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Datasheet for the decision of 28 April 2023

Case Number: T 3067/19 - 3.3.03

Application Number: 14739402.7

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Language of the proceedings: EN

Title of invention:
INTUMESCENT COATING COMPOSITION

Patent Proprietor:
Akzo Nobel Coatings International B.V.

Opponents:
PPG Industries, Inc.
Jotun A/S
Hempel A/S

Relevant legal provisions:
RPBA 2020 Art. 12(6) sentence 2, 13(1)
EPC Art. 56

Keyword:
Late-filed evidence - admitted (no)
Inventive step - improvement not credible
Inventive step - main and auxiliary requests (no)

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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 3067/19 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 28 April 2023

Appellant I: (Patent Proprietor)	Akzo Nobel Coatings International B.V. Christian Neefestraat 2 1077 WW Amsterdam (NL)
Representative:	Akzo Nobel IP Department Christian Neefestraat 2 1077 WW Amsterdam (NL)
Appellant II: (Opponent 1)	PPG Industries, Inc. P.O. Box 3800 West 143rd Street Cleveland, OH 44111 (US)
Representative:	Appleyard Lees IP LLP 15 Clare Road Halifax HX1 2HY (GB)
Appellant III: (Opponent 3)	Hempel A/S Lundtoftegårdsvej 91 2800 Kongens Lyngby (DK)
Representative:	Inspicos P/S Agern Allé 24 2970 Hørsholm (DK)
Party as of right: (Opponent 2)	Jotun A/S P.O. Box 2021 3202 Sandefjord (NO)
Representative:	Dehns St. Bride's House 10 Salisbury Square London EC4Y 8JD (GB)

Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted on 25 September 2019 concerning maintenance of the European Patent No. 3022264 in amended form.**

Composition of the Board:

Chairman D. Semino
Members: M. Barrère
L. Basterreix

Summary of Facts and Submissions

I. The appeals of the patent proprietor and of opponents 1 and 3 lie against the interlocutory decision of the opposition division concerning maintenance of European Patent number 3 022 264 in amended form on the basis of the claims of the auxiliary request filed with letter of 15 June 2018 and an adapted description.

II. The decision under appeal was also based on a main request filed with the same letter.

III. The following documents were *inter alia* cited in the decision of the opposition division:

C1: US 4 529 467
C2: US 5 070 119
C7: US 4 725 457
C8: WO 98/12270
C18: GB 2 269 548
C50: US 6 905 693
C51: Edward D. Weil, "Fire-Protective and Flame-Retardant Coatings - A State-of-the-Art Review", Journal of FIRE SCIENCES, VOL. 29, May 2011, pages 259, 271 and 272
D40: Experimental Report - EP 3 022 264 filed by opponent 3 with letter of 23 July 2018
E31: Additional experimental results filed by the patent proprietor with letter of 15 June 2018
E32: Additional experimental results filed by the patent proprietor with letter of 19 march 2019
E32_color: coloured version of E32

IV. In that decision the opposition division held, amongst others, that:

- The subject-matter of claim 1 of the main request lacked an inventive step over C1 as the closest prior art.

- Conversely, the subject-matter of claim 1 of the auxiliary request involved an inventive step in view of the same document.

V. The patent proprietor (appellant I) as well as opponents 1 and 3 (respectively appellants II and III) filed an appeal against said decision.

Opponent 2 is respondent/party as of right to the appeal proceedings.

For the sake of clarity, the respondent and appellants II and III will be referred to collectively as the opponents for matters relating to those three parties.

VI. With the statement of grounds of appeal, appellant I filed a set of claims as main request.

VII. The following evidence was submitted during the appeal proceedings:

D41: Ullah et al., J. of Applied Polymer Science, 2012, DOI: 10.1002/app.38318, pages 1 to 11
D41A: Epoxy resin BE-188
D40A: Experimental evidence

D41 and D41A were filed by appellant III with their statement of grounds of appeal while D40A was filed with their letter dated 19 October 2020.

VIII. Oral proceedings were held before the Board on 28 April 2023.

IX. Appellant I requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request filed with the statement of grounds of appeal. In the alternative, appellant I requested that the appeals of appellants II and III be dismissed and that the patent be maintained on the basis of the auxiliary request considered allowable by the opposition division. Appellant I further requested that the case be remitted to the opposition division, should any of the documents D40A and D41 be admitted into the proceedings.

Appellants II and III requested that the decision under appeal be set aside and that the patent be revoked.

The respondent requested that the appeal of appellant I be dismissed.

X. Claim 1 of the main request read as follows:

"1. A liquid intumescent coating composition comprising the following components:

(a) 25.0-75.0 volume % of one or more organic thermosetting polymer(s) and one or more curing agent(s) for the organic thermosetting polymer(s),

(b) 5.0-25.0 volume % of a source of phosphoric or sulphonic acid selected from one or more of sodium, potassium or ammonium phosphate or sulphate salts, and para-toluene sulphonic acid

(c) 10.0-50.0 volume % of a source of boric acid selected from one or more of boric acid, borate salts, and borosilicates,

(d) 0-2.0 volume % of melamine or melamine derivatives,

(e) 0-1.0 volume % of one or more isocyanurate derivatives,

wherein the organic thermosetting polymers do not comprise a polysiloxane, and

wherein the organic thermosetting polymer of (a) is an epoxy resin and the curing agent of (a) is selected from an amine, thiol, carboxylic acid, anhydride and/or alcohol functional curing agent,

wherein volume % is calculated on the total volume of the non-volatile components in the coating composition."

Claim 1 of the auxiliary request was limited compared to claim 1 of the main request in that the composition comprised

(d) **0** volume % of melamine or melamine derivatives and

(e) **0** volume % of isocyanurate derivatives (modifications in **bold**).

The remaining claims of these requests are not relevant to this decision.

XI. Appellant I's submissions, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. They were essentially as follows:

(a) Documents D41 and D40A

D41 and D40A should not be admitted into the proceedings.

(b) Inventive step

The subject-matter of claim 1 of the main request and of the auxiliary request involved an inventive step over C1 as the closest prior art.

XII. The opponents' submissions, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. They were essentially as follows:

(a) Documents D41 and D40A

D41 and D40A should be admitted into the proceedings.

(b) Inventive step

The subject-matter of claim 1 of the main request and of the auxiliary request lacked an inventive step over C1 as the closest prior art.

Reasons for the Decision

1. Admittance of document D41

1.1 D41 is a new item of evidence filed by appellant III with the statement of grounds of appeal. Its admission to the proceedings, which is contested by appellant I, is subject to the discretionary power of the Board in accordance with Article 12 paragraphs (4) to (6) RPBA 2020.

1.2 This document is directed to establishing that claim 1 of the auxiliary request is not inventive over C1 (see statement of grounds of appeal, section 74). According to appellant III, D41 was filed in reaction to the contested decision, in which the problem to be solved was formulated as the provision of an intumescent coating with reduced splitting after heat exposure. D41 addressed the effect of boric acid and melamine on intumescent coatings and was therefore *prima facie* relevant. Appellant III further argued that D41 was also filed in reaction to E32_colour, a document which was submitted during the oral proceedings before the opposition division.

1.3 The admittance of D41 is contested by appellant I for the following reasons (see rejoinder, sections (70) to (74)):

> the effect of reduced splitting of the coating was central to the discussion of the experiments in E31, D40 and E32, which were all in the proceedings well before the hearing. Therefore, D41 should have been submitted during opposition proceedings;
>
> E32_colour was merely a coloured version of the photographs already presented in E32. There was nothing fundamentally new about the content of

E32_colour compared to the evidence already in proceedings.

1.4 The Board notes that the effect of reduced splitting was discussed in the opposed patent (see paragraph [0125]). Furthermore said effect was clearly related to the amount of melamine. In view of this clear teaching the Board considers that if appellant III had intended to support their attack of lack of inventive step with respect to the alleged effect of melamine, they should have filed D41 during the opposition proceedings. Already on this basis D41 should not be admitted into the appeal proceedings.

Furthermore, with respect to E32_color, the Board fails to recognise in the argumentation of appellant III any explanation as to why E32_color would change the facts already presented in E32.

1.5 Under these circumstances, the Board finds it appropriate to exercise its discretion under Article 12(4) and (6) RPBA 2020 by not admitting document D41 into the proceedings.

2. Admittance of document D40A

2.1 D40A is a new experimental piece of evidence filed by appellant III with the letter dated 19 October 2020. Its admission to the proceedings, which is contested by appellant I, is subject to the discretionary power of the Board in accordance with Article 13(1) RPBA 2020.

2.2 D40A was submitted to address the argument of appellant I that tris(2-chloroethyl)phosphate (TCEP) would not correspond to a source of phosphoric or sulphonic acid (component (b)) as defined in claim 1 of the main

request (see letter of 19 October 2020, sections 19 to 22 and rejoinder of appellant III, sections 41 to 43).

2.3 The admittance of D40A is contested by appellant I for the following reasons (see letter of 21 March 2022, sections 3 to 17):

> the requests on file were submitted during the opposition proceedings. Therefore, D40A should also have been filed in the opposition proceedings;
>
> D40A is not *prima facie* relevant as it compares ammonium polyphosphate (APP) with phosphoric acid.

2.4 The Board notes that the purpose of D40A is to show that TCEP (used in the examples of C1) is equivalent to APP. However instead of TCEP, the examples of D40A use phosphoric acid. Therefore the Board agrees with appellant I that D40A is *prima facie* not suitable to resolve the issue addressed by appellant III.

2.5 Under these circumstances, the Board finds it appropriate to exercise its discretion under Article 13(1) RPBA 2020 by not admitting document D40A into the proceedings.

3. In view of the fact that D41 and D40A were not admitted into the proceedings, the conditional request for remittal of appellant I does not have to be addressed.

4. Inventive step of the main request

4.1 Closest prior art

The parties consider that the examples of C1 may be selected as the closest prior art for the subject-matter of claim 1.

The Board has no reason to depart from that view.

4.2 Technical differences

According to appellant I (see statement of grounds of appeal, paragraphs (15) and (16)), claim 1 differs from the examples of C1 (such as example I) in that the composition comprises

> (i) 5.0-25.0 volume % of a source of phosphoric or sulphonic acid (b) selected from one or more of sodium, potassium or ammonium phosphate or sulphate salts, and para-toluene sulphonic acid (instead of about 2,2 vol% of APP)
>
> (ii) 0-2.0 volume % of melamine or melamine derivatives (d) and 0-1.0 volume % of one or more isocyanurate derivatives (e)

and is

> (iii) liquid (emphases here and below added by the Board).

These alleged distinguishing features will be dealt with separately below.

4.2.1 Alleged distinguishing feature (i) (amount of component (b))

The opponents and the opposition division did not contest the fact that the composition of example I of C1 comprised less than 5 vol% of APP corresponding to a source of phosphoric acid as defined in claim 1 (component (b)). However they considered that TCEP (which was used in example I) was also a source of phosphoric acid albeit it did not fall under the definition of a component (b). Therefore, in their views, claim 1 differs from example I of C1 in that:

(i) the amount of component (b) is between 5.0 and 25.0 volume % (instead of about 2.2 vol% of APP and 5 vol% of TCEP in example I of C1)

Appellant I held that TCEP was not equivalent to a component (b) according to claim 1 (see statement of grounds of appeal, sections (39) and (43)).

However it does not seem to be contested that TCEP is also a source of phosphoric acid. As to whether TCEP is equivalent to APP (or more generally to a component (b)), the Board holds that appellant I's position is not supported by experimental evidence and is therefore not convincing.

In view of the fact that

TCEP is considered to be an alternative to APP in C1 (column 4, lines 53 to 59) as well as in C2 (column 7, lines 5-16), C7 (column 4, lines 25-36), C8 (page 8, lines 6-16), C18 (page 9, last paragraph), C50 (column 4, lines 5-21) and C51 (pages 271-272, bridging paragraph) and that

APP is a source of phosphoric acid,

the Board does not see any reason to consider that the function of TCEP is not the same as the function of APP. It is further noted that C50 and C51 teach that TCEP is a source of (phosphoric) acid (see C50, column 4, lines 5 to 21 and C51, pages 271 and 272, bridging paragraph).

Consequently the Board agrees with distinguishing feature (i) as defined by the opponents.

In other words, the Board holds that the examples of C1 comprise between 5.0 and 25.0 volume % of a source of phosphoric acid (the total amount of TCEP and APP being about 7,2 vol% in example I) but not between 5.0 and 25.0 volume % of a source of phosphoric acid which is selected from the list of possible components (b) (the amount of APP being only about 2,2 vol% in example I). This difference is particularly relevant for the selection of suitable comparative examples.

4.2.2 Alleged distinguishing features (ii) (amounts of components (d) and (e))

Distinguishing features (ii) were not substantiated by appellant I. In the present case, the Board notes that the composition of example I of C1 comprise no isocyanurate derivative (and therefore no component (e)) and about 1.4 vol% of melamine (corresponding to component (d)). It is further pointed out that neither in the opposition proceedings nor in the appeal proceedings did appellant I contest that assessment of C1. Consequently, the amounts of components (d) and (e) are not features which distinguish claim 1 from example I of C1.

4.2.3 Alleged distinguishing feature (iii) (liquid composition)

As regards the alleged distinguishing feature (iii), the Board is of the opinion that the exemplified compositions of C1 cannot be considered to be clearly and unambiguously liquid. For instance the composition of example I of C1 is a mastic which means that it is in the form of a thick, paste-like material (see column 7, lines 49-51). In the Board's view, a thick paste cannot necessarily be seen as a liquid composition since it may not be able to flow freely.

Consequently the Board agrees with distinguishing feature (iii) as defined by appellant I.

4.2.4 It is therefore concluded that claim 1 differs from example I of C1 in that:

(i) the amount of component (b) is between 5.0 and 25.0 volume % (instead of about 2.2 vol% of APP and 5 vol% of TCEP in example I of C1) and

(iii) the composition is liquid (instead of a mastic composition).

4.3 Problem to be solved

4.3.1 According to appellant I, additional examples submitted during opposition proceedings show that compositions with insufficient amounts of component (b) (corresponding to distinguishing feature (i)) are characterised by poorer crack resistance than the inventive examples. The objective problem to be solved over C1 should therefore be formulated as the provision

of an intumescent coating with an improved crack resistance in the event of a fire.

4.3.2 The opponents consider that the experimental evidence provided by appellant I is not sufficient to conclude that any improvement is achieved.

4.3.3 According to the case law of the Boards of appeal, alleged advantages to which the patent proprietor refers, without offering sufficient evidence to support the comparison with the closest prior art, cannot be taken into consideration in determining the problem underlying the invention and therefore in assessing inventive step (see Case Law of the Boards of Appeal, 10th edition 2022, I.D.4.3.1).

For the Board, it needs to be assessed whether the experimental evidence provided by appellant I is sufficient to support any alleged advantage over C1. In this respect, it is important that the comparative examples are representative of the teaching of the closest prior art.

4.3.4 Appellant I relies on the experimental evidence provided in the opposed patent, E31 and E32.

However, the patent and E32 do not investigate the effect of the amount of component (b). Therefore, the data presented therein are not relevant to support an effect linked to distinguishing feature (i).

With regard to E31, appellant I justifies the presence of a technical effect based on the comparison between:

comparative example APP1 comprising 2.0 vol% of APP (which is the amount of APP used in example I of C1) and

example APP2 comprising 5.0 vol% of APP.

However it is noted that the total amount of the source of phosphoric acid in comparative example APP1 is only 2.0 vol%. In contrast thereto, the total amount of TCEP and APP (as sources of phosphoric acid) in all examples of C1 exceeds 5 vol %.

In the Board's view, comparative example APP1 is therefore not representative of the teaching of C1.

Consequently, the comparative tests provided by appellant I are not suitable to justify any effect linked to distinguishing feature (i). For the sake of completeness, it should also be noted that the parties did not argue that feature (iii) (liquid composition instead of mastic) was related to a technical effect.

4.3.5 Appellant I further argued that it could not be assumed that the cracking performance of the compositions of C1 be sufficient. Example VI of C1 was the only example of C1 in which the absence of cracks was mentioned. By contrast it would be implicit that the crack performances of the coating derived from example I of C1 would be insufficient.

In this respect, it is pointed out that the compositions of C1 are intended to:

provide "*excellent protection for structural steel members and other assemblies from the*

damaging effects of excessive heat and flames during a fire"

and to

"*produce a hard, small-celled char residue which can adhere to a substrate without external reinforcement and afford excellent insulation to protect the underlying steel*" (see C1, column 7, lines 29 to 37)

Therefore, the Board has no reason to assume that the compositions of C1 may be deficient in terms of cracking performance. In any event, the burden of proof was on appellant I to show the contrary, but they failed to adduce any evidence of the alleged weaknesses of the composition of C1 (and in particular of example I) which would be avoided with a modification according to claim 1.

4.3.6 Hence, in the absence of suitable experimental evidence, the objective technical problem solved over C1 has to be formulated as the provision of an alternative intumescent coating composition.

4.4 Obviousness of the solution

It needs to be evaluated whether it was obvious for a skilled person wishing to provide an alternative to the intumescent composition of example I of C1 to:

(i) increase the amount of APP to an amount of 5 to 25 vol% and

(iii) replace the mastic composition by a liquid composition.

4.4.1 According to the opponents, it would have been obvious to a person skilled in the art to replace at least part of the TCEP in Example I with APP, thereby obtaining a composition comprising at least 5 % by volume of APP. Furthermore, C1 itself suggested diluting the mastic to obtain a liquid coating composition (see column 6, lines 51 to 56).

4.4.2 During the oral proceedings before the Board, appellant I argued that TCEP was an organic compound with different properties and functions compared to the inorganic phosphate APP. In particular it was known from C51 that TCEP provided plasticity to the composition which would be essential in the case of a mastic composition (see C51, pages 271-272, bridging paragraph). This would be confirmed by the fact that all examples of C1 contain significant amounts of TCEP. Therefore the skilled person would not replace TCEP with APP in the composition of example I as this would be detrimental to the plasticity of the mastic.

4.4.3 As noted previously, it is not contested that the composition of example I comprises about 2.2 vol% of APP and about 5 vol% of TCEP. In principle replacing TCEP with APP would automatically lead to a composition comprising about between 5 and 25 vol% of APP (corresponding to distinguishing feature (i)). In view of the line of argument put forward by appellant I, it needs to be assessed whether C1 or C51 would teach away from carrying this modification of example I.

With regard to C1, this document teaches that:

The source of phosphorus can be selected from a variety of materials such as, for example, phosphoric acid, mono- and di-ammonium phosphate, tris-(2-chloroethyl)phosphate, phosphorus-containing amides such as phosphorylamide, and melamine pyrophosphate. Preferably the source of phosphorous acid is an ammonium polyphosphate represented by the formula:

$$(NH_4)_{n+2}P_nO_{3n+1}$$

(see column 4, lines 53 to 61)

In terms of properties, C1 does not make any difference between TCEP (tris-(2-chloroethyl)phosphate) and APP (ammonium polyphosphate). In fact APP is even preferred. Furthermore, even if TCEP is used in the examples of C1, it is not apparent that this component is essential and cannot be replaced. Therefore on the basis of C1 alone, the skilled person would in fact be prompted to replace TCEP (at least in part) with APP (as APP is said to be preferred).

Turning to C51, this document teaches that organic phosphates (such as TCEP) can provide plasticity. Assuming to the benefit of appellant I that the plasticity of the mastic compositions C1 is mainly provided by TCEP (which is not the Board's position), it needs to be evaluated whether the skilled person whishing at least to maintain the plasticity of the compositions of C1, would have considered replacing TCEP by APP. As noted by the opponents, TCEP does not have to be fully replaced by APP in order to achieve a minimum APP amount of 5 vol%. Moreover, C1 teaches that the viscosity of the composition can also be controlled by the addition of rheology control agents or solvents (see C1, column 6, lines 41 to 44 and 53 to 56). Therefore, even if the skilled person had experienced difficulties to maintain the composition plasticity while replacing TCEP with APP, C1 provides several obvious options. In any event, in view of the fact that

present claim 1 is directed to a liquid composition and the teaching of C1 concerning viscosity control, the alleged problem of maintaining the plasticity of the mastic composition is not relevant.

With respect to distinguishing feature (i), the Board concludes that it was obvious to the skilled person, wishing to provide an alternative coating composition, to replace (at least) part of TCEP by APP (both used in the examples of C1). By doing so, the skilled person would obtain a composition containing from 5 to 25 vol% of APP, having regard to the teaching of C1 alone.

4.4.4 As to distinguishing feature (iii), C1 teaches that the coating composition may be spray applied however "*thinning of the mastic composition is generally necessary prior to application*" (see C1, column 6, lines 49 to 58). Conventional organic solvents are also mentioned. Therefore, in view of this disclosure, it was also an obvious option to replace the thick mastic paste of example I by a liquid composition.

4.5 Since both distinguishing features were obvious to a person skilled in the art, claim 1 of the main request does not involve an inventive step over example I of C1.

5. Inventive step of the auxiliary request

Claim 1 of the auxiliary request was limited compared to claim 1 of the main request in that the composition comprised

(d) 0 volume % of melamine or melamine derivatives and

(e) 0 volume % of isocyanurate derivatives.

5.1 Closest prior art and technical differences

The parties do not dispute that example I of C1 may be chosen as starting point for evaluating inventive step and that present claim 1 further differs from this example in that the composition comprises

(iv) 0 vol% of melamine or melamine derivatives (instead of about 1.4 vol% melamine in example I).

The Board agrees with this additional distinguishing feature. Reference is made to point 4.2.4 for the other distinguishing features between claim 1 and example I of C1 (hereinafter distinguishing features (i) and (iii)).

5.2 Problem to be solved

The effect of distinguishing features (i) and (iii) has already been addressed in the context of the main request and remains the same in so far as the auxiliary request is concerned (see point 4.3 of the present decision).

As regards distinguishing feature (iv), the Board needs to evaluate whether it can be linked to a technical effect.

5.2.1 According to appellant I the objective problem to be solved over C1 may be seen as the provision of an intumescent coating with an improved crack resistance in the event of a fire.

5.2.2 The opponents consider that the experimental evidence provided by appellant I is not sufficient to conclude that any improvement is achieved.

5.2.3 In the Board's view, it is necessary to evaluate whether the experimental evidence provided by appellant I is sufficient to support an alleged advantage in respect of the additional distinguishing feature (iv).

In order to show an effect of the amount of melamine on the crack resistance, appellant I relies on the examples given in the opposed patent and E32 (part B).

The Board acknowledges that (comparative) sample 2 of the opposed patent shows that cracking occurs if the amount of melamine is 3 vol%. Conversely E32 shows that 1 vol% of melamine does not cause cracks or breaks in the chars (see E32, part B, sample M10 and page 14, last paragraph).

As mentioned above, the amount of melamine in example I of C1 is about 1.4 vol%, which is closer to sample M10 of E32 than to sample 2 of the opposed patent. Hence, based on the data provided by appellant I, there is no evidence that the crack resistance will be deteriorated if the amount of melamine of the composition is 1,4 vol% instead of 0 vol%. On the contrary, according to the available experimental evidence, no deterioration would be expected.

In fact, also the opposed patent teaches the opposite since the coatings of the claimed invention do not crack even if the amount of melamine is 2 vol% (see page 5, lines 12 to 14 in combination with granted claim 1). Therefore it is not credible that

distinguishing feature (iv) is linked to any technical effect.

5.2.4 Hence, in the absence of suitable experimental evidence (showing a comparison representative of example I of C1), the objective technical problem solved over C1 has to be formulated as the provision of an alternative intumescent coating composition.

5.3 Obviousness of the solution

As regards to the obviousness of distinguishing features (i) and (iii), reference is made to the main request and the corresponding passage of the decision (see point 4.4 of the reasons).

It remains to be evaluated whether it was obvious for the skilled person wishing to provide an alternative to the composition of C1 to reduce the amount of melamine to 0 vol%.

Appellant I argued that C1 did not disclose any melamine-free system and there would be no hint that melamine could be removed from the composition.

With regard to distinguishing feature (iv), the Board agrees with the opponents that C1 discloses alternatives to melamine such as urea, dimethyl urea, dicyandiamide, guanylurea phosphate and glycine (see C1, column 5, lines 13 to 19). It was therefore obvious to replace melamine by any of these specific gas forming agents. By doing so, the skilled person would obtain a melamine-free composition without inventive skills.

For these reasons, the Board concludes that the additional distinguishing feature (iv) is also obvious in view of C1 alone.

5.4 Consequently, claim 1 of the auxiliary request does not involve an inventive step over example I of C1.

6. As all operative requests are not allowable, the decision under appeal is to be set aside and the patent is to be revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

D. Hampe D. Semino

Decision electronically authenticated