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**Datasheet for the decision
of 26 February 2020**

Case Number: T 0151/17 - 3.3.03

Application Number: 11004001.1

Publication Number: 2404766

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C08L53/02, B60C5/14

Language of the proceedings: EN

Title of invention:
Polymer sheet for inner liner and pneumatic tire using the same

Patent Proprietor:
Sumitomo Rubber Industries, Ltd.

Opponent:
MICHELIN Recherche et Technique S.A.

Relevant legal provisions:
EPC Art. 56, 123(2)

Keyword:
Inventive step - Main request and auxiliary requests 1-7 (no)
Amendments - Auxiliary request 8 - allowable (no)



Beschwerdekammern

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Case Number: T 0151/17 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 26 February 2020

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 21 November
2016 rejecting the opposition filed against
European patent No. 2404766 pursuant to Article
101(2) EPC.**

Composition of the Board:

Chairman	M. C. Gordon
Members:	D. Marquis
	R. Cramer

Summary of Facts and Submissions

I. The appeal lies against the decision of the opposition division posted on 21 November 2016, rejecting the opposition against European patent No. EP 2 404 766.

II. Claims 2 and 3 of the application as filed read as follows:

"2. A polymer sheet for an inner liner, including an SIBS layer containing a styrene-isobutylene-styrene triblock copolymer, and at least one of an SIS layer containing a styrene-isoprene-styrene triblock copolymer, and an SIB layer containing a styrene-isobutylene diblock copolymer, said SIBS layer having a thickness more than or equal to 0.05 mm and less than or equal to 0.6 mm, said SIS layer and said SIB layer having a total thickness more than or equal to 0.01 mm and less than or equal to 0.3 mm, and said SIBS layer, and at least one of said SIS layer and said SIB layer containing more than or equal to 0.5% by mass and less than or equal to 40% by mass of a polymer obtained by polymerization of a monomer unit having 4 carbon atoms."

"3. The polymer sheet for an inner liner in accordance with claim 1 or 2, wherein said polymer obtained by polymerization of a monomer unit having 4 carbon atoms is composed of at least one of polybutene and polyisobutylene."

III. Claim 1 of the patent read as follows:

"1. A polymer sheet for an inner liner, including an SIBS layer containing a styrene-isobutylene-styrene triblock copolymer, and at least one of an SIS layer containing a styrene-isoprene-styrene triblock copolymer, and an SIB layer containing a styrene-isobutylene diblock copolymer, said SIBS layer having a thickness more than or equal to 0.05 mm and less than or equal to 0.6 mm, said SIS layer and said SIB layer having a total thickness more than or equal to 0.01 mm and less than or equal to 0.3 mm, and said SIBS layer, and at least one of said SIS layer and said SIB layer containing more than or equal to 0.5% by mass and less than or equal to 40% by mass of a polymer obtained by polymerization of a monomer unit having 4 carbon atoms."

IV. The patent was opposed on the grounds that its subject matter was not sufficiently disclosed and lacked novelty and inventive step.

V. On 22 July 2016, the patent proprietor filed auxiliary requests 1 to 8 in reply to the objections of lack of sufficiency of disclosure.

Claim 1 of auxiliary requests 1 and 2 corresponded to claim 1 of the main request.

Claim 1 of auxiliary request 3 corresponded to claim 1 of the main request with the amendment of the thickness of the SIS layer or the SIB layer to a range of more than or equal to 0.05 mm and less than or equal to 0.2 mm.

Claim 1 of auxiliary request 4 corresponded to claim 1 of the main request wherein the polymer obtained by polymerization of a monomer unit having 4 carbon atoms was composed of at least one of polybutene and polyisobutylene.

Claim 1 of auxiliary request 5 corresponded to claim 1 of the main request in which the reference to an SIB layer was deleted.

Claim 1 of auxiliary request 6 corresponded to claim 1 of the main request wherein the polymer obtained by polymerization of a monomer unit having 4 carbon atoms was composed of at least one of polybutene and polyisobutylene and in which the reference to an SIB layer was deleted.

Claim 1 of auxiliary request 7 corresponded to claim 1 of auxiliary request 6 with the amendment of the thickness of the SIS layer or the SIB layer to a range of more than or equal to 0.05 mm and less than or equal to 0.2 mm.

Claim 1 of auxiliary request 8 corresponded to claim 1 of auxiliary request 7 with the amendment of the content of the SIBS in the first layer to a range of more than or equal to 60% by mass and less than or equal to 99.5% by mass.

VI. The following documents, inter alia, were filed during the opposition:

D7: WO-A-2010063427

D17: Experimental Report filed on 17 July 2014

D28: JP2002301786

D29: Partial human translation of D28

D30: JP200894895
D31: Partial human translation of D30
D32: JP2009149711
D33: Partial human translation of D32
D34: Machine translation of JP2002301786 (D28)
D35: Machine translation of JP200894895 (D30)
D36: Machine translation of JP2009149711 (D32)

VII. The contested decision can be summarized as follows:

- (a) The claims of the main request were sufficiently disclosed. The experimental evidence submitted by the opponent lacked relevance and the patent in suit contained a number of examples of polymer sheets showing that it was possible to prepare such polymer sheets with a SIBS layer and at least one of said SIS layer and said SIB layer as claimed.
- (b) Claim 1 of the patent in suit was novel over D7. In particular, several selections within D7 were necessary to come to the claimed invention. Also, D7 did not disclose the percentage by mass of the plastifier with respect to the mass of the polymer.
- (c) D7 represented the closest prior art. The problem to be solved with respect thereto was to provide a polymer sheet for an inner liner of a pneumatic tyre which had improved flex crack growth resistance, rolling resistance and static air pressure drop and high vulcanization adhesive strength when bonded to the carcass layer. The solution provided in the patent in suit was not obvious over D7.

VIII. An appeal against that decision was lodged by the opponent (hereinafter appellant). The appeal was based

on objections of lack of sufficiency of disclosure, lack of novelty and lack of inventive step. It was requested not to admit D27 to D33 into the appeal proceedings and that, if these documents were admitted, to admit D34 to D36.

- IX. In a communication sent in preparation of oral proceedings, the Board summarised the points to be dealt with and provided a preliminary view on the disputed issues.
- X. Oral proceedings were held on 26 February 2020.
- XI. The arguments provided by the appellant, as far as relevant to the present decision, can be summarised as follows:

Main request

Inventive step

- D7 was the closest prior art document.
- Claim 1 differed from the example of D7 in the thickness of a layer of styrene-isobutylene-styrene triblock copolymer (SIBS layer) and in the presence of extender oil in the layer comprising a styrene-isobutylene-styrene triblock copolymer (SIS layer). The value of the thickness of the SIBS layer (0.75 mm) that was disclosed on page 14 of D7 did not fall under the range according to claim 1 of the main request. From the total thickness of the assembly disclosed in D7 on page 16 however it was derived that the thickness of the SIS layer was according to claim 1 of the main request (0.30 mm). The total thickness mentioned on that page

unambiguously referred to the assembly comprising the SIBS and SIS layers 10a and 10b disclosed on page 14. There was no reason to assume that the thickness of the SIBS layer and that of the assembly had been measured under different conditions, i.e. before and after vulcanization. It had in any case not been established that that would make any difference on the determination of the thickness of the layer.

- Neither the patent in suit nor experimental report D17 contained fair comparative examples in respect of the assembly disclosed in the example of D7. The examples on file were not suitable to show whether the distinguishing features resulted in any technical effect.
- With regard to the lower thickness of the SIBS according to claim 1 of the main request it had not been shown that this had a significant impact on the properties of pneumatic tyres. The effect of a reduction in weight was in any case obvious.
- With regard to the presence of polyisobutylene (PIB) in the SIS layer, the data on file did not show that it had any effect.
- The problem was thus to provide an alternative thickness for the SIBS layer and an alternative composition for the SIS layer.
- D7 taught that the thickness of the SIBS layer could be varied within a broad range that overlapped the range according to claim 1 of the main request. The use of PIB as extender oil as well as its content in the SIS layer was disclosed

on page 9. D7 thus rendered the claimed subject matter obvious.

Auxiliary requests 1-8

- The respondent had only provided arguments concerning the objections of lack of sufficiency of disclosure against auxiliary requests 1-8. No arguments regarding inventive step were provided. Furthermore the auxiliary requests 1-8 were not convergent. These requests were thus not to be admitted into the proceedings.
- Furthermore, claim 1 of the auxiliary requests 1 and 2 lacked inventive step for the same reasons as the main request.
- The amended range defining the thickness of the SIS/SIB layer in auxiliary request 3 was not associated with any effect and that range was in any case already taught in D7. Auxiliary request 3 therefore lacked inventive step.
- With respect to auxiliary request 4, the use of polyisobutylene was already taught on pages 6, 9 and 14 of D7. The same arguments applied to auxiliary requests 5-7 since the modifications made to these requests did not give rise to any further effect.
- With respect to auxiliary request 8, there was no basis in the application as filed for the combination of features defined in claim 1. In particular, the combination of the range defining the amount in SIBS was selected from a preferred range within the description without the

corresponding preferred ranges being defined for the other features. There was no basis for the characterization of the polymer sheets by the content of SIBS in the SIBS layer without also limiting the other features disclosed at the same level of preference in the application as filed. Claim 1 did not meet the requirements of Article 123(2) EPC.

XII. The arguments of the respondent, as far as relevant to the present decision, can be summarised as follows:

Main request

Inventive step

- D7 was the closest prior art. Claim 1 differed from the example of D7 in the thickness of the first layer and in the presence of a polymer obtained by polymerization of a monomer having 4 carbon atoms in the second layer. Also, the thickness of the SIS layer was not directly and unambiguously disclosed in D7. That thickness could also not be deduced from the value of the total thickness on page 16 because that thickness was measured on the laminate before vulcanization, by contrast the thickness of the SIBS layer disclosed on page 14 was measured on the vulcanized laminate. Since it was common general knowledge that the thickness of a layer changed as a result of vulcanization, the thickness of the SIS layer could not be deduced from the information disclosed in D7.
- The examples and comparative examples of the patent in suit showed that overall good results were obtained and that a reduction of weight of the

layers led to an increased fuel efficiency of the produced pneumatic tyres. As to the presence of PIB in the second layer, the patent in suit showed that this resulted in a high vulcanization adhesion strength index. In that respect, a comparison of example 8 with examples 1-7 confirmed these effects. The problem solved was therefore to provide a pneumatic tyre with with excellent static air pressure drop rate, rolling resistance index, flex crack growth index and improved presence or absence of air-in portions without impacting the remaining properties of the tyre.

- D7 taught away from a thickness of the SIBS layer as defined in claim 1 of the main request since a relatively thick layer was employed. Furthermore, the SIBS layer of D7 contained a platy filler and an extender oil, although the second SIS layer contained no additives. However the presence of the platy filler resulted in a polymer having a relatively high specific gravity compared to the rubber, which was contrary to the objective of reducing the weight of the tyres which was an objective of the patent in suit. D7 thus did not teach the reduction in total thickness of the polymer laminate, on the contrary, the SIBS layer according to D7 could be up to 10 mm thick. There was also no incentive in D7 to use a polymer prepared from a monomer with 4 carbon atoms specifically. D7 taught the addition of a plasticizer such as PIB in the SIS/SIB layers only for the purpose of increasing the flexibility of this layer and not in view of increasing its adhesiveness. Claim 1 was inventive over D7.

Auxiliary requests 1-8

- Auxiliary requests 1-8 had been validly filed during the first instance proceedings. These requests thus formed part of the appeal proceedings.
- Claim 1 of auxiliary requests 1 and 2 was inventive for the same reasons as claim 1 of the main request.
- The limitation of the range defining the thickness of the SIS layer in claim 1 of auxiliary request 3 resulted in a weight reduction of the polymer sheet and therefore in an improvement of fuel efficiency of the pneumatic tyre. That range of thicknesses was not taught in D7. Claim 1 of auxiliary request 3 met the requirements of Article 56 EPC.
- With regard to auxiliary request 4, D7 did not suggest the specific polymers obtained from monomers having 4 carbons according to claim 1. Auxiliary request 4 was thus inventive over D7.
- The arguments submitted for auxiliary requests 3 and 4 applied to auxiliary requests 5-7. These requests were thus inventive.
- Claim 1 of auxiliary request 8 was based on claims 2 and 3 as originally filed as well as on paragraphs 40 and 56 of the A1 publication which disclosed the preferred amount in SIBS in the SIBS layer.

XIII. The appellant requested that the decision under appeal be set aside and that the patent be revoked.

Furthermore they requested that documents D27 to D33 not be admitted into the proceedings, and that if they were admitted, documents D34 to D36 also be admitted.

- XIV. The respondent requested that the appeal be dismissed, or alternatively that the decision under appeal be set aside and the patent be maintained in amended form on the basis of any of auxiliary requests 1 to 8 filed with the letter of 22 July 2016 before the opposition division.

Reasons for the Decision

Main request

1. Inventive step
 - 1.1 The patent in suit concerns a thin polymer sheet for an inner liner that allows a pneumatic tyre to be produced which exhibits excellent performance in flex crack growth resistance, rolling resistance and static air pressure drop (paragraphs 12 and 22).
 - 1.2 Both parties in appeal considered that D7 represented the closest prior art, in accordance with the contested decision. D7 concerns gas tight layers or laminates that render inflatable articles, in particular pneumatic tyres, gas impermeable (page 1, lines 11 and 12). The laminates according to D7 are used as inner liners that are intended to reduce rolling resistance of pneumatic tyres (page 1, lines 23-39). D7 is in the same field as the patent in suit and concerns the same type of inner liners to improve selected properties of pneumatic tyres. The Board does not see a reason to diverge from the position of the parties in respect to

the status of that document as closest prior art.

- 1.3 The example disclosed on pages 14 line 20 to page 17 line 15 in D7 is the most relevant starting point since that disclosure concerns the preparation of pneumatic tyres with an inner liner comprising a multilayer laminate. The laminate employed in this example is made of a first layer (layer 10a) containing SIBS, 65 phr. of PIB, 28 phr. of filler and having a thickness of about 0.75 mm, and of a second layer containing SIS (page 14, lines 20-25).
- 1.4 The content of SIBS by mass in the first layer can be deduced from the content of the other components in that layer, and amounts to 33.7% weight. In its composition and amount this component corresponds to the polymer obtained by polymerization of a monomer unit having 4 carbon atoms as defined in claim 1 of the main request.
- 1.5 The second layer of the laminate (layer 10b) is made of SIS and does not contain additives (page 14, lines 34-38). The thickness of the second layer is not explicitly disclosed in D7. However, since the total thickness of the layers 10a and 10b is known from the passage on page 16, lines 30-34 of D7 (1.05 mm) and the thickness of layer 10a is disclosed on page 14, line 20 (about 0.75 mm), the thickness of layer 10b must therefore be about 0.30 mm. That value is found to anticipate the range of 0.01 mm to 0.3 mm defined in claim 1 of the main request.
- 1.6 The respondent argued for the first time at the oral proceedings before the Board that claim 1 of the main request differed from the multilayer laminate of D7 in the thickness of the SIS layer. It was in particular

argued that the thickness of the SIBS layer (layer 10a) was measured on the vulcanized laminate, in contrast to the total thickness of the laminate which was measured before vulcanization. Since vulcanization had an impact on the thickness of the layers of the laminate, one could not deduce the thickness of the SIS layer from the data available in D7.

1.7 There is however no indication in D7 that the thickness of the SIBS layer 10a was measured on the vulcanized laminate. Vulcanization or the influence thereof is not mentioned in the passage describing layer 10a on page 14, lines 20-32. Furthermore, the passage at page 16, lines 30-34 discloses that the total thickness of the laminate of layers 10a and 10b was determined before vulcanization. There is no apparent reason in D7 to measure the thickness of layer 10a on the vulcanized laminate rather than to measure the total thickness of the laminate before vulcanization. The measurement of the thickness of layer 10a on the vulcanized laminate makes, in the context of the preparation of the laminate in the example of D7, no sense in particular because it has not been shown that it is possible to measure said thickness once the layers of the laminate have been vulcanized.

1.8 It was further argued by the respondent that the passage on page 16, lines 30-34 of D7 referred to multiple pneumatic tyres which made it ambiguous whether the total thickness related to the specific laminate containing layers 10a and 10b disclosed on page 14 of that document. The reference to multiple tyres in that passage is however to be read in the context of page 15, which discloses that several pneumatic tyres were produced from the laminate containing the layers 10a and 10b, these tyres only

differing from each other in the vulcanization step. Since that passage refers to the only laminate disclosed to contain the layers 10a and 10b, the Board finds it unambiguous that it can only refer to the layers disclosed on page 14, lines 20-38.

- 1.9 The Board concludes from the above that the thickness of the SIS layer is not a distinguishing feature of claim 1 of the main request with respect to D7. Claim 1 of the main request thus differs from the example of D7 in the lower thickness of the SIBS layer (0.05-0.6 mm) instead of about 0.75 mm in the example of D7 and in the presence of PIB in an amount of 0.5-40 weight-% in the SIS layer.
- 1.10 As to the formulation of the problem to be solved over the closest prior art D7, the respondent referred to the examples and comparative examples of the patent in suit that allegedly showed very good results. These results were furthermore considered by the respondent to be plausible over the whole scope of the claim even if there was no direct comparative example with the laminate of the example of D7. In particular reference was made to an improved fuel efficiency of the exemplified pneumatic tyres and to an improved vulcanization adhesion strength index with the carcass of the tyre.
- 1.11 It is however established case law that the technical problem has to be determined on the basis of objectively established facts, since for the determination of the objective technical problem, only the effect actually achieved vis-à-vis the closest prior art should be taken into account (Case Law of the Boards of Appeal, 9th Edition, July 2019, I.D.4.1 and 4.2). In this connection, advantages to which the

patent proprietor merely refers or alleges, without offering sufficient supporting evidence in the form of a comparison with the closest prior art, cannot be taken into consideration in determining the problem underlying the invention and therefore in assessing inventive step.

- 1.12 In the present case, the question with respect to the determination of the problem was whether the examples and comparative examples of the patent in suit showed the presence of the alleged effects resulting from the choice of the thickness of the SIBS layer or from the content of PIB in the SIS layer.
- 1.13 The respondent argued on the basis of the description in paragraphs 45 and 60 of the patent in suit that a SIBS layer having a thickness between 0.05 mm and 0.6 mm, that is according to claim 1 of the main request, was associated with increased fuel efficiency as compared the example of D7 wherein the SIBS layer had a thickness of about 0.75 mm. It was however acknowledged that the examples and comparative examples of the patent in suit showed no link between an increased fuel efficiency of the pneumatic tyre and the selection of a specific range of thickness of the SIBS layer since in all examples and comparative examples the value of the thickness was within the range according to claim 1 of the main request. Furthermore, it was not made credible that a reduction of the thickness of the SIBS layer of a polymer sheet from about 0.75 mm as disclosed in the example of D7 to a value of up to 0.6 mm as defined in claim 1 of the main request had a noticeable influence on the fuel efficiency of a pneumatic tyre containing that polymer sheet. Under these circumstances, the Board finds that an improvement of the fuel efficiency of the pneumatic tyre having a polymer sheet according

to claim 1 of the main request has not been made credible. That - alleged but not proven - effect can therefore not be taken in to account for the formulation of the problem solved over D7.

- 1.14 With regard to the polymer obtained by polymerization of a monomer unit having 4 carbon atoms, the respondent argued that its presence in an amount of 0.5% by mass to 40 % by mass in the SIB layer according to claim 1 of the main request resulted in an increase of the vulcanization adhesive strength index as described in paragraph 59 of the patent in suit. In particular, a comparison of example 8 which was according to claim 1 of the main request with example 4 which was not according to claim 1 showed that the presence of polybutene in the SIS layer led to a pneumatic tyre having a higher vulcanization adhesive strength index (115 in example 8 vs. 111 in example 4).
- 1.15 The pneumatic tyres according to examples 8 and 4 of the patent in suit however do not differ from one another solely by the presence of 0.5 % by mass of polybutene in the SIS layer (second layer). Both examples describe a polymer sheet composition containing three layers, the third layer containing SIB and being adjacent to the second layer (paragraph 111). It is also apparent from Table 2 of the patent in suit that the third layer according to example 4 does not contain polybutene whereas the third layer according to example 8 contains 0.5 % by mass of polybutene. As a result, the comparison of example 8 with example 4 cannot show that the alleged improvement in vulcanization adhesion strength index is causally linked to the presence of polybutene in the SIS layer only. The comparison of example 4 with example 8 is thus not relevant to the formulation of the problem in

view of the example of D7 which only contains two layers (an SIBS layer and an SIB layer).

1.16 There is no other example in the patent in suit that could serve to establish the presence of an improvement in vulcanization adhesion strength index for the polymer sheets according to claim 1 of the main request as compared to D7. Examples 8, 16, 24 and 32, which are the only examples according to claim 1 of the main request, all disclose a polymer sheet containing three layers (an SIBS layer, an SIS layer and an SIB layer) wherein both SIS and SIB layers contain a polymer obtained by polymerization of a monomer unit having 4 carbon atoms (Polybutene or PIB). There is no polymer sheet in the examples and comparative examples of the patent in suit that differs from examples 8, 16, 24 and 32 in the composition of the second layer only.

1.17 The additional experimental report D17 by the respondent provides further examples of pneumatic tyres comprising a polymer sheet containing only two layers, namely an SIBS layer and an SIS layer (examples 8b, 16b, 24b and 32b) or alternatively an SIBS layer and an SIB layer (examples 8b, 16b, 24b and 32b) which are all according to claim 1 of the main request. These examples of D17 however cannot be meaningfully compared to the examples of the patent in suit containing two layers (examples 2, 3, 10, 11, 18, 19, 26 and 27) since the second layer in D17 has a thickness that is half of that disclosed in the patent in suit (0.05 mm vs 0.1 mm). D17 therefore cannot establish the presence of a technical effect, for example an improvement in the vulcanization adhesive strength index resulting from the presence of a polymer obtained by polymerization of a monomer unit having 4 carbon atoms in an amount of

0.5% by mass to 40 % by mass in the second layer.

1.18 In that respect the examples available on file do not allow a meaningful comparison between two polymer sheets only differing in the thicknesses of the SIBS layer or in the content of PIB in the SIS layer. There is also no evidence of any effect resulting from the combination of an SIBS layer having a thickness of 0.05 mm to 0.6 mm and the presence of a polymer obtained by polymerization of a monomer unit having 4 carbon atoms in an amount of 0.5% by mass to 40% by mass in the second layer. The problem solved is therefore the provision of further polymer sheets.

1.19 It remains to be decided whether the claimed solution to that problem is obvious or not in view of the prior art. D7 teaches on page 7, lines 19-20 that the airtight layer, which is the layer that may comprise SIBS in D7 (page 4, line 33), preferably has a thickness of more than 0.05 mm and more preferably 0.1 mm to 10 mm. Thus, while the thickness of the SIBS layer in the example of D7 is about 0.75 mm (page 14, line 20), D7 taught that said thickness could be anywhere above 0.05 mm. The - in the light of the available evidence arbitrary - selection of a thickness of the SIBS layer in the range of 0.05 mm to 0.6 mm to provide further polymer sheets does therefore not involve an inventive step. On the contrary, it could be expected from the teaching of D7 alone that employing a SIBS layer thickness between 0.05 mm and 0.6 mm would provide a route to obtain further polymer sheets.

1.20 With regard to the second layer of D7, which comprises SIS in the example, the passage on page 8, line 31 to page 9, line 5 teaches that it may contain a liquid plastifier in an amount of between 0 and 100 phr,

preferentially between 5 and 50 phr, in particular within a range from 10 to 40 phr, these ranges representing an excellent compromise between ease of processing of the adhesive layer, on the one hand, and effectiveness of adhesion, on the other hand, of the adhesive layer to the other (gas tight) layer of the laminate of the invention. The liquid plastifier can be PIB according to page 9, line 4. D7 therefore teaches the presence of PIB, which is a polymer obtained by polymerization of a monomer unit having 4 carbon atoms, in an amount within the range of 0.5% by mass to 40 % by mass according to claim 1 of the main request in the SIS layer. The presence of a polymer obtained by polymerization of a monomer unit having 4 carbon atoms in an amount of 0.5% by mass to 40% by mass in the second layer in order to provide further polymer sheets does therefore not involve an inventive step. There is also no reason in D7 which would impede the skilled person from selecting a polymer sheet having simultaneously a thickness of 0.05 mm to 0.6 mm and the presence of a polymer obtained by polymerization of a monomer unit having 4 carbon atoms in an amount of 0.5% by mass to 40% by mass in the second layer. Claim 1 of the main request therefore does not involve an inventive step.

1.21 The main request does not meet the requirements of Article 56 EPC.

Auxiliary requests 1-8

2. Admittance

2.1 Auxiliary requests 1-8 were all filed in response to the summons to attend oral proceedings before the opposition division. These requests were filed to

address objections of lack of sufficiency of disclosure raised in the notice of opposition for which a justification for their admittance was submitted in the letter of the patent proprietor of 22 July 2016.

2.2 While these auxiliary requests are not part of the contested decision as the opposition division rejected the opposition on the basis of the main request, it can nonetheless be concluded from the above that auxiliary requests 1-8 were validly filed during the first instance proceedings.

2.3 There is also no indication on file that auxiliary requests 1-8 had been abandoned at any point during the first instance proceedings. On the contrary, the same auxiliary requests 1-8 were addressed in the rejoinder to the statement of grounds of appeal in view of the objections of lack of sufficiency of disclosure pursued by the appellant in appeal. The auxiliary requests 1-8 which were part of the first instance proceedings are thus also part of the appeal proceedings.

3. Inventive step

3.1 Auxiliary requests 1 and 2

3.1.1 With regard to inventive step the parties relied exclusively on their arguments submitted for the main request. Since claim 1 of auxiliary requests 1 and 2 corresponds to claim 1 of the main request, the reasoning and the conclusion of lack of inventive step reached by the Board for the main request also apply to auxiliary requests 1 and 2.

3.2 Auxiliary request 3

- 3.2.1 Claim 1 of auxiliary request 3 differs from claim 1 of the main request in that the range defining the total thickness of the SIS layer and the SIB layer has been limited to 0.05 mm to 0.2 mm. That modification is based on the passages of the application as filed relating to alternative or preferred embodiments (page 12, line 25 for an SIS layer; page 16, line 2 for an SIB layer and page 17, lines 26 and 27 in the case of an SIS layer and an SIB layer).
- 3.2.2 The limitation of claim 1 of auxiliary request 3 introduces a further distinguishing feature over the example of D7 in which the SIS layer has a thickness of about 0.30 mm. That distinguishing feature comes in addition to the thickness of the SIBS layer and the presence of a polymer obtained by polymerization of a monomer unit having 4 carbon atoms in an amount of 0.5% by mass to 40% by mass in the second layer as established in the discussion of the main request above.
- 3.2.3 The respondent argued that the limitation of the thickness of the SIS layer promoted the increase in fuel efficiency of a pneumatic tyre produced with the polymer sheet according to claim 1 of auxiliary request 3 without impacting its other properties. The respondent however did not advance evidence demonstrating that said effect of the polymer sheets according to claim 1 of auxiliary request 3 actually arose. There is also no evidence on file that the limitation of the range defining the total thickness of the SIS layer and the SIB layer to 0.05 mm to 0.2 mm has any effect in combination with the other distinguishing features of claim 1 of auxiliary request

3.

3.2.4 Under these circumstances, the problem with respect to claim 1 of auxiliary request 3 is the provision of further polymer sheets.

3.2.5 The thickness of the adhesive layer of the laminate, which corresponds to the SIS layer in the example of D7, is addressed on page 9, lines 12-16 of that document. That passage teaches that the thickness of the layer is preferably more than 0.01 mm and that it can vary within large boundaries, for example between 0.01 mm and 0.5 mm. That passage provides the information that alternative polymer sheets to that of the example of D7, wherein the thickness of the SIS layer is about 0.3 mm, are also possible with an SIS layer having a thickness in a range that fully encompasses the range defined in claim 1 of auxiliary request 3.

3.2.6 The selection of an SIS layer having a thickness of 0.05 mm to 0.2 mm to provide further polymer sheets is not inventive on the basis of the teaching provided in D7 alone. With regard to the other two distinguishing features of claim 1 of auxiliary request 3, the reasoning and conclusion indicated above for the main request also apply to auxiliary request 3. Claim 1 of auxiliary request 3 therefore lacks inventive step.

3.3 Auxiliary requests 4-7

3.3.1 Claim 1 of auxiliary request 4 corresponds to claim 1 of the main request further amended in that the polymer obtained by polymerization of a monomer unit having 4 carbon atoms is limited to polybutene or polyisobutylene (PIB). Since however the corresponding

extender oil in the laminate of the example of D7 is PIB, the limitation introduced in claim 1 of auxiliary request 4 does not constitute a further distinguishing feature over D7. With regard to the specific choice of the extender oil for the SIS layer, the respondent argued that D7 did not particularly emphasise PIB. The passage referred to by the respondent in D7, on page 9, lines 1-5, mentions PIB among other oils that can be used as extender oils in the airtight layer or the adhesive layer. PIB is, according to that passage, one of the extender oils that can be used in the laminate of D7. The respondent did not argue that that limitation provided any effect in combination with the other features of claim 1 of auxiliary request 4. Under these circumstances, the reasoning and conclusion provided for the main request apply to auxiliary request 4. In view of the problem posed which is to provide further polymer sheets, the use of PIB as an extender oil does not need to be particularly emphasised to be obvious. Claim 1 of auxiliary request 4 therefore lacks inventive step.

- 3.3.2 Claim 1 of auxiliary request 5 corresponds to claim 1 of the main request further amended in that claim 1 only defines the presence of an SIS layer. Since however the corresponding adhesive layer in the laminate of the example of D7 is SIS, the further limitation introduced into claim 1 of auxiliary request 5 does not constitute a distinguishing feature over D7. Also, the respondent did not argue that that limitation gave rise to any effect in combination with the other features of claim 1 of auxiliary request 5. Under these circumstances, the reasoning and conclusion reached in respect of the main request apply to auxiliary request 5. Claim 1 of auxiliary request 5 lacks therefore

inventive step.

3.3.3 Claim 1 of auxiliary request 6 corresponds to claim 1 of auxiliary request 5 further amended in that the polymer obtained by polymerization of a monomer unit having 4 carbon atoms is limited to polybutene or polyisobutylene (PIB). The example of D7 already discloses PIB as an extender oil and discloses the presence of an SIS layer as adhesive layer. The respondent did not argue that that limitation provided any effect in combination with the other features of claim 1 of auxiliary request 6. Under these circumstances, the reasoning and conclusion provided for auxiliary request 5 apply to auxiliary request 6. Claim 1 of auxiliary request 6 lacks therefore inventive step.

3.3.4 Claim 1 of auxiliary request 7 corresponds to claim 1 of auxiliary request 3 further amended such that the polymer obtained by polymerization of a monomer unit having 4 carbon atoms is limited to polybutene or polyisobutylene (PIB) and in that claim 1 only defines the presence of an SIS layer, i.e. no SIB layer is defined. The example of D7 however already discloses PIB as an extender oil and discloses the presence of an SIS layer as adhesive layer. Also, the respondent did not argue that the limitation made gave rise to any effect in combination with the other features of claim 1 of auxiliary request 7. Under these circumstances, the reasoning and conclusion provided for auxiliary request 3 apply to auxiliary request 7. Claim 1 of auxiliary request 7 therefore lacks inventive step.

3.4 Auxiliary request 8

3.4.1 Claim 1 of auxiliary request 8 is based on claim 3, which is dependent on claim 2 of the application as filed in which the range defining the thickness of the SIS layer is further amended to 0.05 mm to 0.2 mm, the content of SIBS copolymer in the SIBS layer is defined as being more than or equal to 60% by mass and less than or equal to 99.5% by mass and the reference to an SIB layer is deleted.

3.4.2 The definition of the content in SIBS copolymer in the SIBS layer is only found in the description of the application as filed in the passage on page 11, lines 26-27 referring to the preferred numerical range disclosed on page 9, lines 13 and 14 of the application as filed.

3.4.3 Alongside the content in SIBS copolymer in the SIBS layer the description of the application as filed additionally defines other features of the polymer sheets based on an SIBS layer and an SIS layer such as the weight-average molecular weight of the SIBS polymer (page 10, line 25 to page 11, line 3), the content of styrene unit in the SIS (page 11, lines 4-6), the molar ratio of isoprene unit to styrene unit (page 11, lines 6-11) and the content of SIS in the SIS layer (page 12, lines 10-11) which are all at the same level of preference. The respondent however only chose to limit claim 1 of auxiliary request 8 by the content in SIBS copolymer in the SIBS layer. The question was thus whether the application as filed provided a basis for the definition in claim 1 of auxiliary request 8 of the specified content in SIBS copolymer in isolation to the

other features disclosed in the application as filed.

3.4.4 The limitation of the content of SIBS copolymer in the SIBS layer to the specific range of 60% by mass to 99.5% by mass is in part associated with an improvement of the vulcanization adhesive strength with the carcass or insulation in the passage on page 9 of the application as filed. The application as filed therefore provides a basis for the choice of that specific range of content of the SIBS copolymer in the SIBS layer for the purpose of improving the vulcanization adhesive strength with the carcass or insulation. It is however apparent from the application as filed on page 12, lines 11-14 that an improvement of the vulcanization adhesive strength with the carcass or insulation also requires that the content of SIS in the SIS layer be below 99.5% by mass. That limitation however is not present in claim 1 of auxiliary request 8.

3.4.5 There is therefore no basis in the application as filed for claim 1 of auxiliary request 8 in which the content in SIBS copolymer in the SIBS layer is limited to the range of 60% by mass to 99.5% by mass without also limiting the content of SIS in the SIS layer in accordance with the teaching provided on page 12, lines 11-14. Claim 1 of auxiliary request 8 does not meet the requirements of Article 123(2) EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



B. ter Heijden

M. C. Gordon

Decision electronically authenticated