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Datasheet for the decision of 28 February 2023

Case Number: T 0739/20 - 3.3.10

Application Number: 11778316.7

Publication Number: 2566930

IPC: C09K5/04, C07C19/08

Language of the proceedings: EN

Title of invention:
USE OF COMPOSITIONS FOR REFRIGERATION

Patent Proprietor:
Honeywell International Inc.

Opponents:
ARKEMA FRANCE
Mexichem Fluor S.A. de C.V.

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - obvious alternative - all requests

Decisions cited:

Catchword:

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Case Number: T 0739/20 - 3.3.10

D E C I S I O N
of Technical Board of Appeal 3.3.10
of 28 February 2023

Appellant: (Opponent 2)	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 Chapel Quarter Chapel Bar Nottingham NG1 6HQ (GB)
Respondent: (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)
Party as of right: (Opponent 1)	ARKEMA FRANCE 420, Rue d'Estienne d'Orves 92700 Colombes (FR)
Representative:	Arkema Patent Arkema France DRD-DPI 420, rue d'Estienne d'Orves 92705 Colombes Cedex (FR)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 27 February 2020 concerning maintenance of the**

European Patent No. 2566930 in amended form, Article 101(3)(a) EPC.

Composition of the Board:

Chairwoman	R. Pérez Carlón
Members:	M. Kollmannsberger
	T. Bokor

Summary of Facts and Submissions

I. Opponent 2 ("the appellant") filed an appeal against the Opposition Division's interlocutory decision that the disputed patent can be maintained in the form of the patentee's main request filed during opposition proceedings, Article 101(3)(a) EPC.

II. The following documents are referred to in this decision:

D13: WO 2005/108522

D25: EC Preparatory Studies for Eco-Design Requirements of EUPs, Tender TREN/D1/40-2005, LOT13: Domestic Refrigerators and Freezers

III. In its decision the Opposition Division came to the conclusion that the patent as amended had a basis in the original disclosure (Article 123(2) EPC) and the amendments did not introduce a lack of clarity (Article 84 EPC). Novelty was acknowledged, Article 54 EPC. Inventive step, Article 56 EPC, was assessed starting from D13 as closest prior art and was likewise acknowledged.

IV. The appellant requested the impugned decision to be set aside and the patent to be revoked.

In its statement setting out the grounds of appeal, and throughout the appeal proceedings the appellant submitted, among other objections, that the uses defined in the independent claims of the requests on file lacked an inventive step over that disclosed in document D13. The use of the mixture of fluorocarbons

as defined in these claims was an obvious alternative to the uses disclosed in D13.

V. The patent proprietor ("the respondent") agreed with the Opposition Division's decision that the use of the mixture of fluorocarbons as defined in the sole claim of the requests on file involved an inventive step. It was a non-obvious alternative to the teaching of D13 which could not be derived by a skilled person from the cited prior art.

In its reply to opponent 2's appeal the respondent requested the appeal to be dismissed, or the patent to be maintained in amended form based on the claims of the auxiliary requests underlying the impugned decision. In the course of the appeal proceedings some of these requests were withdrawn so that the respondent's final request was to maintain the patent in amended form with the claims of the main request filed on 24 February 2023 or of one of auxiliary requests 1-5 filed on the same date.

VI. The respondent's claim sets for maintenance of the patent in amended form consist of one claim each which are worded as follows (~~deletions~~ and additions are highlighted with respect to the claim of the main request):

Main request:

"*Use of a composition of 42% by weight of HFC-134a and 58% by weight of HFO-1234ze in a medium temperature refrigeration system having an evaporator temperature of from -18°C to 2°C, and a condenser temperature of from 27°C to 66°C wherein said HFO-1234ze consists essentially of trans-HFO-1234ze.*"

First auxiliary request:

"*Use of a composition of 42% by weight of HFC-134a and 58% by weight of HFO-1234ze as a replacement for HFC-134a in a medium temperature refrigeration system having an evaporator temperature of from -18°C to 2°C, and a condenser temperature of from 27°C to 66°C wherein said HFO-1234ze consists essentially of trans-HFO-1234ze.*"

Second auxiliary request:

"Use of a composition of 42% by weight of HFC-134a and 58% by weight of HFO-1234ze as a replacement for HFC-134a in a medium temperature refrigeration system having an evaporator temperature of ~~from -18°C to 2°C~~ about 7°C, and a condenser temperature of ~~from 27°C to 66°C~~ about 54°C wherein said HFO-1234ze consists essentially of trans-HFO-1234ze."

Third auxiliary request:

"*Use of a composition consisting of 42% by weight of HFC-134a and 58% by weight of HFO-1234ze in a medium temperature refrigeration system having an evaporator temperature of from -18°C to 2°C, and a condenser temperature of from 27°C to 66°C wherein said HFO-1234ze consists essentially of trans-HFO-1234ze.*"

Fourth auxiliary request:

"*Use of a composition consisting of 42% by weight of HFC-134a and 58% by weight of HFO-1234ze as a replacement for HFC-134a in a medium temperature refrigeration system having an evaporator temperature*

of from -18°C to 2°C, and a condenser temperature of from 27°C to 66°C wherein said HFO-1234ze consists essentially of trans-HFO-1234ze."

Fifth auxiliary request:

"Use of a composition consisting of 42% by weight of HFC-134a and 58% by weight of HFO-1234ze as a replacement for HFC-134a in a medium temperature refrigeration system having an evaporator temperature of ~~from -18°C to 2°C~~ about 7°C, and a condenser temperature of ~~from 27°C to 66°C~~ about 54°C wherein said HFO-1234ze consists essentially of trans-HFO-1234ze."

VII. With summons of 29 April 2022 the parties were summoned to oral proceedings.

VIII. On 23 September 2022 the Board issued a communication under Article 15(1) RPBA 2020 with its preliminary view that the use of the composition as defined in the independent claims of all requests appeared to be an obvious alternative to the use of the compositions taught in D13.

IX. Oral proceedings were held on 28 February 2023, at the end of which the Board's decision was announced.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. Inventive step (Article 56 EPC)

2.1 The patent deals with compositions containing hydrofluorocarbons for use in domestic refrigeration systems. In particular it deals with compositions that can be used in refrigeration systems that heretofore had used pure HFC-134a as refrigerant, the (partial) replacement of which is beneficial in achieving compositions having a lower global warming potential (GWP), see paragraphs [0003], [0012] and [0023] of the patent specification.

The claim of the main request is directed to the use of a composition of 42% by weight HFC-134a and 58% by weight trans-HFO-1234ze in a medium temperature refrigeration system. The evaporator and condenser temperatures of the refrigeration system are required to be -18°C to 2°C and 27°C to 56°C, respectively.

2.2 Closest prior art

It was undisputed that D13 was the closest prior art.

D13 deals with mixtures of HFO-1234ze and other hydrofluorocarbons, including HFC-134a. These mixtures are said to be "azeotrope-like" and to have a variety of uses, see page 19, line 30, to page 20, line 4, i.a. as heat transfer compositions in residential refrigerators, see page 20, lines 2 to 3. In particular they can be used to replace HFC-134a in refrigeration systems since the operating parameters are said to be similar, see the passage starting on page 22, lines 6. The replacement of some hydrofluorocarbons is said to be beneficial to obtain compositions with lower global warming potentials, see page 1, lines 19-24. Thus, D13 is directed to the same purpose as the disputed patent.

2.3 Differences of the claimed use with respect to D13

The respondent defined two differences of the claimed use versus the disclosure of D13. The first one is the composition as such, the second one the evaporator temperature of the refrigeration system.

2.3.1 In the framework of the inventive step discussion the parties agreed that the specific composition of 42% by weight HFC-134a and 58% by weight trans-HFO-1234ze defined in the claims was not disclosed in D13. Thus, this distinguishing feature was undisputed.

The specific disclosure in D13 coming closest to the composition defined in the claim is the binary composition of 40 wt.% HFC-134a and 60 wt.% trans-HFO-1234ze disclosed as end-point of a range on page 9, lines 18-20, and in claim 4. This was likewise undisputed.

2.3.2 Regarding the refrigeration system the parties agreed that evaporator and condenser temperatures are not explicitly mentioned in D13.

For the inventive step assessment the Board assumes, in the respondent's favour, that a residential refrigerator may also be operated outside the claimed temperature range.

2.4 Objective technical problem and its solution

Starting from D13 the objective technical problem to be solved was the provision of an alternative to the use of a composition of 40% by weight of HFC-134a and 60% by weight of HFO-1234ze in a medium temperature refrigeration system.

This was the parties' view throughout the procedure; no improvements were invoked.

The proposed solution is the use of a composition of 42% by weight HFC-134a and 58% by weight trans-HFO-1234ze in a medium temperature refrigeration system with evaporator and condenser temperatures as defined in the claim.

That the problem is solved by the claimed use was undisputed.

2.5 Obviousness of the solution

2.5.1 As outlined above, D13 proposes a variety of azeotrope-like mixtures of HFC-134a and several hydrofluorocarbons that may replace pure HFC-134a in a number of applications.

2.5.2 The compositions as such are disclosed in D13 in a broad sense on page 7, lines 30 and following where it is stated that the compositions may consist essentially of *"from greater than zero to about 99 wt% of HFO-1234, preferably trans-HFO-1234ze"*, and, accordingly, from about 1 wt.% to less than 100 wt.% of one or more components selected from four hydrofluorocarbons, among them HFC-134a.

Mixtures specifically of trans-HFO-1234ze and HFC-134a are disclosed on page 9 lines 10 and following, starting from zero to 75 wt.% of trans-HFO-1234ze to 5 to 35 wt.% of trans-HFO-1234ze, in increasing preference. Example 1 investigates the azeotropic behaviour of binary mixtures by measuring their boiling points. These mixtures contain from 100 wt.% to 51.05

wt.% of HFC-134a, corresponding to zero to 48.95 wt.% of trans-HFO-1234ze.

2.5.3 Starting from the disclosure of a binary composition of 40 wt.% HFC-134a and 60 wt.% trans-HFO-1234ze on page 9 lines 18-20 and in claim 4, a skilled person seeking an alternative would have considered small changes in the component's proportions such as increasing the amount of HFC-134a from 40 wt.% to 42 wt.% and reducing the amount of trans-HFO-1234ze from 60 wt.% to 58 wt.% and would thus have arrived at the composition defined in the claim.

The claimed composition is inside the range of zero to 75 wt.% trans-HFO-1234ze disclosed in D13, page 9, lines 10 to 25. This range is already disclosed as being preferred. Being inside the general concentration ranges disclosed in D13 as being suitable, a skilled person would have seen the composition defined in the claim as an obvious alternative to the ones explicitly disclosed therein. In particular, when comparing with the ratio of 40/60 explicitly disclosed in D13, a skilled person would have seen a ratio of 42/58 of the required components as being equally suitable.

2.5.4 The selection of the evaporator and condenser temperatures defined in the claim is straightforward.

D13 mentions residential refrigerator systems in claim 34 and in the corresponding passage on page 19 line 20 to page 20 line 4.

Fresh food compartments of residential refrigerators are, according to international standards, to remain at a maximum of 4°C. The appellant referred to D25 which lists the corresponding AS/NZS, ANSI/AHAM and ISO/EN

standards in table 1.2 on pages 36/37. Since the parties agreed on the fact that the evaporator temperature is around 5°C below the operating temperature of the compartment, the evaporator temperature of a residential refrigeration system according to the standards listed in this table is inside the range defined in the claim, which is from -18°C to 2°C.

The respondent referred to the ISO entry in table 1.2 of D25, mentioning a temperature interval of (0-8)°C. It argued that the operating temperature of the compartment is not necessarily 4°C. However, it is clear from footnote 12 that the *average* temperature in operating conditions is 4°C.

The respondent referred to table 1.1 of D25 where it is stated that household refrigerators/chillers of category 2 may have compartments operated at 5°C *and/or at 10°C*. Operating the compartment at 10°C would result in an evaporator temperature outside the claimed range.

However, even if one accepted this to be true the evaporator temperatures defined in the claim are at most the result of a selection of one out of two known equally suitable possibilities. A skilled person would have made such a selection without any inventive activity.

It was undisputed that the condenser of such a refrigeration system is necessarily operated in a temperature range of of 27°C to 66°C as defined in the claim.

2.5.5 The respondent has brought forward a number of arguments why a skilled person would not have chosen

the composition of 42% by weight HFC-134a and 58% by weight trans-HFO-1234ze for use in a medium temperature refrigeration system. However, these arguments are not convincing, for the reasons set out below.

2.5.6 The respondent argued that a skilled person would have looked at D13 in a more general way. From the different levels of preferences in the paragraph on page 9, D13 preferred compositions in which the HFC-134a was the major component, whereas it was the minor component in the composition used in the claim. The only example of D13 containing the components of the mixture used in the claim, example 1, investigated the azeotropic behaviour only of compositions in which HFC-134a was the *major* component. Thus, a skilled person had no motivation to choose a composition from the generic teaching of D13 in which HFC-134a was the *minor* component.

However, the skilled person is not looking for a preferred, or for the most preferred composition in D13. The skilled person is looking for an alternative composition that can be used in the same way as the ones that are specifically mentioned in D13. A skilled person may have deduced from D13 that the authors of D13 preferred compositions in which trans-HFO-1234ze was the major component. However, the teaching of D13 is not limited to those most preferred compositions in which trans-HFO-1234ze is the major component. D13 also teaches that compositions comprising "*more preferably*" 0 to 60 wt.% trans-HFO-1234ze and 40 to 100 wt.% HFC-134a are suitable, see page 9 lines 18-20. The teaching of D13 cannot be reduced to its most preferred embodiments, ignoring the rest of its disclosure. The claimed composition is suitable for the intended use according to D13.

2.5.7 The respondent argued that D13 did not disclose a list of equally suitable alternatives from which a skilled person could chose one. D13 disclosed different levels of preference, as set out on page 9 where the different ranges were labelled as "*preferably*", "*more preferably*", "*even more preferably*", and "*most preferably*". A skilled person looking for alternatives to the specific compositions disclosed would stay at the same level of preference.

Compositions comprising 0 to 60 wt.% trans-HFO-1234ze and 40 to 100 wt.% HFC-134a are labelled "*more preferably*" in the passage on page 9. Starting from a composition of 60 wt.% trans-HFO-1234ze and 40 wt.% HFC-134a and arriving at a composition containing 58 wt.% trans-HFO-1234ze and 42 wt.% HFC-134a a skilled person would remain in the same level of preference.

2.5.8 The respondent argued that a skilled person *could* have come up with the composition used in the claim, however, there was no reason to think that they *would* have arrived at it. There was no motivation to specifically select a weight ratio of 42/58.

What a skilled person *could* or *would* do is related to the technical problem for which a solution needs to be found. If, as in the present case, the skilled person is looking for a suitable alternative to the compositions specifically disclosed in D13 it *would* consider compositions taught in D13 as suitable, including one with the weight ratio 42/58. It is irrelevant whether additionally other equally obvious suitable choices exist. This may be different if the skilled person was trying to achieve a certain effect by selecting specific compositions from the generic

teaching of D13. However, no such effects have been alleged or substantiated.

2.5.9 Finally, the respondent argued that an inventive selection was made in combining the specific composition, out of the less preferred ranges taught in D13, and its use in medium temperature refrigerators, which was taken from a list of possible uses in claim 34 of D13 and in the corresponding passage on page 19, line 20, to page 20, line 4.

It is correct that the composition as defined in the claims is not specifically mentioned in combination with medium temperature refrigerators in D13. However, D13 does not disclose any of the compositions mentioned therein as being particularly suitable, or less suitable, for one or another of the uses described. The passages in which the possible uses of the compositions are explained, starting on page 19, line 30, and extending until the start of the example section on page 26, do not relate any particular composition or groups of compositions to any particular use. Thus, a skilled person would derive from D13 the teaching that all the compositions disclosed are suitable for all of the disclosed uses.

The selection of the composition and its use as defined in the claim is thus an arbitrary one that would have been made by a skilled person without inventive activity.

2.6 In summary, the claim defines an obvious solution to the technical problem of providing an alternative composition for a medium temperature refrigeration system. The claimed use lacks an inventive step.

Auxiliary requests

3. Inventive step

Auxiliary requests 1 to 5 correspond to auxiliary requests 4, 5 and 9 to 11 filed with the respondent's reply to the opponent's grounds for appeal.

It is apparent from the respondent's explanation of these requests that they were submitted in order to address objections under Article 123(2) EPC. No arguments were submitted why these requests would change the inventive step assessment with respect to the claim of the main request. During oral proceedings this was not disputed.

Thus, the assessment of the claims of the auxiliary requests must lead to the same result as for the claim of the main request.

4. In summary, none of the uses defined in the independent claims of the requests submitted by the respondent fulfils the requirement of inventive step, Article 56 EPC. The patent is to be revoked under Article 101(3)(b) EPC.

Order

For these reasons it is decided that:

The decision under appeal is set aside.

The patent is revoked.

The Registrar: The Chair:

C. Rodríguez Rodríguez R. Pérez Carlón

Decision electronically authenticated