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**Datasheet for the decision  
of 5 November 2009**

**Case Number:** T 0549/08 - 3.3.09

**Application Number:** 99952711.2

**Publication Number:** 1128958

**IPC:** B32B 27/12

**Language of the proceedings:** EN

**Title of invention:**

Moulding materials

**Patentee:**

Gurit (UK) Limited

**Opponents:**

01: Hexcel Corporation

02: Hexcel Holding GmbH

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 54, 56, 83, 105, 107, 123(2)

EPC R. 89

RPBA Art. 13

**Relevant legal provisions (EPC 1973):**

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**Keyword:**

"Second alternative main request: admissible"

"Amendments: all requests - allowable under Article 123(2)  
EPC"

"Main and first alternative main requests: sufficiency of  
disclosure - no"

"Second alternative main request: sufficiency of disclosure -  
yes, novelty - yes, inventive step - yes"

**Decisions cited:**

G 0001/94, G 0003/94, G 0003/04

**Catchword:**

-



Case Number: T 0549/08 - 3.3.09

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.09  
of 5 November 2009

**Appellant:** Hexcel Corporation  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 14 January 2008  
rejecting the opposition filed against European  
patent No. 1128958 pursuant to Article 102(2)  
EPC.

**Composition of the Board:**

**Chairman:** N. Perakis  
**Members:** W. Ehrenreich  
M-B. Tardo-Dino

## Summary of Facts and Submissions

- I. Mention of the grant of European patent No 1 128 958 in respect of European patent application No 99952711.2 in the name of Structural Polymer Systems Ltd., now called Gurit (UK) Limited, which had been filed as International application No PCT/GB1999/03667 on 5 November 1999 claiming GB priorities of 6 November 1998 (GB 9824320) and 31 March 1999 (GB 9907489), was announced on 3 August 2005 (Bulletin 2005/31). The patent entitled "Moulding materials" was granted with twenty-three claims. Independent claim 1 and dependent claim 5 read as follows:

"1. A multi-layered moulding material forming a pre-formed prepreg adapted for use in multiple layers, said multi-layered moulding material comprising a layer of resin material, characterised in that the layer of resin material comprises a first fibrous layer conjoined to the upper surface thereof and a second fibrous layer conjoined to the lower surface thereof by contacting the resin layer and the respective fibrous layers, whereby the outer surfaces of the moulding material are free from resin and dry to touch to allow entrapped air to pass out of said multi-layered moulding material during processing of the material."

"5. A multi-layer moulding material according to any one of claims 1 to 4, characterised in that a tackifier and/or a binder is applied to one or both outer surfaces of at least one fibrous layer."

II. A notice of opposition was filed against the patent by Hexcel Corporation (called Opponent 1 in this decision) on 3 May 2006. Opponent 1 requested the revocation of the patent in its entirety relying on Article 100(a) EPC, namely that the claimed subject-matter lacked novelty and/or inventive step, Article 100(b) EPC, namely that the claimed invention was not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, and 100(c) EPC, namely that the subject-matter of the European patent extended beyond the content of the application as filed.

III. The opposition was *inter alia* supported by the following documents:

D6 : WO-A 01/00405

D9 : T Juska *et al*, "An Evaluation of Low Energy Cure Glass Fabric Prepregs", Carderock Division, Naval Surface Warfare Center, NSWCCD-TR-65-96/23, September 1996, pp 1-51

D11: K Jackson, "Low Temperature Curing Materials: The Next Generation", SAMPLE Journal, 34(5), September/October 1998, pp 23-31

D14: WO-A 98/34979

D15: GB-A-1 390 859

D16: Brochure "Prepreg Technology", Hexcel Composites, January 1997, pp 1-32

D17: Technical report dated 16 January 2006, "HexFit 2000 vs HexFit 1000" and Declaration of Yara Borja dated 19 November 2007

D18: WO-A- 98/38031

IV. By a decision orally announced on 17 December 2007 and issued in writing on 14 January 2008 the opposition division rejected the opposition.

It was held in the appealed decision that the granted subject-matter and description fulfilled the requirements of Article 123(2) EPC (see claims 1 and 18 and the legend of figure 2).

Furthermore, it was considered that the claimed invention was disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art and therefore complied with Article 83 EPC.

With regard to the objection of lack of novelty the opposition division held that none of the cited documents anticipated the claimed subject-matter.

As to the objection of lack of inventive step, D14, a document pertaining to conventional prepregs, was considered representative of the closest state of the art. The subject-matter of claim 1 differed from the disclosure of D14 in that the resin did not impregnate the outer surfaces of the fibrous material but constituted a central inner layer, which was conjoined with the fibrous layers "by contacting". This new form of prepreg had improved handling properties, such as drapability, improved air transport, low void formation and prevention of bridging defects. Moreover the skilled person would not have found in the state of the art any motivation to modify the prepreg of D14 so that the outer surfaces of the two fibrous layers be free from resin and dry to touch in order to obtain the cited advantages. The opposition division thus concluded that the claimed moulding material was not obvious but involved an inventive step.

V. On 12 March 2008 **opponent 1** (appellant) lodged an appeal against the decision of the opposition division and paid the appeal fee on the same day.

In the statement setting out the grounds of appeal filed on 23 May 2008 by fax, opponent 1 refuted the conclusions of the opposition division on all issues and requested the complete revocation of the European patent. The following further documents were submitted:

**D20:** US-A-4 228 113

**D21:** US-A-5 112 663

**D22:** EP-A-0 419 401

**D23:** DE-A-19 537 663

**D24:** US-A-3 663 344

With a letter dated 21 April 2009 opponent 1 reiterated the previously raised objections and submitted the documents:

**D25:** Drawing illustrating the claimed prepreg and a conventional prepreg

**D26:** Test report of Mr Mark Whiter.

A notice of intervention was filed on 22 December 2008 by the **assumed infringer** (intervener, opponent 2) Hexcel Holding GmbH. Opponent 2 paid the opposition fee and the appeal fee on the same day and requested the complete revocation of the contested patent. The intervention was based on objections raised under Articles 100(a), (b) and (c) EPC and was relied on documents D1 to D24, already cited in the appeal

proceedings by opponent 1. The further document was submitted:

**D25'**: Expert opinion of Professor Dr W Bremser dated 10 December 2008

With letter dated 20 August 2009 opponent 2 reiterated its objections and filed further documents:

**D26'**: Experimental report by A Endruweit *et al* dated 25 February 2009

**D27'**: GB-A-2 445 929

**D28'**: Extract from Wittfoht, *Plastics Technical Dictionary*, 1995, pp 226, 386

Even further arguments were submitted with letter dated 5 October 2009 accompanied by a final document:

**D29'**: Drawing illustrating a one sided prepreg stack and a two sided prepreg stack

VI. With letters dated 20 October 2008 and 22 May 2009 the **respondent patent proprietor** filed observations concerning the appeal and the intervention respectively, essentially contested the arguments of the opponents, and filed additional documents in support and new requests.

The new documents are:

**D27''**: Coloured photographs and drawings (Annex A of letter dated 20 October 2008)

**D28''**: Data Sheet of SE 90 dated 1999 (Annex A1 of letter dated 22 May 2009)



**D29''**: DVD with narration in German together with a sequence of screenshots with English text

With the letter dated 2 October 2009, the patent proprietor filed further arguments and new requests replacing the requests on file. Claims 1 and 5 of the main and the (first) alternative main request were identical with the granted claims 1 and 5.

VII. Oral proceedings were held before the Board on 4 and 5 November 2009. In the course of these proceedings the Board pointed out to an objection of insufficient disclosure of the invention other than the one raised by the appellants. This related to a feature claimed in all requests which, according to one embodiment, comprised the feature of a tackifier and/or binder applied to one or both outer surfaces of at least one fibrous layer. This objection related specifically to claim 5 of the main and (first) alternative main requests. In reaction thereto the patent proprietor filed a second alternative main request which did not claim the contested embodiment of the invention.

VIII. The arguments put forward by the opponent 1 (appellant) and opponent 2 in their written submissions and at the oral proceedings can be summarized as follows:

Added subject-matter

The subject-matter of claims 1 of the main and alternative main requests 1 and 2 did not fulfil the requirements of Article 123(2) EPC. The claims in particular:

- did not comprise the direct link between the properties of the outer surfaces of the fibrous layers, namely "free from resin" and "dry to touch" as disclosed in the originally filed application (page 4, lines 12-14);
- combined the property "dry to touch" with the ability of the moulding material to allow entrapped air to pass out during processing of the material, which combination did not find support in the originally filed application.
- did not limit the evacuation of the entrapped air during further processing to the application of a vacuum.

#### Sufficiency

The invention claimed by the subject-matter of claim 1 of all main requests did not fulfil the requirements of Article 83 EPC because:

- the contested patent did not provide any definition or a test method for measuring the features "free from resin" and "dry to touch". These features did not have a unique and unambiguous meaning or unique test procedures. Different test methods would produce different results. Therefore any result to be achieved could not be unambiguously determined and verified;
- the feature "to allow entrapped air to pass out of said multi-layered moulding material during processing of the material", was nowhere defined, whether with regard to the speed or the amount of the air which had to pass out of the multi-layered moulding material;

- the expert opinion of Professor Bremser (D25') explained that the above mentioned features, in addition to "conjoined with", depended on a large number of factors not specified in the claim or the specification. It had therefore to be concluded that without the guidance from the description it was an undue burden to select from the countless possible combinations the small number of combinations which would allow the features to be arrived at;
- the sole example of the patent did not disclose how to conjoin the layers because the fibrous layers were simply laid on opposing sides of a resin layer;
- the resin material in that example, SP Systems SE90, was not commercially available and the skilled person was therefore not able to repeat the sole example of the contested patent since on the priority date of the patent the prepreg resin SE90 was not available to the public.

### Novelty

The subject-matter of claims 1 of the main request and the alternative main requests 1 and 2 lacked novelty in view of the disclosure of D28', D21 and D20.

- All these documents disclosed moulding materials which had the multi-layered structure claimed: fibrous layer/resin layer/fibrous layer. In all these documents the outer fibrous layers were dry, and thus free from resin. During processing of these moulding materials the entrapped air was allowed to pass out of said material.
- The patent proprietor was wrong in arguing that the resin of the claimed subject-matter was a B-staged

resin and therefore not liquid and thus was different from those of the opposed documents. No such definition was provided in the originally filed application.

Inventive step

The subject-matter of claim 1 lacked an inventive step as it was obvious *inter alia* in view of the combination of D11 with D28', D22 with D28' or D15 with D22.

D11, D22 or D15 should be considered to represent the closest state of the art, depending on the starting point of the skilled person: a moulding material with a single or two fibrous layers.

The technical problem to be solved was to provide an alternative moulding material with improved handleability.

On the one hand no technical evidence was provided to show that the technical problem was effectively solved. The sole example of the patent was not repeatable because it involved a resin which was not publicly available on the priority date of the patent.

On the other hand the solution of the technical problem by means of the distinguishing features of the claimed invention was obvious to the skilled person in view of the available state of the art.

- Starting from D11/D22, which disclosed a moulding material with a single fibrous layer, the skilled person would have no difficulties in adding a further resin-free and dry-to-touch fibrous layer on the resin material. Such a three layer composite construction was shown in D28'.

- Starting from D15, which disclosed a moulding material with two fibrous layers which is fully impregnated, the skilled person would find it obvious to reduce the impregnation of the outer surfaces in order to improve its handleability. The incentive for this measure was provided by D15 itself.
- Contrary to the argument of the patent proprietor there was no technical prejudice in the art against the use of a second fibrous layer disclosed by D11/D22 to solve the set technical problem (see T 1212/01). In the prior art, single-sided prepregs were intentionally used; this did not mean that they should not be modified.
- The alleged commercial success was not demonstrated in comparison with competitors and over the years.
- The merits of the technical awards were not clear.
- Furthermore the solution of the technical problem was not plausibly obtained across the whole scope of the claimed subject-matter.

IX. The arguments put forward by the respondent (patent proprietor) in its written submissions and at the oral proceedings can be summarized as follows:

Added subject-matter

- Support was found in the originally filed application for the features that the outer surfaces of the fibrous layers should be "free from resin" and "dry to touch" (page 4, lines 12-14). The fact that "dry to touch" was a direct consequence of "free from resin" was immaterial.

- Furthermore the description provided the link of the dry outer surface of the fibrous material with its ability to evacuate air entrapped in the moulding material (page 4, lines 19-24).
- The originally filed application was not limited to the application of a vacuum during the processing of the moulding material.

#### Sufficiency

- The objections raised under Article 83 EPC were in fact objections according to Article 84 EPC which was not a ground of opposition.
- The meaning of the expressions "free from resin", "dry to touch", "conjoined with", "to allow entrapped air to pass out of said multi-layered moulding material during processing of the material" related to clarity issues.
- The resin material SP Systems SE90 involved in the example of the patent was that disclosed in D28''. This resin material was commercially available.
- Anyway, the test reports D17 and D26' submitted by the opponents themselves provided the necessary evidence that the skilled person was able to reproduce the multi-layered moulding material of the claimed invention without undue burden.

#### Novelty

- The subject-matter of claims 1 of the main request and the alternative main requests 1 and 2 was novel. Documents D28', D21 and D20, contrary to the arguments of the opponents, did not directly and

unambiguously disclose that the outer surfaces of the fibrous layers were free from resin and dry to touch.

- While D21 and D20 referred to dry fibrous layers, it was clear that this property related to the initial layers before they were put into contact with the resin.
- Moreover, the moulding materials of D21 and D20 were not "prepregs" but "short fibre composites" and "wet lay-up composites", respectively, in the sense of D16 (page 3, table).
- Liquid resins were used in all three documents, contrary to the partially cured B-staged resin in the resin material according to the invention. Such liquid resins would, upon contact with the fibrous layers, spread in the fibrous layers as far as their outer surfaces, either because of gravity or capillary forces.

#### Inventive step

The claimed subject-matter involved an inventive step whatever the closest state of the art (D11, D15 or D22).

- Only with hindsight would the skilled person consider putting a second fibrous layer having an outer surface free from resin and dry to touch on the resin layer at the side opposite to the first fibrous layer.
- By means of this second fibrous layer the following technical problem was solved: the provision of thicker and more complex moulding materials. This was based on the improved drape of the moulding material and to the sliding of the unimpregnated

fibres over each other which led to less bridging over details in the mouldings.

- This was shown in the photographs 1-3 of the technical evidence submitted as D27''.
  - D28 and D22 did not disclose any improvement of drape and any sliding of the moulding material during further processing in a moulding.
  - D20, which disclosed in column 2, lines 11-13 that during moulding any shearing forces were absorbed by the protective finish, was also irrelevant. These shearing forces related to the sliding of the layers within the moulding material and not to the sliding of the moulding material within a stack of such materials.
  - Furthermore, there were other considerations for the involvement of an inventive step, such as a technical prejudice in the art of prepregs, a commercial success and technical awards.
- X. The appellant (opponent 1) and the intervener (opponent 2) requested that the decision under appeal be set aside and that the European patent No 1 128 958 be revoked.
- XI. The respondent (patent proprietor) requested that the patent be maintained in amended form on the basis of the set of claims of the main request, or of the alternative main request, filed with the letter dated 2 October 2009, or alternatively on basis of the set of claims of the second alternative main request, filed during the oral proceedings (5 November 2009), or alternatively on the basis of the set of claims of one of the auxiliary requests 1 to 7, filed with the letter of 2 October 2009.



## **Reasons for the Decision**

### 1. *Admissibility of the appeal*

The appeal is admissible.

### 2. *Admissibility of the intervention*

2.1 According to Article 105(1)(a) EPC any third party may intervene in opposition proceedings after the opposition period has expired if it proves that proceedings for infringement of the same patent have been instituted against him. In G 1/94 (OJ 1994,787) the Enlarged Board interpreted Article 105 EPC in the sense that the term of opposition proceedings as used in that provision is not restricted to such proceedings before an opposition division but comprises also any subsequent pending appeal proceedings before a Board of Appeal (point 10 of the decision).

2.2 In the present case, the notice of intervention was filed (22 December 2008) within three months of the date on which the summons for infringement proceedings had been served (25 September 2008 according to the date written on the summons) for the same patent by the patent proprietor. The opposition fee was paid in the same time and the intervention comprised a reasoned statement (Rule 89(1)and (2) EPC).

The intervention of the assumed infringer Hexcel Holding GmbH is thus admissible and the intervener acquired the status of party as of right according to

Article 107 EPC, as the Enlarged Board stated in G 3/04 (OJ 2006,118, point 10 of the decision). In view of these considerations the initially paid appeal fee was reimbursed to them (see G 3/94, *loc cit*, point 11).

3. *Admissibility of the second alternative main request*

This request was filed during the oral proceedings before the Board of appeal. It was filed as a reaction to the objection raised against the sufficiency of disclosure of the invention claimed in claim 5 of the main and (first) alternative main requests (see point 5 below). The second alternative main request differed from the hierarchically higher main requests only in that it did not contain dependent claim 5. Therefore the Board, exercising its discretion under Article 13 RPBA, allowed this request into the proceedings.

4. *Amendments - Article 123(2) EPC*

4.1 The opponents contested the subject-matter of claim 1 of all requests on the basis of Article 123(2) EPC. They argued that the features "whereby the outer surfaces of the moulding material are free from resin and dry to touch to allow entrapped air to pass out of said multi-layered moulding material during processing of the material" did not find support in the originally filed application.

4.2 The Board, contrary to the argument of the opponents, considers that the contested features do find support in the originally filed application, which is represented by the WO publication.

4.2.1 With regard to the features relating to outer surfaces free from resin and dry to touch the Board makes specific reference to page 4, lines 12 to 14. This passage discloses that "in one particularly preferred embodiment, the outer surface of the moulding material is **free from resin** and is therefore **dry to touch** due to the presence of the fibrous layers". The Board recognizes in this passage the unambiguous factual disclosure of the two properties of the outer surfaces of the claimed composite structure. For the Board the link between the two properties on the basis of the word "therefore" is immaterial as it only establishes their cause-result relation.

4.2.2 With regard to the link of these two properties with the ability of the air evacuation of the entrapped air the board relies on page 4, lines 19-24. It is specifically disclosed in lines 21-24 that "the fibrous layer of the material of the present invention performs in a similar manner to dry layers of reinforced conventional systems, in that it allows entrapped air to pass out of the laminate". This disclosure provides the necessary link between the surface structure - its dryness - and the effect it enables, namely - **to allow entrapped air to pass out of the said multi-layered moulding material during processing of the material.** Undisputedly if this occurs on the surface of one of the fibrous layers it will also occur on the surface of the second fibrous layer of the claimed composite.

4.2.3 Finally, with regard to the feature relating to the evacuation of the air **during processing of the multi-layered moulding material** the Board refers to page 12, lines 4 to 6. This passage discloses that "the

materials may be processed by any suitable method" and therefore does not impose any particular process limitation.

The objection raised by the opponents in this context based on page 12, lines 31-33, cannot be followed by the Board. This specific disclosure relates to the particular situation of full evacuation of the entrained air, which corresponds to a specific embodiment of the claimed subject-matter.

4.3 In view of the above considerations the Board accepts that the claimed subject-matter fulfils the requirements of Article 123(2) EPC.

5. *Disclosure of the invention - Article 83 EPC*

Main request and first alternative main request

5.1 The invention according to claim 1 of the main request and the (first) alternative main request requires that multi-layered moulding material comprises two fibrous layers, the outer surfaces of which are **free from resin** and dry to touch **to allow entrapped air to pass out of said multi-layered moulding material during processing of the material.**

5.1.1 The opponents argued that the patent specification gives the skilled person no indication how to simultaneously control the features of the multi-layered moulding material, namely that:

- (i) the outer surfaces of the fibre layers must be free from resin;
- (ii) they must be dry to touch and

(iii) they must allow air to pass out during processing of the material.

5.1.2 The Board does not agree with the opponents for the following reasons. On the one hand it was known in the art to make prepregs having one layer of resin and one layer of dry fibre material. On the other hand the skilled person, on the basis of this knowledge, would have no difficulties in providing a composite construction with a second dry fibrous layer on the other side of the resin layer. Thus the patent application itself (page 4, lines 19-24) discloses that it was known in the state of the art how to make conventional systems with dry layers of reinforcement of fibrous material, ie necessarily free from resin, which allowed entrapped air to pass out of the laminate. This position of the Board is confirmed by the documents cited by the opponents themselves. Particular reference is made to D9 (page 16, third paragraph), D11 (page 31, left column, lines 16-20), D14 (page 3, lines 15-19; page 3, line 26 to page 4, line 2). Furthermore the opponents have filed technical evidence, namely D17, D26 and D26', which demonstrates that the skilled person in the art was able to reproduce the claimed multi-layered moulding material - no particular technical difficulties is disclosed in these documents.

5.1.3 On the basis of the above considerations the Board concludes that **the invention according to claim 1** of the main and the (first) alternative main requests fulfils the requirements of Article 83 EPC.

5.2 In the particular realisation of **the invention according to claim 5** of the main request and the (first)

alternative request, which is dependent on claim 1, a tackifier and/or a binder is applied to one or both outer surfaces of the at least one fibrous layer.

5.2.1 The question which has to be answered in the context of Article 83 EPC is therefore the following: how can the skilled person putting into practice the invention as claimed by the subject-matter of claim 5 manufacture a multi-layered moulding material which has simultaneously both outer surfaces of the fibrous layers free from resin and dry to touch and enable the evacuation of entrapped air from the multi-layered moulding material during its processing. The Board remarks that this is technically not possible. Consequently essential features of the claimed invention, structural and functional, cannot be put into practice.

5.2.2 The Board disagrees with the patent proprietor, who argued that the objection of the board boiled down to a clarity objection - which is not a ground of opposition. To the Board's understanding the dependency of claim 5 on claim 1 does not simply introduce an inconsistency or contradiction in respect of the structural properties on the surface(s) of the fibrous layers - "free from resin" and "dry to touch". On the contrary this dependency introduces a more severe defect since besides the essential structural features the skilled person is not also able to realize the functional feature of the air evacuation during processing of the multi-layered moulding material.

- 5.2.3 Under these circumstances the Board considers that the invention according to claim 5 of the main and the (first) alternative main requests does not meet the requirements of 83 EPC.

Alternative second main request

- 5.3 The set of claims defining the scope of protection of the second alternative main request does not contain as a dependent claim, a claim comprising the contested subject-matter of claim 5 of the main and the alternative main requests. Consequently the invention claimed by the second alternative main request fulfils the requirements of Article 83 EPC.

6. *Novelty - Article 54*

- 6.1 Claim 1 of the second alternative main request concerns a multi-layered moulding material. This material comprises a layer of resin material, a first fibrous layer and a second fibrous layer. The first fibrous layer is conjoined to the upper surface of the layer of resin material and the second fibrous layer is conjoined to the lower surface of the layer of resin material. The way they are conjoined is defined to be "by contacting". The outer surfaces of these fibrous layers of the moulding material are defined to be free from resin and dry to touch so as to allow entrapped air to pass out of the multi-layered moulding material during processing of the material. This moulding material forms a prepreg adapted for use in multiple layers.

6.1.1 The meaning of the terms "free from resin" and "dry to touch" has been challenged by the opponents. They based their objection on D29'' (screenshot 03:51-04.13; the English text) submitted by the patent proprietor which discloses that the skilled person would interpret the claim to mean that the material has sufficient dry glass on the surface to enable a robust air connection between adjacent plies of the material and therefore to enable entrapped air to pass out of the laminate during processing. On this basis they argued that the feature "dry to touch" should be understood to mean sufficiently dry to touch and the feature "free from resin" be interpreted as "sufficiently free from resin".

The Board, however, has not found any basis for such an interpretation in the subject-matter of claim 1 or the originally filed application. Consequently it considers that there is no reason to deviate from the conventional meaning of these terms and give them an alleged particular and unfounded meaning.

6.1.2 With regard to the term "prepreg" the Board considers that its meaning does not deviate from that which the skilled person would give this term except for the type of contact between the resin and the fibrous layers. The Board notes that the application as originally filed (page 2, lines 1-3) clearly discloses that the claimed prepregs not only embrace those with fibres embedded in the resin material (ie a specific embodiment of the conventional prepregs with an outer fibrous surface free from resin and dry to touch) but also extend further off to cover composites in which the fibres are in contact with the resin. Nevertheless, whatever the degree of impregnation of the resin in the



fibrous layer is, one thing remains undisputable, namely that the resin component in a "prepreg" implicitly relates to a partly reacted (B-staged) resin. The uncontested evidence for this has been provided by the opponents themselves (D28': page 226, section E, "Prepreg Production" and D11: page 1, left column, lines 1-8).

- 6.2 The opponents contested the novelty of the subject-matter of Claim 1 of the second alternative main request based on the disclosure of D28', D21 and D20. The Board, however, does not consider that these documents disclose in a direct and unambiguous manner moulding materials with outer surfaces of fibrous layers which are "free from resin and dry to touch to allow entrapped air to pass out of said multi-layered moulding material during processing of the material".
- 6.2.1 D28' is an extract from an English-German/German-English dictionary (page 226) which illustrates by means of a figure the preparation of prepregs by internal impregnation. According to this figure two layers of textile glass mats impregnated by resin are passed through squeeze rolls while the resin is being applied in the nip of the squeeze rolls. No details are provided in the document with regard to the chemical composition and thickness of the mats, the chemical nature of the resin, the conditions of the internal impregnation, such as the pressure applied by the rolls, the temperature at which the process is carried out and the feed rate of the resin. Such features would determine the degree of impregnation of the resin. Under the circumstances of this very general disclosure, the Board cannot unambiguously and directly derive that

the outer surfaces of the mats constituting the prepreg will be free from resin and dry to touch so as to allow entrapped air to pass out of said multi-layered moulding material during processing of the material. The novelty attack on the basis of this document must therefore fail.

6.2.2 D21 (abstract; figure 2; column 1, line 62 to column 2, line 10; column 2, lines 42-48; column 3, lines 8-30; examples I and II; claim 1) discloses a composite moulding layer which is of a wet lay-up type rather than a prepreg (see differentiation in D6: page 3, diagram; page 27, section B, lines 4-5) and has the layered structure fibre/resin layer/fibre. The resin layer is made of an open-cell foam, impregnated with liquid thermosetting resin. Although the fibre layers are characterized as initially dry it cannot be excluded - as the patent proprietor convincingly argued in the oral proceedings - that the liquid resin would, either by capillary forces or by gravity, diffuse into the fibrous layers and wet them out. It is therefore not directly and unambiguously derivable from D21 that the outer surfaces of the fibre layers will remain "free from resin and dry to touch". Consequently this novelty attack must also fail.

6.2.3 D20 (column 1, lines 6-16 and 47-60; column 2, lines 6-35; column 4, line 64 to column 5, line 24) discloses moulding material assemblies which comprise (i) a layer made of a resin material and mineral fillers and (ii) a dry glass-fibre fleece, which is preferably dry on one or both sides of the resin material. However this document does not disclose a prepreg - the resin is not a partly cured B-staged resin but is a

resin thickened by mineral filler and forms a dough (column 1, lines 6-16; column 5, lines 12-18). Furthermore, the resulting mixture may be quasi-liquid (column 4, lines 42-54) or can be self-levelling (column 5, lines 17-20), which implies that the resin material is in a sufficient liquid state to penetrate the fibrous layer, namely the glass fleece layer. Moreover, as the fibrous layer is not disclosed in detail, the Board considers that it is not directly and unambiguously derivable that the outer surfaces of such initially dry fibrous layer material remain "free from resin and dry to touch". Therefore this novelty attack must also fail.

- 6.3 In view of the above consideration and since the other cited documents were not considered relevant for the issue of novelty by the opponents, the Board in this respect concurring with them, concludes that the subject-matter of the second alternative main request is novel.

7. *Inventive step - Article 56 EPC*

7.1 Closest state of the art

- 7.1.1 The Board considers document D11 (page 31, left column, under point "Variation in the level of impregnation") to represent the closest state of the art. This document relates to moulding materials involving a resin layer and a conjoined fibrous layer, the outer surface of which is free from resin and therefore dry to touch and which allows the entrapped air to pass out during processing of the moulding material. It

therefore belongs to the same technical field and seeks to solve primarily the same technical problem.

- 7.1.2 D22 (abstract; column 2, lines 31-36; column 3, lines 17-37; column 4, lines 2-5 and 37-45) relates to prepregs with pre-impregnated fabric plies having a dry side with no resin detectable on it. However it relates to the release of these pre-impregnated fabric plies from surfaces and not to the relation between the dry side of the fabric and the evacuation of entrapped air from the prepreg as in the opposed patent. Therefore D22 was considered less relevant than D11.
- 7.1.3 D15 (page 1, lines 28-48 and 55-85; page 2, lines 7-19) discloses a laminate having two outer layers and a core, all formed by filaments and all impregnated with a thermosetting material which is matured, so that its viscosity increases and the surfaces become non-tacky. This document does not concern prepregs but SMC (thermosetting Sheet Moulding Compositions) and the thermosetting material is not a partially cured (B-staged) resin. Furthermore, it does not address the issue of entrapped air evacuation. This document is consequently far less relevant than D11.
- 7.1.4 The moulding material of claim 1 of the second alternative main request differs from the moulding material of D11 in that it comprises a second fibrous layer conjoined to the resin layer on the opposite side. This second fibrous layer, like the first one, has an outer surface free from resin and dry to touch so as to allow entrapped air to pass out of said moulding material during processing of the material.

7.2 The technical problem to be solved

7.2.1 The originally filed application sets as a technical problem to be solved the prevention of void formation due to air trapped either within a layer of the moulding material or between adjacent layers. Such voids have as detrimental effect the deterioration of the mechanical properties of the cured composite materials (page 2, lines 10-14).

7.2.2 The originally filed application acknowledges, however, that this problem has already been solved by the moulding material of the invention either when used alone or in combination with conventional prepregs, whose single dry fibrous layer allows entrapped air to pass out of the laminate (page 4, lines 19-24). Such prepregs correspond to those of the closest prior art D11. In the light of these facts the argument of the opponents that the technical problem amounts to providing an alternative moulding material to that known in the art is considered plausible.

7.2.3 Additionally the board does not accept that the above technical problem could be reformulated on the basis of a technical improvement, namely the provision of moulding materials with fewer voids. On the basis of the technical evidence D17 and D26 filed by the opponents, no substantial difference in void formation can be observed when comparing the claimed moulding material with a conventional prepreg.

The argument of the patent proprietor that this technical evidence does not reflect the industrial reality because of the small size of the analysed

samples is rejected by the board. The reason is that the claimed subject-matter does not contain dimensional limitations and the patent proprietor did not file counter-evidence to substantiate such an argument.

7.2.4 Nevertheless the Board concurs with the patent proprietor in that the originally filed application discloses as a further technical problem solved by the claimed invention, namely the provision of moulding materials which exhibit **improved handling characteristics in that they are more flexible**, that is to say they have **improved drape**, and in that they exhibit **lower tendency to bridge across details**, such as corners, in the moulding (page 5, lines 1-11). The result of this would be the ability to manufacture more complex shapes than achievable heretofore (page 5, lines 5-6, 21 and 23-24). The Board considers that this constitutes an appropriate formulation of the objective technical problem on the basis of the originally filed application. At this point it should be noted that the meaning of the term "handleability" as used here is different from that used in D22 (column 2, lines 32-35; column 2, lines 22-26 and 31-33; column 2, line 54 to column 3, line 2; column 4, lines 16-22; claim 1), in which it means ability to treat/to process.

7.2.5 Document D27'' (figure 8, photos 1 to 3) filed by the patent proprietor with letter dated 20 October 2009 and the explanations given in that letter (paragraphs 188-198) provide concrete technical evidence that the above cited technical problem has indeed been solved. The comparison of the thick laminate according to the invention (photo 3) with thick laminates according to the prior art, namely fully and partially impregnated

prepregs (photos 1 and 2, respectively), shows the achievement of particularly advantageous characteristics such as a more flexible material, ie drupe improvement, and lower tendency to bridge across details - shown in the comparison by the absence of voids in the laminate according to the claimed invention.

### 7.3 Obviousness

7.3.1 The question which remains to be answered is whether the skilled person starting from D11 and setting as the technical problem the provision of a moulding material forming a preformed prepreg adapted for use in multiple layers, which has improved drupe and lower tendency to bridge across details in a moulding, would find the solution or a hint thereto in the state of the art.

7.3.2 On the basis of the prior art documents filed by the opponents the Board concurs on this issue with the patent proprietor. It argued that only with hindsight would the skilled person consider a prepreg composite construction having two fibrous layers with outer surfaces free from resin and dry to touch. Indeed the Board did not find in any of the filed documents any hint that composites with two such fibrous layers would have an intrinsically flexible structure and conformability and would slide over each other during the consolidation and curing stages, thus significantly reducing the tendency for the moulding material to bridge across details in the moulding. Under these circumstances the Board concludes that the solution of the set technical problem is not obvious.

7.3.3 The opponents referred to D28', D15 and D20. However, the skilled person would not have considered them. D28', D15 and D20 do not disclose outer surfaces of the moulding material, be it a prepreg or not, which are free from resin and dry to touch. Therefore they provide no motivation for the double-sided structure of the moulding material.

7.3.4 Moreover the Board has no reasons to doubt that the set technical problem is solved across the scope of the claim. No technical evidence was submitted by the opponents in order to persuade the Board that their argument had any technical foundation and was not a mere allegation.

7.4 Consequently the Board concludes that the subject-matter of claim 1 of the second alternative main request involves an inventive step. The specific embodiments of dependent claims 2 to 14 also fulfil *mutatis mutandis* the requirements of Article 56 EPC. This applies equally to the method claims 15 to 17 relating to the method of forming the multi-layered material according to claims 1 to 14.



## Order

### **For these reasons it is decided that:**

The decision under appeal is set aside.

The case is remitted to the opposition division with the order to maintain the patent on the basis of the claims 1 to 17 of the second alternative main request, filed during the oral proceedings (5 November 2009), after any necessary consequential amendments of the description.

The Registrar:

The Chairman:

G. Röhn

N. Perakis