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Datasheet for the decision of 23 June 2017

Case Number: T 1812/14 - 3.2.03

Application Number: 08724978.5

Publication Number: 2126239

IPC: E04C1/00, B32B5/18, B32B27/40

Language of the proceedings: EN

Title of invention:
HIGH DENSITY POLYURETHANE AND POLYISOCYANURATE CONSTRUCTION BOARDS AND COMPOSITE BOARDS

Applicant:
Firestone Building Products, LLC.

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - obvious modification

Decisions cited:
T 0002/83

Catchword:

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Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 1812/14 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 23 June 2017

Appellant: (Applicant)	Firestone Building Products, LLC. 250 W. 96th Street Indianapolis, Indiana 46260 (US)
Representative:	Beckmann, Claus Kraus & Weisert Patentanwälte PartGmbB Thomas-Wimmer-Ring 15 80539 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 14 February 2014 refusing European patent application No. 08724978.5 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	G. Ashley
Members:	B. Miller
	E. Kossonakou

Summary of Facts and Submissions

I. The appellant (applicant) appealed the decision of the examining division to refuse European patent application No.08 724 978.

II. The decision of the examining division was based on the finding that the subject-matter of independent claims 1, 2 and 4 filed with the letter of 11 May 2011 lacked an inventive step.

III. The appellant requested that the decision be set aside and a patent be granted on the basis of the set of claims filed on 7 June 2017.

IV. The independent claims of the sole request read as follows:

Claim 1

"A covered low-slope or flat roof comprising:
(a) a roof deck;
(b) an optional insulation board including a polyurethane, a polyisocyanurate, or a mix of polyurethane and polyisocyanurate cellular structure having a density that is less than 40 kg/m^3 (2.5 pounds per cubic foot);
(c) a coverboard including a polyisocyanurate or a mix of polyurethane and polyisocyanurate cellular structure, where the cellular structure has a density greater than about 40 kg/m^3 (2.5 pounds per cubic foot), an ISO index of at least 270, and includes at least 5.0 weight percent flame retardant based on the weight of the cellular structure; and
(d) a membrane."

Claim 2:

"A method of re-roofing a low-slope or flat roof, the method comprising:
(a) applying a re-coverboard to an existing covered low-slope or flat roof, wherein the re-coverboard includes a polyisocyanurate or a mix of polyurethane and polyisocyanurate cellular structure, where the cellular structure has a density greater than about 40 kg/m^3 (2.5 pounds per cubic foot), an ISO index of at least 270, and includes at least 18 parts by weight flame retardant per l00 parts by weight polyol and
(b) applying a membrane to the re-coverboard subsequent to the step of applying a re-coverboard."

Claim 4:

"A composite construction board comprising:
a cellular body including at least one planar surface, where the cellular body includes a polyisocyanurate or a mix of polyurethane and polyisocyanurate cellular structure, where the cellular structure has a density greater than about 40 kg/m^3 (2.5 pounds per cubic foot), an ISO index of at least 270, and where the cellular body includes at least 5.0% by weight flame retardant based on the weight of the cellular body; and at least one facer adjacent to said at least one planar surface."

Dependent claims 3 and 5 to 10 concern preferred embodiments.

V. Prior art

The following prior art was cited in the examination proceedings and is of relevance for this decision:

D1: US-A-2006/179749
D3: WO-A-98/15406
D6: "High density polyisocyanurate insulation", 2005, retrieved from the Internet: http://www.prestigepanel.com/production/mousse/mousse_en.htm.

The following document has been cited by the appellant in the appeal proceedings:

D7: James T. Lyon, Robert E. Riley "Effective Use of Compatibilizers to Achieve Resin Stability with Hydrocarbon Blowing Agents", Polyurethanes EXPO 2002, pages 41 to 48

VI. The appellant's arguments may be summarised as follows.

Starting from D1 the skilled person had no motivation to modify the prior art teaching so as to arrive at the claimed invention.

While Dl taught the benefits of a high density board, Dl failed to teach or appreciate that the flammability of the board increased with density.

The discovery of the unexpected problem alone meant that the invention was not obvious (T2/83, page 3 of the reasons).

The inventors found that, upon increasing the amount of flame retardant, the strength of the board

deleteriously decreased. The prior art did not suggest that this problem could be overcome by using a cellular material having an ISO index of at least 270.

Reasons for the Decision

1. Article 56 EPC

1.1 The problems set out in paragraphs [0002]-[0008] of the present application, namely providing a high density insulation board including a polyisocyanurate cellular structure, are the same as those addressed in paragraphs [0002]-[0008] of D1.

D1 therefore deals with the same problem as the present application and is considered as the closest prior art.

1.2 D1 (claim 1) discloses a covered low-slope or flat roof comprising:

(a) a roof deck;

(b) an optional insulation board including a polyurethane or a polyisocyanurate cellular structure having a density that is less than 40 kg/m^3 (2.5 pounds per cubic foot);

(c) a coverboard including a polyurethane or a polyisocyanurate cellular structure, where the cellular structure has a density greater than about 40 kg/m^3 (2.5 pounds per cubic foot); and

(d) a membrane.

Corresponding coverboards are also described in the examples of D1.

1.3 The subject-matter of claim 1 differs from the roof described in D1 in that the cellular structure

a) has an ISO index of at least 270 and

b) comprises at least 5.0 weight percent flame retardant based on the weight of the cellular structure.

1.4 The ISO index (MDI/polyol ratio) correlates with the stiffness of the polyisocyanurate and the amount of flame retardant has an effect on the flame retardancy.

The present application does not demonstrate any unexpected or surprising effect linked to these features. In paragraphs [0030] and [0031] of the application the ISO index and the amount of the flame retardant are presented as possible embodiments without any hint of possible technical effects or advantages achieved by the choice of the individual parameters or by the combination of these features.

In the single example of the application no technical teaching can be found linking the choice of a cellular structure having an ISO index of at least 270 and comprising at least 5.0 weight percent flame retardant to a specific technical effect. The example on file neither indicates the ISO index nor shows any results concerning the flammability of the coverboard.

Therefore an interrelation between the two parameters is not shown in the application and has not been rendered plausible by the appellant.

1.4.1 Both features are open-end ranges (at least 5 wt.-%, ISO index of at least 270). In view of the open-range type definitions it is also not discernible how a balancing of the parameters can be significant for achieving a certain effect.

1.4.2 The appellant argued that the inventors have surprisingly realised that by increasing the density of coverboards, i.e. by using less of the inflammable blowing agent, the flammability nevertheless increased. By reference to T2/83 (page 3 of the reasons) it concluded that the discovery of the unexpected problem already meant that the invention was not obvious.

However, the Board observes that the present application does not mention this problem, and does not teach that the higher flammability of high density boards could be compensated for by the use of at least 5 wt.-% of flame retardant.

The Board accepts that it is known in the art that an increase of the amount of flame retardant increases the flame retardance and that the stability of polyisocyanurate increases with an increase of the ISO index (MDI/polyol ratio).

The objective technical problem to be solved by claim 1 can therefore be seen as to provide a roof having
i) improved mechanical stability and
ii) a sufficient flame retardance.

1.5 concerning partial problem i)

D1 suggests in paragraph [0031] that the coverboards can be manufactured by using known techniques for

producing polyurethane or polyisocyanurate insulation boards.
D1, however, does not specify the ISO index of the coverboards.

It is generally known that the stiffness and thus the mechanical stability of polyisocyanurate increases with an increase of the ISO index (MDI/polyol ratio). This fact is confirmed by e.g. D6 (page 1, first section, list of advantages).

Moreover, it is common practice in the art to use rigid, high density coverboards made from polyurethane or polyisocyanurate having an ISO index up to 400 as roofing material as evidenced by D3 (table 1).

These facts have not been contested by the appellant.

In case the mechanical stability of the coverboard of D1 is not high enough, it comes within the experimental routine of the skilled person to use a stiffer material such as polyisocyanurates, which are known in the art for their higher stiffness compared to polyurethanes, see D6 (page 1, first section, list of advantages).

Using conventional polyisocyanurates having an arbitrarily selected ISO index of at least 270 to achieve an intended or required minimum stability comes within the experimental routine of the skilled person.

1.6 concerning partial problem ii)

D1 already suggests in paragraph [0042] that the coverboards may contain a flame retardant.

The applicant argued that D1 does not contain any concrete teaching concerning the amounts of flame retardant to be used and therefore provides no motivation to select at least 5 wt.-% thereof.

However, the Board observes that in the examples of D1 it is taught that the coverboards of D1 meet the requirements of the flame spread test UL 790, which is the same test as used in the examples of the present application. Therefore the skilled person starting from D1 would pay attention to the flame spread properties and would determine the required amount of flame retardant agent.

Determining by trial and error an appropriate minimum amount for the known functional ingredient in order to fulfil the required or intended level of flame retardance or using an arbitrarily selected amount of flame retardant comes within the customary practice of the skilled person.

The appellant argued in this respect that the skilled person conventionally used only 3 wt.-% of flame retardant as evidenced by the formulations presented on page 48 of D7.

However, exemplary formulations presented in a single document do not establish that higher amounts of flame retardant would not be considered by the skilled person. Moreover, it is known in the art as shown by D3 (table 1) that flame retardants can be used in amounts from 1 to 50 wt.-% in rigid, high density polyurethane foams for roofing products. Thus, the range of at least 5 wt.-% falls within the conventional range for the amounts of flame retardant materials in this technical field.

The Board therefore reaches the conclusion that the mere choice of an arbitrary selected minimum amount of flame retardant within the conventional range does not require any inventive step when starting from D1.

1.7 The Board therefore comes to the final conclusion that the underlying problem is solved by conventional measures with a predictable result: a stiffer material and a minimum amount of flame retardant.

The subject-matter of claim 1 is therefore considered to be obvious when starting from D1 as the closest prior art.

2. D1 also discloses a method of re-roofing (claim 8) and a composite board (claim 14) which correspond to claims 2 and 4 of the present application.

Therefore the same arguments as for claim 1 apply also for present claims 2 and 4.

3. In summary, the set of claims submitted by the appellant does not fulfil the requirements of Article 56 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Rauh G. Ashley

Decision electronically authenticated