Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 31 August 2020

Case Number: T 1602/17 - 3.3.03

Application Number: 11009802.7

Publication Number: 2465987

IPC: D04H1/64, C03C25/32, C08B37/00, C08L5/00, C09J179/00, D04H3/12

Language of the proceedings: EN

Title of invention:
Improved spunbond polyester mat

Patent Proprietor:
Johns Manville

Opponent:
Knauf Insulation SPRL

Relevant legal provisions:
EPC Art. 54, 56, 83, 123
EPC R. 80

Keyword:
Priority - (yes)
Novelty - main request (yes)
Inventive step - main request (yes)
Sufficiency of disclosure - (yes)
Article 100(c)- validly invoked as gorund of opposition - no
Interpretation of the claims - unduly broad (Appellant); unduly narrow (Respondent)

Decisions cited:
G 0003/14, T 0615/95

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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 1602/17 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 31 August 2020

Appellant: (Opponent)	Knauf Insulation SPRL Rue de Maastricht, 95 4600 Visé (BE)
Representative:	ARC-IP ARC-IP sprl Rue Emile Francqui 4 1435 Mont-Saint-Guibert (BE)
Respondent: (Patent Proprietor)	Johns Manville 717 Seventeenth Street Denver, CO 80202 (US)
Representative:	Dörr, Klaus Dörr IP Nordring 29 65719 Hofheim (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 14 June 2017 concerning maintenance of the European Patent No. 2465987 in amended form.**

Composition of the Board:

Chairman	D. Semino
Members:	M. C. Gordon
	W. Ungler

Summary of Facts and Submissions

I. The appeal of the opponent lies from the interlocutory decision of the opposition division posted on 14 June 2017 according to which it was held that European Patent number 2 465 987 could be maintained in amended form on the basis of the main request (claims 1-20) and an amended description filed during the oral proceedings on 28 April 2017.

II. The patent was granted with a set of 20 claims, whereby claim 1 read as follows:

"A spunbond polyester mat comprising a binder comprised of a reaction product of an aldehyde or ketone with an amino-amide, which is a reaction product of an amine and an unsaturated or saturated reactant."

Claims 2-10 were dependent claims. Claim 11 was directed to a method of preparing the spunbond polyester mat of claim 1, with claims 12-16 being dependent thereon. Claims 17-19 were directed to various articles comprising the mat of claim 1 and claim 20 was directed to the use of the mat of claim 1 to prepare such articles.

III. A notice of opposition against the patent was filed in which revocation of the patent on the grounds of Article 100(a) EPC (lack of novelty, lack of inventive step), Article 100(b) EPC and Article 100(c) EPC was requested.

Inter alia, the following documents were cited in support of the opposition:
D5: EP-A-1510607
D6: WO-A-2011/22222
O1: WO-A-2011/22227
O2: EP-A-2 386 605
O3: EP-A-2 386 394
O4: WO-A-2010/142568
O5: EP-A-1 652 868
O6: WO-A-2010/108999
O7: US-A-5 539 077
O8: US-A-2010/0029160
O16: WO-A-2011/19593
O17: WO-A-2011/19598.

IV. The decision of the opposition division was based on the claims of the main request as submitted at the oral proceedings. Claim 1 of said request was identical to claim 1 of the patent as granted.

Claims 2 and 4 differed from the correspondingly numbered claims of the patent as granted by deletion of the features inorganic acids (claim 2), and salts of acids (claims 2 and 4).

Claim 11 had been amended by deleting the feature polyester "fibres" and so limiting the claim to polyester continuous filaments.

According to the decision the newly submitted main request was admissible, being a direct response to objections raised by the opponent with their latest submissions.

The ground of opposition pursuant to Article 100(c) EPC had been indicated on Form 2300E, but not substantiated

in the written submissions. Accordingly this ground was not part of the proceedings.

The claims of the amended main request had been reduced in scope compared to the granted claims. This restriction was not objectionable. The restricted subject-matter furthermore had a basis in the application as filed.

Accordingly there were no objections pursuant to Articles 123(2) or (3) EPC.

The requirements of sufficiency of disclosure were met. Contrary to the position of the opponent, the division did not consider the claim to be of excessively broad scope. Further it was considered, with reference to paragraph 22 of the patent, that the term "amino-amide" did not introduce any ambiguity.

The opponent had not discharged the burden of demonstrating insufficiency. Certain constellations of subject-matter invoked by the opponent in support of its objection of lack of sufficiency related to combinations which would be understood not to fall under the claim (penultimate paragraph of section 13 of the decision).

The patent was entitled to the claimed priority because the subject-matter claimed was not disclosed in the invoked earlier documents of the patent proprietor (O1, D6, D5, O17). These did not disclose either the claimed subject-matter or that defined in the claims of the priority application. Thus there was no evidence that the invoked priority document (US969156) was not the first application in the sense of Article 87(4) EPC.

The subject-matter claimed was novel over the cited documents D5, D6, O1-08 and O17 either because the invoked documents did not disclose amino-amides and/or did not disclose spunbond polyester mats.

In addition:

With respect to O5 it was considered that there was no direct disclosure that the reaction product of melamine and aldehyde would, upon reaction with "glyoxalic" acid, form an amino-amide. The Board presumes that the term intended was "glyoxylic" acid. Furthermore O5 did not provide a disclosure of "spunbond web".

O8 did not provide a disclosure of amino-amides and provided no information about the situation when polyamine was used for the hydrolysis reaction. In any case it was necessary to make two selections from long lists in order to arrive at the subject-matter claimed in terms of the chemical constitution and a further selection in respect of polyester mats, notwithstanding that O8 provided no disclosure of spunbond mats.

Regarding inventive step the opposition division considered that D5 was the most suitable starting point since this disclosed low-emission binders which were used for the consolidation of polyester spunbond mats. The problem to be solved was the provision of alternative binder bonded low emission spunbond web, which problem was solved by a spunbond web comprising the binder of claim 1. This solution was not obvious as D5 contained no pointers thereto and no other document disclosed any pointers to said binders.

V. The opponent (appellant) lodged an appeal against the decision.

Objections in respect of non-entitlement to priority, allowability of amendments (Rule 80 EPC), added subject-matter, sufficiency of disclosure, novelty and inventive step were sustained.

VI. In response the patent proprietor (respondent) maintained the set of claims as upheld by the opposition division.

VII. Both parties requested oral proceedings.

VIII. The Board issued a summons to oral proceedings and a communication setting out its preliminary view of the case. With respect to the question of interpretation of the claims, it was held that the parties were either adopting an unduly broad (appellant) or unduly narrow (respondent) interpretation.

IX. With letter of 12 May 2020 the respondent, in reaction to the observations of the Board in respect of the interpretation to be given to the claims, submitted two further auxiliary requests in which said aspect had been further specified.

X. With letter of 9 July 2020 the appellant withdrew the request for oral proceedings and stated that it would not attend the hearing.

XI. By e-mail of 22 July 2020 the respondent stated that dependent on the opinion of the Board in respect of the operative requests, the request for oral proceedings could be withdrawn and requested a response from the Board.

XII. By notification dated 17 August 2020 the parties were informed that the oral proceedings had been cancelled.

XIII. The arguments of the appellant can be summarised as follows:

(a) Interpretation of the claims

The term "amino amide" was not a conventional term and had no standard meaning, e.g. according to IUPAC. The definition in the claim was very broad. "Reactant" was a term which encompassed many compounds, only some of which were set out in claim 4. The feature "saturated or unsaturated" did not add any valuable information and amounted merely to defining any reactant. The reliance of the respondent, with respect to paragraph 22 of the patent, on the presence of an amic acid functionality in the amino compound might be the case for certain embodiments but this was not what was required by claims 1 or 2. The feature in claim 2 that the reactant could be an inorganic acid or salts thereof emphasised the breadth of the "amino-amide" feature as extending beyond merely a compound having at least one amino group and at least one amide functionality.

The term was broad and could, for example, designate a family of anaesthetics or the amide of an aminoacid, which meanings were not in line with the interpretation set out by the Board in its communication that the reaction product needed to comprise an amine and amide functionality in the molecule.

Following the principle that a patentee may define its own vocabulary, the definition of amino amide as given in claim 1 should prevail, namely that the amine was not defined and that the reactant could be anything.

The definition provided in the section of the patent "Detailed Description of Preferred Embodiments" was no more precise than that in claim 1 and what followed were preferred embodiments culminating in the respondent's preferred restrictive understanding relating to the presence of the amic acid function.

A "spunbond mat" was a mat of spun laid fibres that were bonded, whereby the bonding could be of different types such as thermal, needlepunching or chemically by means of a binder (with reference to Wikipedia). Hence when a synthetic fibre mat was bonded by a binder it was to be considered as spunbond. In particular, currently polyester fibres were almost exclusively made by spinning, which information corresponded to what was stated in paragraph 3 of the patent.

(b) Added subject-matter, Article 123(3) EPC and Rule 80 EPC

Due to the uncertainty and ambiguity of the term "amino-amide" and the breadth of the term "reactant" the subject-matter claimed extended beyond the content of the application as filed and also resulted in an extension of the scope of protection compared to the patent as granted.

Contrary to what was held by the opposition division, the amendments to the dependent claims claim did not limit the scope since the claim still extended to a spunbond polyester mat comprising a reaction product of any amine and any saturated or unsaturated reactant. For this reason they were also not allowable pursuant to Rule 80 EPC.

(c) Sufficiency of disclosure

The decision of the opposition division relied upon restricting the claims to those embodiments explicitly disclosed. However the claim language was far more general.

Even assuming that the skilled person would understand what was meant by the term "amino-amide", said interpretation was valid only as long as the patent proprietor did not itself seek to apply a different interpretation, whereby it was reiterated that the scope of the claim was very broad. The description - paragraph 22 - explained that in order to cross-link the aldehyde or ketone component it was necessary that the crosslinker have an amine function, an amide function and a carboxylic acid function. However, contrary to the interpretation favoured by the respondent, claim 1 had no corresponding restriction which had the consequence that its scope extended to non-working embodiments. The approach taken by the respondent, applying an unduly restrictive interpretation resulted in reintroduction "by the back door" of subject-matter that should have been excluded.

In addition the method of claim 11 could not be carried out as it was not according to the teaching

in the description and the examples.

(d) Entitlement to priority

The application underlying the patent was not the first application of the patent proprietor for the claimed subject-matter meaning that the claim to priority was invalid.

Document O1, with a priority date of 19 August 2009 and a filing date of 6 August 2010, disclosed non-woven webs of polymeric fibres comprising a binder which was a reaction product of an aldehyde or ketone with an amine salt of an inorganic acid. The document also disclosed a binder comprised of a reaction product of aldehyde and/or ketone with an amino-amide intermediate with molar ratio of acid in said intermediate to carbonyl or ketone of from 1:50 to 50:1 with ratios of 1:20 to 20:1 and 1:10 to 10:1 being more preferred. Polyester fibres were listed as the first preferred polymeric fibres and as seen from example 4 the nonwoven fibre web was a spunbond web. Thus O1 disclosed major parts of the teaching of the patent.

Similarly D5 disclosed a nonwoven web of polymeric fibres such as spunbond polyester fibre web, wherein the fibres were bonded by a resinous binder comprising an aldehyde and ammonium bisulphite (which was to be considered an amine since the ammonium ion contained amine groups) and a reactant - sulphurous acid - which was an inorganic acid as defined in operative claim 2. This fell under the term of "reactant", notwithstanding the attempt of the respondent to impose an unduly narrow interpretation on said term.

Similar conclusions resulted in view of D6. This disclosed the same binder composition and application process as the patent. The binder of D6 was intended to bond polymeric fibres which had uses in battery separators, filters etc. Polyesters were conventional materials for such uses and were cited in D6, page 3, final paragraph. The use of fibres which fell under the term "spunbond" for said end uses was also part of the disclosure of D6.

O17 related to binding compositions comprising the reaction product of an amine and a reactant in the form of an amino-amide and an aldehyde or ketone. Essentially the same amines were employed as listed in the patent. The preferred reactants were selected from carboxylic acids which again were essentially the same as those listed in the patent. It was also disclosed that the binder could be used for binding various types of fibres including spun polyester fibres, corresponding to the subject-matter of the patent. This document also confirmed that the application underlying the patent in suit was not the first for the defined subject-matter.

(e) Novelty

As a result of the broad meaning of the terms of the claims, as well as, in some cases, the lack of entitlement to priority, the subject-matter claimed was anticipated by the disclosures of any of D5, D6, O1 to O5, O7, O8 and O17 for the following reasons:

- O1, D5, D6 and O17, for the reasons discussed above in connection with the entitlement to priority;

- O2 disclosed aqueous binder compositions for use as curable binders for spunbond polyester fibres. The compositions contained diprimary diamines, reducing mono- and di-saccharides and hypophosphite or phosphinic acid. Uses included spunbonded polyester roof shingles and filters. It was considered, contrary to the findings of the decision under appeal, that O2 disclosed amino-amides in the sense of claim 1 when given the correct interpretation;

- O3 the situation was similar to that of O2;

- O4 disclosed a process for producing swollen nonwoven fabrics which process involved the preparation of a combination of a polysaccharide, an organic compound substituted at each end with primary amino groups, and phosphoric or tetrafluoroboric acid. The composition could be employed to bind nonwoven webs including spunbond mats of polymeric fibres. The mats of O4 were stated to be preferably made of fibres including filaments and the preferred polymer was polyester. Spunbond mats were mentioned. Since the spunlaid fibres were bonded with binder a spunbond mat was generated. With respect to the nature of the polyester fibre and the question of whether spunbond web was identical to spun web it was argued that if the terms "Vlies" or "Vliesstoff" were relatively broad and encompassed different manufacturing techniques, the term "Spinnvlies" as employed at page 2, line

33 of O4 was specific, meaning "spunbond mat", i.e. continuous fibres which had been spun and then laid (spunlaid) i.e. deposited randomly and bonded by a binder. This corresponded to the definition adopted in paragraphs 3 and 15 of the patent;

- O5 related to curable binder compositions for binding polymeric nonwoven substrates of polyester fibres. The binders contained polyols, preferably dextrose, melamine and an acid. The compositions could be applied to a substrate and cured. A further aspect of O5 related to compositions which additionally contained glyoxylic acid which was a reactant as defined in the patent. Regardless of the precise understanding of the term "amino amide", the contacting of a multifunctional primary amine such as melamine and a carboxylic acid such as glyoxylic acid in aqueous medium would result in an amide. Such products would arise in the examples of O5. The nonwoven substrates of polyester fibres as disclosed in O5 were implicitly spunbond polyester substrates as required by the patent;

- O7 related to resin compositions useful as a binder which were the reaction product of an amine with an aldehyde, which composition could further contain a polyol and inorganic acid catalysts, which compounds were reactants in the sense of claim 1. The binder was intended for use to bond substrates such as polyester nonwoven substrates, which were envisaged for uses such as filters or roofing mats. The mats were prepared from hot extruded polyester fibres deposited in a

random pattern, and hence overlapping and thus forming multiple overlapping layers as required by the operative claims;

- O8 related to aqueous binder compositions for preparing fibre products, specifically a mat of nonwoven fibres such as polyester fibres. The binder comprised a polyol and a copolymer of maleic anhydride or acid solubilised by an amine. The examples emphasised that amides were generated. On the basis that the term "amino amide" were given its correct - broad - interpretation, this disclosure would be novelty destroying. The fibre mats of O8 were prepared from non-woven fibres whereby the list of fibres included polyester. The fibres were long filaments and thus had necessarily been deposited randomly and so would overlap, forming multiple layers, corresponding to a spunbond web as required;

(f) Inventive step

The examples of the patent did not exemplify the invention since the binders were tested on a glass plate, and hence could not demonstrate any technical effect arising from the claimed subject-matter.

Furthermore the evidence provided did not relate to a significant part of the claimed scope.

D5 related to binders according to claim 1 and related to nonwoven webs of polymeric fibres such as spunbond polyester fibre web wherein the fibres were bonded by a resinous binder comprising an

aldehyde and ammonium bisulphite, i.e. a reaction product of an amine (the ammonium ion contained amine groups) and a reactant (sulphurous acid). Even assuming there were to be some distinguishing feature with respect to D5, it was not credible that the combination of substrate and binder provided an unexpected technical effect, meaning that the claimed subject-matter had to be seen as an obvious alternative to that of D5.

Similar conclusions arose on the basis of O1, O5, O7, O8, O10, O11, O14 and O16 since any distinguishing feature was not shown to lead in a non-obvious manner to a technical effect.

XIV. The arguments of the respondent can be summarised as follows:

(a) Interpretation of the claims

Within the meaning of the patent in suit an amino-amide was a compound which contained an amic acid function as well as an amine function. Thus such amino-amide had three functions - amine, amide and carboxylic acid in the same molecule as set out in paragraph 22 of the description.

(b) Added subject-matter

As stated in the decision, the grounds under Article 100(c) EPC had never been substantiated during the opposition proceedings and consequently there was no right to invoke said grounds in appeal. The further issues of extension of the scope of protection and allowability of amendments

pursuant to Rule 80 EPC were not commented upon.

(c) Sufficiency of disclosure

The application contained several examples and a detailed description which put the skilled person in a position to operate the invention. In particular the specification required that the amino-amide contained an amic acid function as well as an amine function. The formation of the amino-amide was also described in detail in the description.

(d) Entitlement to priority

O1 did not disclose spunbond polyester mat but disclosed polymeric fibre webs in general. The examples disclosed spunbond materials but there was no disclosure of any spunbond polyester mat. Since the operative claims contained a restriction to such materials, priority was given.

With respect to D5, no amino-amide concept as defined by the patent was disclosed.

D6 failed to disclose spunbond polyester mat and related to polymeric fibre webs in general. Also the examples provided no disclosure of a spunbond polyester mat.

O17 related to fibreglass materials consolidated by a binder. The fibreglass could contain other fibres in combination therewith e.g. polyester. However O17 had no disclosure of a spunbond polyester mat.

(e) Novelty

The claimed subject-matter was novel over those documents cited in connection with entitlement to priority for the reasons set out in the preceding paragraph.

Regarding the other documents invoked in respect of novelty:

- O2 was prior art pursuant to Article 54(3) EPC. The binder compositions contained reducing sugars and diprimary diamines. The document did not provide a disclosure of an amino-amide which was a reaction product of an amine and an unsaturated or saturated reactant. The document permitted emulsion polymers to be additionally present. These were however not an amino-amide as required by the operative claim, i.e. containing an amic acid function as well as an amine function. Furthermore the catalyst mentioned in O2 did not take part in the reaction to form an amino-amide. Even if such a compound were to be formed there was no disclosure of the presence of such a compound or of any advantage resulting from such a compound;

- O3 was also prior art pursuant to Article 54(3) EPC and disclosed binder compositions containing reducing sugars and primary diamines, whereby various suitable compounds were disclosed. There was no disclosure of an amino-amide being a reaction product of an amine and an unsaturated or saturated reactant. Similarly to the situation with O2 even if an amino-amide would be formed in

the reaction, the presence and advantage thereof was not part of the disclosure of O3;

- O4 was also prior art pursuant to Article 54(3) EPC. The composition contained two polymers A and B, whereby polymer A had amino groups derived from grafting a poly (vinyl acetate) with amino substituted polyalkylene glycol. There was no disclosure of an amino-amide as required by claim 1. Polymer B was a water soluble polymer which contained starch including modified starches. There was no disclosure of an amino-amide within the meaning of the invention, nor was there any disclosure of any spunbond polyester mat consolidated by the binder;

- O5 related to binder compositions which comprised melamine, at least one aldehyde, a cross-linking agent and at least one polyol (e.g. dextrose or glucose). There was no disclosure of an amino-amide being the reaction product of an amine and an unsaturated or saturated reactant as defined in operative claim 1. Similarly to O2 and O3 the catalyst employed did not take part in a reaction to form an amino-amide, and even if such reaction did take place it would not result in an amino-amide of the required stoichiometry;

- O7 related to the reaction product of an amine and aldehyde which could further be mixed with a polyol, e.g. dextrose. There was however no disclosure of an amino-amide which was a reaction product as required by claim 1. Similarly to O2, O3 and O5, to the extent that the catalyst employed took part a reaction to form an amino-amide the stoichiometry thereof would not be

disclosed as corresponding to that required by the operative claim. Furthermore there was no disclosure of a spunbond polyester mat consolidated by a binder;

- O8 disclosed a binder composition containing a polyol and a hydrolysed copolymer of maleic anhydride and vinyl aromatic compound. The copolymer was solubilised by an alkaline substance, e.g. ethylene diamine. It was noted that the appellant appeared to interpret the alkaline solubilised polymer as falling within the terms of amino-amide as defined in the claim. O8 provided no disclosure of a spunbond polyester mat consolidated by a binder.

(f) Inventive step

The approach taken by the appellant did not follow the problem-solution approach since there was no consideration of the identification of the closest prior art.

The patent in suit related to the technical field of spunbond polyester mats and their consolidation, and consideration of inventive step had to start on the basis of documents related to such technology.

With respect to D5 the examples of the patent in suit, in particular example 7, demonstrated an improvement of the claimed subject-matter with respect to the binders thereof. D5 provided no teaching to employ the claimed amino-amide concept. Other documents invoked which were citable in respect of inventive step (O5, O7, O8, O10, O11, O14) did not relate to the field of spunbonded

polyester nonwoven and their consolidation, nor did they relate to the claimed binder compositions and hence were not relevant of the consideration of inventive step.

XV. The appellant requests that the decision under appeal be set aside and that the patent be revoked.

XVI. The respondent requests that the appeal be dismissed. In the alternative it is requested that the decision under appeal be set aside and the patent maintained on the basis of one of the auxiliary requests numbered 1 and 2, submitted with letter of 12 May 2020.

Reasons for the Decision

1. As the appellant has withdrawn its request for oral proceedings and the decision is based on grounds and evidence on which the parties concerned had ample opportunity to present their comments, the decision can be taken in writing.

2. Main request

2.1 Interpretation of claim 1

2.1.1 "Amino-amide"

A large part of the objections of the appellant relies on giving the definition of the binder in claim 1 a very broad interpretation, in particular this relates to the aspect "amino-amide" which is defined in the claim as the reaction product of an amine and an unsaturated or saturated "reactant".

Whilst, as argued by the appellant, this latter term is broad and even vague - notwithstanding that Article 84 EPC is not available in respect of claim 1 because this claim is identical to the granted claim - the term "reactant" has to be interpreted in the context of the claim, i.e. as something which will, when reacted with an amine, give rise to a compound having an amino group and an amide group in the same molecule in agreement with the common understanding on the term "amino-amide". This is confirmed by what is stated in the "Detailed Description of Preferred Embodiments".

Conversely the respondent applies a highly restrictive interpretation of the term, relying in large part on the description to seek to restrict the claim to an amino-amide containing an amic acid function and amine function. This is stated for example in section A.II, 3rd and 4th paragraph of the rejoinder with reference to paragraphs [0022] and [0037]-[0040] of the patent in the context of sufficiency; section A.III.2.6, 6th paragraph in the context of novelty with respect to O4 and in particular section A.IV.4, 4th paragraph in the context of inventive step.

Thus both parties are applying an unwarrantedly broad (appellant) or narrow (respondent) interpretation of the claims, neither of which interpretations is commensurate with the actual wording employed.

The Board considers that the claim is to be interpreted in line with the explicit wording thereof i.e. that the amino-amide is a reaction product of an amine and a reactant - saturated or unsaturated - which is such that the resulting product is an amino amide. This thus requires that the reactant must contain by necessity either an amine group and a carboxylic acid group, or

in the alternative an amide group of some kind. Nothing more - nor less - is to be subsumed under the term.

2.1.2 Spunbond polyester mat

Paragraph 3 of the patent provides a definition of "spunbond polyester" mat. Here it is explained that such mats are a sheet of randomly oriented polyester filaments bonded by one or more of calendering, needling, or chemically with a binder. Following formation of the fibres these are deposited or laid on a forming surface to form a loosely entangled web which is then subjected to bonding.

In the statement of grounds of appeal on page 7, fourth paragraph and with the letter of 9 July 2020, page 2, 5th complete paragraph, by means of reference to Wikipedia the appellant argued that "spunbond web" applied to any fibres which had been spun, i.e. drawn or extruded which were then laid randomly and bonded by a binder.

The general definition of spunbond web invoked by the appellant appears to correspond to that of the patent.

One aspect which is of significance is the constitution of the mat. The patent defines a polyester spunbond mat and the description thereof in paragraphs 3 and 15 as a mat formed exclusively of polyesters and not of any other fibres, or of combinations of such other fibres with polyester fibres. This is in agreement with the common understanding of the skilled person and no evidence have been submitted that a different reading would be taken by the skilled person, in particular a reading in which the mat was constituted of a small

amount of polyester fibres together with a major proportion of other fibers (e.g. glass fibers).

2.2 Article 123 EPC (added subject-matter and extension of scope of protection); Rule 80 EPC

2.2.1 Claim 1 is identical to claim 1 as granted.

Article 100(c) EPC is not part of the opposition or appeal proceedings. Although this ground was indicated on Form 2300E no substation of the objection was advanced (see decision under appeal, section 11).

2.2.2 The arguments of the appellant (see section XIII.(b) above) in any case relate to the interpretation given to the claim by the respondent and the opposition division (section 4 of the statement of grounds of appeal) but not to the actual wording of the claims. As claim 1 as granted corresponds to claim 1 as originally filed limited to the preferred embodiment and the Board sees the interpretation of the term "amino-amide" given above as equally valid for claim 1 as originally filed and claim 1 as granted, no room can be seen for an objection under Article 123(2) EPC.

The argument of the appellant has to be understood at most as relating to issues that would be addressed in respect of an objection of lack of clarity. However since the claim is unchanged compared to the granted claim such an objection is not available (G 3/14 of 24 March 2015).

2.2.3 Regarding the objection relating to extension of scope of protection, as noted, operative claim 1 is identical to claim 1 as granted.

For this reason an extension of the scope of protection cannot be identified.

Dependent claims 2, 4 and 11 have been restricted compared to the claims as originally filed and as granted by striking out of alternatives. These amendments have not been shown to result in an unallowable "singling out" of specific embodiments within the generality of the originally disclosed subject-matter (see also T 615/95 of 16 December 1997). Similarly it is obscure to the Board how such a restriction can, in the particular circumstances of this case, result in an extension of the scope of protection.

2.2.4 The conclusion is thus that the requirements of Article 123(2) and (3) EPC are complied with.

2.2.5 The Board further finds that the limitations made to the dependent claims were in the nature of addressing objections pursuant to Article 100(a) and (b) EPC raised by the appellant (independently of them being successful or not) and so there are no grounds to hold these amendments unallowable pursuant to Rule 80 EPC.

2.3 Sufficiency of disclosure

The submissions made relate to the interpretation and understanding of the feature "amino-amide" and in particular the potentially broad scope of the term.

This is a matter which is correctly to be considered in a discussion of clarity. However since claim 1 is identical to claim 1 as granted and it has not been shown that any of the amendments, e.g. to the dependent claims, made compared to the patent as granted would

give cause to apply a different interpretation of the term, pursuant to the findings of G 3/14 (OJ, EPO 2015, 102) Article 84 EPC is not available.

In any case it has not been shown that the information provided by the patent would not place the skilled person in a position to carry out the invention as claimed, or that there would be any particular obstacles to so doing which could not be resolved by reference to the information in the patent. The same holds for the objection against the method of claim 11, as no evidence has been provided by the appellant with respect to it.

Accordingly the conclusion is that the case of lack of sufficiency of disclosure has not been proven.

2.4 Entitlement to priority

The patent in suit claims priority of 15 December 2010 based on US 969156.

The documents O1, D5, D6 and O17 are all earlier filings of the patentee.

The dispute is not what is disclosed in the priority document *per se* but the appellant takes the position, mostly based on the - in the view of the Board unduly broad - interpretation of the claims that these earlier documents disclosed subject-matter falling within the scope claimed.

O1 has a priority date of 19 August 2009. Claim 1 relates to non-woven webs of polymeric fibres. The binder is the product of an aldehyde or ketone with an

amine salt of inorganic acid. Page 3, line 15ff discloses that a wide range of fibres can be used. At line 28 polyester is named in a list among many others. According to page 4 line 5, the salt can be any amine salt of an inorganic acid. There is however no disclosure of binders based on amino-amides even if such are potentially encompassed within the scope of the document.

D5 has a priority date of 26 August 2003. The document relates to a nonwoven fibre mat (paragraph [0011]) which according to the following paragraph is a spunbond web of polymer such as polyester. The appellant invokes the binder described in paragraph [0018] of D5 which contains ammonium bisulphite. As stated in section 6.2 of the statement of grounds of appeal, this is the reaction product of an amine and sulphurous acid. The appellant considers that sulphurous acid falls under the term "reactant" and that the ammonium compound contains amine groups and arrives thus at the conclusion that the product corresponds to the binder required by the operative claim. In arriving at this conclusion the appellant however disregards the feature of the claim that the product is an amino-amide, and it is not shown that the product resulting from the indicated reaction in D5 would in fact satisfy this requirement, even if the terminology employed in the claim is indeed somewhat broad.
The contention that the ammonium compound is to be seen as containing amine groups relies on an interpretation which is at odds with the conventional understanding of functional group chemistry and rather appears to be based on a - with respect - somewhat oversimplistic view, considering only the atoms present rather than the chemical characteristics of the respective

functional groups. Accordingly the Board cannot follow this argument of the appellant. The definition of the binder of D5 is thus more general than that of the patent in suit, e.g. ABS in example 1.

D6 has a priority date of 19 August 2009. Claim 1 relates to a nonwoven web of polymeric fibres whereby the binder is a reaction product of an aldehyde or ketone and amino-amide which itself is a reaction product of amine and a reactant. The question to be addressed is whether there is any disclosure of said binder in association with a spunbond polyester mat. According to page 3, line 32 of D6, polyester fibres may be used to form the nonwoven web. At page 6, lines 18-22 of D6 it is explained how the binder can be combined with the polymeric fibres. However polyesters or spunbond are not mentioned in this connection. It appears (from the submissions in respect of novelty) that the appellant is arguing in the paragraph numbered 7.3 on page 5 of the statement of grounds of appeal that the arrangement is identical to/indistinguishable from "spunbond". However no supporting evidence is provided. Rather this seems to be based on consideration of the envisaged end uses rather than on any direct and unambiguous disclosure within the citation. Accordingly the disclosure of D6 is broader than the subject-matter defined by the operative claim and does provide a disclosure thereof.

O17, having priority dates of 11 and 19 August 2009, relates to a curable composition for use in the binding of fibreglass which according to claim 1 is the reaction product of a ketone or aldehyde with an amino-amide which is the addition product of amine and a reactant. Page 11, line 16ff disclose that said binder is employed to form a bonded fibre web whereby glass

fibres are emphasised. Page 13, line 5, of O17 discloses that other fibres can be present including melt spun polyester. There is however no disclosure of a spunbond polyester mat (see point 2.1.2 above).

Hence O17 also relates to subject-matter which is more general than the subject-matter claimed, notwithstanding that it does encompass said subject-matter.

The conclusion is that none of the documents cited provides a disclosure of the subject-matter as claimed with the consequence that there are no grounds to hold the priority claim invalid.

2.5 Novelty

2.5.1 O1, D5, D6, O17

As follows from the above discussion of entitlement to priority none of the documents O1, D5, D6 and O17 provides a disclosure of the subject-matter claimed.

2.5.2 O2, O3 (prior art pursuant to Article 54(3) EPC)

These documents relate to binders of di- or polyprimary amine and a reducing sugar. These are then used to impregnate various substrates.

The examples disclose binders based on various sugars, e.g. xylose, dextrose and various amino acids e.g. lysine, glycine. There is no disclosure in O2 or O3 of an amino-amide nor is it apparent how such a compound would form in the reactions disclosed. Furthermore the documents contain no disclosure of application of the

obtained binder compounds to spunbond polyester mats.

2.5.3 O4 (Article 54(3) EPC), O5 (Article 54(2) EPC)

Similarly O4 and O5 do not to relate to a binder which is the product of an aldehyde or ketone with an amino-amide and do not disclose spunbond polyester mats. The converse has not been shown by the appellant. Indeed the arguments in section 6.7 of the statement of grounds of appeal explicitly rely on language that can only be described as "speculative" as can be seen from the last two sentences of the second paragraph in this section. A similarly speculative approach is taken in the next paragraph with respect to the nature of the mats/substrates used. This does not serve to establish a lack of novelty.

2.5.4 O7 (Article 54(2) EPC)

The arguments of the appellant (section 6.8 of the statement of grounds of appeal) are again based on the very broad interpretation given to the features of the claim discussed above, in particular interpreting "reactant" very broadly and disregarding the requirement and an amino-amide must result. Similarly it is not apparent to the Board where in this document a disclosure of a spunbond polyester mat is to be found.

2.5.5 O8 (Article 54(2) EPC)

The arguments of the appellant rely on the same unduly broad interpretation of "reactant" and "amino-amide". In the light of the components present in the cited examples 1 and 2 i.e. styrene/maleic anhydride copolymer and diethanolamine, it is not apparent how an

"amino-amide" could arise since reaction between the acid group of the copolymer with the diethanolamine would result in an amino ester or a hydroxy amide. Similarly a disclosure of spunbond polyester mats cannot be derived from the cited passages (paragraphs [0033] and [0039]).

2.5.6 Accordingly novelty is recognised.

2.6 Inventive step

In the statement of grounds of appeal the appellant did not apply the "problem solution approach", which involves as a first step identifying the closest prior art. Instead a number of documents were discussed, without any consideration of their relationship to the technical problem addressed by the patent and the effect of any distinguishing features discussed.

Although in the rejoinder the respondent did comment upon the absence of an analysis by the appellant based on the structure of the "problem solution approach", its own submissions similarly failed to follow this structure but similarly, to a large part, simply considered the difference(s) between the claimed subject-matter and a number of documents without clear reference to the technical problem underlying the patent in suit.

This was noted in the communication of the Board, with an indication of the following considerations, following the problem-solution approach. Neither party disputed this outline view in their written submissions filed following issue of the summons and communication.

2.6.1 Citable prior art

In this connection it is noted that of the documents discussed in connection with entitlement to priority, D5, with a priority date of 26 August 2003 and a publication date of 2 March 2005 is comprised in the state of the art according to Article 54(2) EPC.

O1 and D6 have priority dates of 19 August 2009 and publication dates of 24 February 2011. O17 has priority dates of 11 and 19 August 2009 and a publication date of 17 February 2011. Hence all of O1, D6 and O17 are comprised in the state of the art pursuant to Article 54(3) EPC and consequently are not citable in respect of inventive step.
Furthermore, as noted above in the discussion of novelty, O2, O3 and O4 are also prior art pursuant to Article 54(3) EPC and consequently not citable in respect of inventive step.

Similarly O16 with priority date of 11 August 2009 and publication date of 17 February 2011 is not citable in respect of inventive step.

2.6.2 Closest prior art

The patent in suit is directed to the provision of spunbond polyester webs having low formaldehyde emission, which webs are intended for use in applications such as filters, battery separators or roofing membranes (paragraphs [0001], [0004], [0012]).

Of the documents cited in particular D5 addresses this same problem (paragraphs [0001], [0010], [0012]) with particular emphasis on roofing membranes.

2.6.3 Distinguishing feature

As noted above, the binder employed in D5 is a water based latex, preferably ethylene-vinyl acetate copolymer etc. (paragraphs [0018], [0019]). In the examples an emulsified styrene butadiene acrylonitrile copolymer latex binder is employed. As stated in example 1 (paragraph [0022]), this has low formaldehyde content. In certain examples disulphite is added which is shown to lower the formaldehyde content.

The binder defined according to the operative claim is the reaction product of an aldehyde or ketone with an amino-amide which in turn is a reaction product of an amine and an unsaturated or saturated reactant.

Thus the nature of the binder provides the distinguishing feature.

2.6.4 Technical effect

Examples 1-3 of the patent relate to various binders based on three different amino-amide intermediates which are coated onto a glass substrate. Example 4 corresponds to examples 1-3 with addition of ammonium sulphate. Examples 5 and 6 employ a different base composition and add ammonium sulphate. These examples show that addition of ammonium sulphate leads to the composition becoming insoluble within 10 minutes. Although as submitted by the respondent with letter of 12 May 2020 (page 2) these examples would appear to demonstrate good curing of the compositions over various ratios, none of these 1-6 relate to a spunbond polyester web. Accordingly they are of little or no relevance to the subject-matter claimed or the technical problem underlying the patent.

Example 7, finally, does relate to preparation of a spunbond web. A binder based on hexamethylenediamine/ maleic anhydride and dextrose in proportions 1:1:3 is applied to a spunbond mat. The example reports in paragraph [0049], lines 34-41, that said binder was superior to "any commercially available thermoplastic latex or formaldehyde-free thermosetting binder system". However, this statement appears to be no more than an assertion, as there are no actual examples of latex systems and no comparative data of any kind which would permit this statement to be verified or the extent of the "superiority" to be assessed. This cannot be changed by the statement in the latest letter of the respondent dated 12 May 2020 (paragraph bridging pages 2 and 3) which is not only late but also not corroborated by clear experimental data and a proper comparison.

The Board therefore finds the statement in the patent inadequate to establish the presence of any technical effect.

2.6.5 Objective technical problem

Due to the absence of any evidence for a technical effect - see above - the objective technical problem can be formulated only as the provision of further binder systems for spunbond polyester mats.

This problem was solved according to the claim by the specified binder.

2.6.6 Obviousness

The arguments of the appellant are based on the premise

that the claim to priority is invalid, with the consequence that the filing date of the application is the relevant date and that thus documents O1, D6 and O17 would be comprised in the state of the art pursuant to Article 54(2). As indicated in section 1.6.1, above, this is not the case and said documents cannot be invoked in consideration of inventive step.

Furthermore the arguments of both parties rely on interpretations of the scope of the claims both of which likewise the Board is disinclined to follow.

To the extent that, as noted, the documents which relate to the claimed binder system, namely D6 and O17, are comprised in the state of the art pursuant to Article 54(3) EPC there are no documents citable in respect of Article 56 EPC which disclose the defined binder.

Under these circumstances the only conclusion which the Board can reach is that obviousness of the claimed subject-matter has not been demonstrated.

No different conclusion can be reached starting or making use of any of the further documents cited for inventive step (O5, O7, O8, O10, O11, O14) as none of them discloses the defined binder according to its proper reading (point 2.1.1 above).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

B. ter Heijden D. Semino

Decision electronically authenticated