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Datasheet for the decision of 8 July 2021

Case Number: T 1986/18 - 3.3.09

Application Number: 08744559.9

Publication Number: 2129713

IPC: C08J9/00, C08J9/14

Language of the proceedings: EN

Title of invention:
BLOWING AGENT COMPOSITION OF HYDROCHLOROFLUOROOLEFIN AND HYDROFLUOROOLEFIN, AND PROCESS OF FORMING THERMOSETTING FOAM

Patent Proprietor:
Arkema, Inc.

Opponents:
Honeywell International Inc.
Solvay Fluor GmbH

Headword:
Blowing agent/ARKEMA

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (no)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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Case Number: T 1986/18 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 8 July 2021

Appellant: (Patent Proprietor)	Arkema, Inc. 2000 Market Street Philadelphia, Pennsylvania 19103 (US)
Representative:	Casalonga Casalonga & Partners Bayerstraße 71/73 80335 München (DE)
Respondent: (Opponent 1)	Honeywell International Inc. 101 Columbia Road Morristown NJ 07962-2245 (US)
Representative:	Crooks, Elizabeth Caroline Kilburn & Strode LLP Lacon London 84 Theobalds Road London WC1X 8NL (GB)
Respondent: (Opponent 2)	Solvay Fluor GmbH Hans-Böckler-Allee 20 30173 Hannover (DE)
Representative:	Valentino, Cédric Rhodia Operations IAM 85 Avenue des Frères Perret 69190 Saint-Fons (FR)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 15 June 2018 revoking European patent No. 2129713 pursuant to Articles 101(2) and 101(3)(b) EPC.**

Composition of the Board:

Chairman	A. Haderlein
Members:	M. Ansorge
	F. Blumer

Summary of Facts and Submissions

I. The appeal was filed by the patent proprietor (appellant) against the opposition division's decision revoking European patent No. 2 129 713.

II. With their notices of opposition, opponents 1 and 2 had requested that the patent be revoked in particular on the ground for opposition under Article 100(a) EPC (lack of inventive step).

III. In the present decision, reference is made to the following document:

D3: WO 2007/002703 A2

IV. Claims 1 and 7 of the patent as granted read as follows:

"1. A polymer blowing agent composition for thermosetting foams comprising (a) at least one hydrofluoroolefin in combination with (b) at least one hydrochlorofluoroolefin (HCFO), selected from HCFO-1223, (dichlorotrifluoropropene) HCFO-1233zd, (1-chloro-3,3,3-trifluoropropene) HCFO-1233xf (2-chloro-3,3,3-trifluoropropene) and mixtures thereof."

"7. A process of forming a thermosetting foam comprising mixing polyurethane foam components with a foam blowing agent comprising (a) at least one hydrofluoroolefin in combination with (b) at least one hydrochlorofluoroolefin (HCFO), selected from HCFO-1223, HCFO-1233zd, HCFO-1233xf and mixtures thereof."

V. The opposition division decided that none of the requests before the opposition division, including the claims of the patent as granted (main request), met the requirements of the EPC; in particular, it concluded that the claimed subject-matter lacked inventive step in view of D3 as the closest prior art.

VI. The former opponent 1 had withdrawn its opposition and thus ceased to be a party to the proceedings.

VII. Opponent 2 (respondent) did not file a reply to the statement of grounds of appeal.

VIII. The board issued a communication pursuant to Rule 100(2) EPC indicating its preliminary opinion that the subject-matter claimed in the main request and in auxiliary requests 1 to 8 filed with the grounds of appeal did not involve an inventive step in view of D3 as the closest prior art, thus confirming the opposition division's conclusion.

IX. By a subsequent letter, the appellant withdrew its request for oral proceedings.

X. The appellant's arguments, as far as relevant to the decision, are reflected in the reasoning below.

XI. Claim 1 of the main request (patent as granted) and claim 1 of auxiliary request 1 are identical (see point IV above).

Claim 1 of auxiliary requests 2 and 3 differs from claim 1 of the main request in that the feature "wherein said hydrofluoroolefin comprises HFO-1234ze in

an amount of 5 wt% or more of said polymer blowing agent composition" is added at the end of the claim.

Claim 1 of auxiliary requests 4 and 5 differs from claim 1 of auxiliary request 2 in that the term "an amount of 5 wt% or more" is amended to "an amount of more than 5 wt%".

Claim 1 of auxiliary request 6 is identical to claim 7 of the patent as granted (see point IV above).

Claim 1 of auxiliary request 7 differs from claim 1 of auxiliary request 6 in that the feature "wherein said hydrofluoroolefin comprises HFO-1234ze in an amount of 5 wt% or more of said polymer blowing agent composition" is added at the end of the claim.

Claim 1 of auxiliary request 8 differs from claim 1 of auxiliary request 7 in that the term "an amount of 5 wt% or more" is amended to "an amount of more than 5 wt%".

XII. Requests

The appellant requested that the decision be set aside and that the patent be maintained as granted (main request) or, as an auxiliary measure, be maintained on the basis of one of auxiliary requests 1 to 8 filed with the statement of grounds of appeal.

Reasons for the Decision

MAIN REQUEST (patent as granted)

1. Inventive step

1.1 The appellant, in line with the opposition division, considered D3 as the closest prior art and provided a problem-solution approach starting from example 6 of D3. The board does not see any reason to disagree with the choice of example 6 of D3 as the closest prior art.

1.2 Example 6 of D3 relates to the formation of a thermosetting foam comprising mixing polyurethane foam components with "HFCO-1233zd" (being simply another designation for "HCFO-1233zd" as mentioned in claim 1) as the sole blowing agent.

1.3 The subject-matter of claim 1 of the main request differs from example 6 of D3 in that a **hydrofluoroolefin (HFO**) is used in combination with at least one hydrochlorofluoroolefin (HCFO), selected from HCFO-1223, HCFO-1233zd, HCFO-1233xf and mixtures thereof, as the blowing agent, whereas in example 6 HCFO-1233zd is used as the sole blowing agent.

1.4 The appellant is of the opinion that there is an effect (improved volume change) resulting from this difference over example 6 of D3, as supported by the graph submitted during the examination proceedings on 21 October 2011, which portrays the volume change achieved for samples A to D shown in Table 4 of the patent (hereinafter referred to as "graph"). Samples A to D of Table 4 of the patent relate to experiments

using only HFO-1234ze (sample A), a mixture of HFO-1234ze and HCFO-1233zd (samples B and C) and HCFO-1233zd alone (sample D) as the blowing agent.

1.5 The board is not convinced for the following reasons:

1.5.1 Although no comparative data explicitly reworking example 6 of D3 and comparing it with a composition according to the invention were provided, sample D as shown in Table 4 of the patent is similar to this example 6 of D3, since it also contains HCFO-1233zd as the sole blowing agent. Thus it is considered to be representative of example 6 of D3.

1.5.2 However, the graph is not suited for demonstrating that an improved volume change is achieved over example 6 of D3.

In this context, the board is not convinced that the line drawn between the points for samples A and D (reflecting only single compounds) of the graph is in fact what a skilled person would expect to happen for a binary mixture of these two compounds. In the board's view, a binary mixture typically shows a more complex and non-linear relation. In any event, as set out below this is not decisive.

1.5.3 As correctly outlined by the opposition division, what is decisive is whether there is an effect compared with the blowing agent according to example 6 of D3 over the entire breadth of claim 1. As set out below, this is not the case.

The blowing agent of example 6 of D3, which can be considered to correspond to sample D of the patent (0 mol % HFO-1234ze and 100 mol % HCFO-1233zd) in the

graph, leads to a higher volume change compared to sample B (about 90 mol % HFO-1234ze and about 10 mol % HCFO-1233zd). Since sample B falls within the scope of claim 1 of the main request and leads to worse results compared to sample D (reflecting example 6 of D3), no improvement can be acknowledged over the whole range claimed. In this context, it is immaterial that sample C (about 10 mol % HFO-1234ze and 90 mol % HCFO-1233zd) provides a higher value, since the claimed subject-matter is not limited to such a mixture.

1.5.4 Moreover, the board does not see that there is any bonus effect. A line drawn between the two points for samples A and D (relating to two single compounds) is not a realistic simulation of what a skilled person would expect to happen in a binary system (samples B and C). Thus it cannot be accepted as being a surprising finding, as alleged by the appellant, that samples B and C lead to a volume change above an arbitrary line drawn between samples A and D.

1.6 Thus the objective technical problem in view of D3 is to provide an alternative blowing agent for thermosetting foams.

1.7 With respect to obviousness, the board observes as follows:

1.7.1 D3 discloses that one or more compounds of Formula I (XCF_zR_{3-z}) can be used as blowing agent (see page 7, first paragraph, paragraph bridging pages 9 and 10 and page 13, last paragraph). HFO-1234 and "HFO-1233zd" (another designation for HCFO-1233zd mentioned in claim 1) are mentioned in D3 as preferred compounds falling within Formula I (see page 7, lines 21 to 24 of D3). D3 further mentions that the

compositions may comprise HFO-1234ze (see page 8, lines 2 to 9, page 11, second paragraph and page 12, third paragraph of D3).

In the light of the less-ambitious objective technical problem, there is no need for a particular pointer towards using a specific combination of HCFO-1233zd and an HFO such as HFO-1234ze as the blowing agent. A skilled person having knowledge of D3 would contemplate a blowing agent comprising HCFO-1233zd (as used in example 6) in combination with HFO-1234ze, both falling within Formula I, as suited to solving the objective technical problem of providing an alternative blowing agent.

1.7.2 In this context, the appellant argued that on page 7, lines 21 to 24 of D3 HFO-1234 and HCFO-1233 are disclosed on the same level and there is no disclosure in D3 for the combination of both. However, in the absence of any effect resulting from the distinguishing feature, no particular motivation is required to contemplate the combination of these two blowing agents which are explicitly disclosed in D3. More importantly, D3 clearly teaches that more than one compound of Formula I may be used, so a combination of two or more compounds of Formula I is clearly envisaged in D3. Thus the board cannot concur with the appellant in this respect.

1.7.3 The appellant further argued that on page 14, last paragraph of D3 HFO-1234ze is disclosed as a preferred blowing agent, but no HCFO is mentioned as a co-blowing agent. For the same reasons as given above, this is not necessary either, since the presence of one or more compounds of Formula I is clearly taught in D3 (see for

instance page 7, first paragraph of D3). Thus this argument too must fail.

1.8 In view of the above, the subject-matter of claim 1 of the main request does not involve an inventive step in view of D3 as the closest prior art.

1.9 Claim 7 of the main request relates to a process of forming a thermosetting foam comprising mixing polyurethane foam components with a foam blowing agent, the latter being the same as defined in claim 1 of the main request.

However, example 6 of D3 already discloses a process of forming a thermosetting foam comprising mixing polyurethane foam components with a foam blowing agent, i.e. discloses the process features of claim 7 of the main request. As explained in relation to claim 1 of the main request, it is obvious to a skilled person to contemplate the mixture of blowing agents required in claim 1 (and also by analogy in claim 7).

Thus the process of claim 7 of the main request does not involve an inventive step in view of D3 either.

AUXILIARY REQUESTS

2. The subject-matter of claim 1 of auxiliary request 1 corresponds to that of claim 1 of the main request. It therefore does not involve an inventive step in view of D3 for the same reasons as outlined for claim 1 of the main request.

3. As outlined above in relation to the main request, it is obvious to a skilled person to use HFO-1234ze in combination with HCFO-1233zd as blowing agent. As the

problem to be solved is still the provision of an alternative blowing agent, it is obvious to use a hydrofluoroolefin comprising HFO-1234ze in an amount of 5 wt% or more in view of page 16, lines 18 to 31 of D3, which teaches that the blowing agents may be present in an amount of preferably at least about 5 wt% and even more preferably at least about 15 wt% of the composition. This amount of blowing agent as taught in D3 corresponds to or lies within the range defined in claim 1 of auxiliary requests 2 to 5.

Thus the subject-matter of claim 1 of auxiliary requests 2 to 5 does not involve an inventive step in view of D3 as the closest prior art.

4. The subject-matter of claim 1 of auxiliary request 6 corresponds to that of claim 7 of the main request. It therefore does not involve an inventive step in view of D3 for the same reasons as outlined for claim 7 of the main request.

5. Claim 1 of auxiliary requests 7 and 8 relates to a process of forming a thermosetting foam and is based on the process of claim 1 of auxiliary request 6 (identical to claim 7 of the patent as granted). It includes the same limitations directed to the blowing agent as in claim 1 of auxiliary requests 2 and 4, respectively. Thus auxiliary requests 7 and 8 fall for the same reasons as given for claim 1 of auxiliary request 6 and claim 1 of auxiliary requests 2 and 4.

Thus the subject-matter of claim 1 of auxiliary requests 7 and 8 does not involve an inventive step in view of D3 as the closest prior art.

6. In view of the above, there is no allowable request on file.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

A. Nielsen-Hannerup A. Haderlein

Decision electronically authenticated