #40, #41 and #44 to #47 comprises or involves a composition of HFO-1225ye, HFO-1234yf, HFC-32 and HFC-125.

Consequently, the subject-matter of claim 1 of these auxiliary requests lacks an inventive step in the light of document (4).

Admittance of auxiliary request #48

12. This request was filed during the oral proceedings before the Board. For its admissibility into the proceedings Article 13(2) RPBA 2020 applies, which stipulates that an amendment of the case shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified by cogent reasons.

The respondent has not provided any convincing argument as to why this auxiliary request was filed so late. Thus the filing of auxiliary request #48 cannot be considered as a reaction to an exceptional circumstance.

Claim 1 of auxiliary request #48 was amended by deleting the alternative included in claim 1 of auxiliary request #47 on which the appellant focused its inventive step attack. The appellant submitted that this amendment required a new assessment of inventive step with regard to the remaining subject-matter of claim 1. This amendment therefore increases the

technical and procedural complexity of the case, thus deserving procedural economy.

Taking these specific factors into account, the board considers that the reasons for filing auxiliary request #48 during the oral proceedings are not cogent and therefore decided not to admit it into the appeal proceedings (Article 13(1), (2) RPBA).

Partial reimbursement of the proprietor's appeal fee

13. The patent proprietor withdrew its appeal before the decision was announced at oral proceedings and is therefore entitled to a partial reimbursement of the appeal fee at 25% under Rule 103(4) (a) EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.
3. The appeal fee paid by the patent proprietor is reimbursed at 25%.

The Registrar:

The Chairman:



C. Rodríguez Rodríguez

P. Gryczka

Decision electronically authenticated