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**D E C I S I O N**  
of 22 August 1996

Case Number: T 0367/92 - 3.3.3  
Application Number: 85302885.0  
Publication Number: 0160510  
IPC: B32B 17/10

Language of the proceedings: EN

Title of invention:  
Sandwich glass

Patentee:  
Bridgestone Corporation

Opponent:  
HT Troplast AG

Headword:  
-

Relevant legal provisions:  
EPC Art. 54, 56, 123(2)

Keyword:  
"Amendments (second auxiliary request): no - specific term not clearly and unambiguously derivable from generic term"  
"Novelty (main request and first auxiliary request): no - feature anticipated"  
"Inventive step (third auxiliary request): no - obvious combination of known features"

Decisions cited:  
-

Catchword:  
-



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Boards of Appeal

Chambres de recours

Case Number: T 0367/92 - 3.3.3

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.3  
of 22 August 1996

**Appellant:**  
(Proprietor of the patent)      Bridgestone Corporation  
10-1, Kyobashi 1-chome, Chuo-ku  
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**Representative:**  
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**Respondent:**  
(Opponent)      HT Troplast AG  
Patente/Lizenzen (Geb. 56)  
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**Representative:**      -

**Decision under appeal:**      Decision of the Opposition Division of the  
European Patent Office posted 24 February 1992  
revoking European patent No. 0 160 510 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:**      C. Gérardin  
**Members:**      B. ter Laan  
                    J. Stephens-Ofner

## Summary of Facts and Submissions

- I. Mention of the grant of the patent No. 0 160 510 in respect of European patent application No. 85 302 885.0 filed on 24 April 1985 and claiming the priority of 24 April 1984 of two earlier applications in Japan (JP 81172/84 and JP 81173/84), was published on 14 March 1990 on the basis of 6 claims, Claim 1 reading:

"A sandwich glass comprising two glass plates and a laminate interposed therebetween, characterized in that the laminate comprises at least two intermediate layers each composed of a cross-linking type polymer composition which is an ethylene-vinyl acetate copolymer containing an organic peroxide, and an organic resin film layer interposed between the said intermediate layers, wherein the said organic resin film is a polyester film."

Claims 2 to 6 are directed to preferred embodiments of the subject-matter as defined in claim 1.

- II. On 12 December 1990 a Notice of Opposition was filed by Hüls Troisdorf Aktiengesellschaft against the grant of the patent on the ground that the requirements of Article 100(a) EPC, namely Article 54 and 56 EPC, were not met.

These objections were mainly based on the teachings of the following documents:

- E1: US-A-3 666 614, and  
E3: GB-A-1 315 489.

III. By a decision delivered orally on 4 February 1992 and issued in writing on 24 February 1992, the Opposition Division revoked the patent after Claim 1 had been amended by replacing the final words "polyester film" by the words "polyester resin film not being a polycarbonate". In that decision it was first stated that document E1 described a sandwich glass laminate comprising two glass plates and interposed between them a layer of polycarbonate bonded to the glass plates by means of ethylene/vinyl acetate (EVA) adhesive layers which could contain a peroxide. Since the polycarbonate suitable for such structures also encompassed polyesters within the terms of the patent in suit, this disclosure was held to be novelty destroying. The decision further specified that, even if novelty could be established with respect to document E1, no inventive step could be acknowledged, particularly in view of the fact that document E3 described all the elements of Claim 1 except for the presence of a peroxide in the adhesive layer.

IV. The Appellant (Proprietor) filed a Notice of Appeal on 22 April 1992 and paid the prescribed fee on 23 April 1992.

(i) Together with the Statement of Grounds of Appeal filed on 19 June 1992 three alternative versions of Claim 1 were submitted, of which Alternative 1 corresponded to Claim 1 as amended during the opposition proceedings and Alternative 2 specified that "the said organic resin film is a polyethylene terephthalate film". Alternative 3 was later withdrawn.

(ii) Regarding Alternative 1 the Appellant pointed out that Figure 2 and Claim 12 of document E1 showed a laminate with the same five layer-structure as the sandwich glass according to the patent in suit, but which comprised polycarbonate as the core layer so that novelty was established by disclaiming that specific embodiment. Nor could inventive step be denied in view of the several differences and advantages over the closest prior art. Furthermore, the polycarbonate used for the comparative test submitted on 25 March 1988, which was identified as corresponding to formula IV in column 6 of document E1, was clearly not suitable for the preparation of sandwich structures having the properties claimed in the patent in suit.

(iii) To support the explicit reference to polyethylene terephthalate in Alternative 2, the Appellant filed a Declaration by one of the inventors, according to which the polyester resin actually used in Examples 1 to 5 of the patent specification was polyethylene terephthalate, as well as a copy of the Norm JIS C 2318-1975 (Japanese Industrial Standard), according to which the term polyester films generally meant polyethylene terephthalate films.

V. Oral proceedings were held on 22 August 1996.

(i) At the beginning of the hearing the Appellant informed the Board of its intention to defend the patent as granted as main request. Without disputing the fact that the various compositional and structural features were

mentioned in document E1, the Appellant argued that there was neither a disclosure of these features in combination as required in Claim 1, nor any incentive leading the skilled person to such a combination.

- (ii) During oral proceedings the Appellant filed an amended version of Claim 1 to be considered as Alternative 3 (third auxiliary request), which comprised as preamble the wording of Claim 1 as granted and as characterizing portion the following clause: "characterized in that a thin layer of a metal or metal oxide is deposited on the surface of the said polyester film for the reflection of heat radiation and/or conductivity". The deposition of a metal oxide for that purpose was not disclosed in document E1, so that the requirement of novelty was met; although document E3 mentioned such an after-treatment, the general features of the laminates considered in that citation were so different from those described in document E1 that a skilled person would not have combined those two teachings.

VI. The submissions and arguments of the Respondent, whose relevant rights had been transferred to HT TROPLAST AG as the legal successor of the original Opponent (cf. letter of 27 July 1994), can be summarized as follows.

- (i) The objections against the patentability of the subject-matter of Claim 1 as granted (main request), as expressed in the grounds 3 and 4 of the decision under appeal, were maintained.

- (ii) As regards Alternative 1 (first auxiliary request), Figure 2 of document E1 interpreted in the light of Claims 1 and 7 showed a five-layer windshield structure in which the resin layer could be a polycarbonate as well as a polyester. Therefore, the disclaimer could not restore novelty.
  
- (iii) Regarding Alternative 2 (second auxiliary request), it was objectionable under Article 123(2) EPC. Apart from the fact that the original application made no reference to polyethylene terephthalate, the relevance of the norm JIS C 2318-1975 was disputed, since the latter concerned polyester films used for electrical insulation, which had nothing in common with sandwich glass.
  
- (iv) Regarding Alternative 3 (third auxiliary request), its late submission was objected to. In substance, the additional deposition of a metal oxide to achieve heat reflection would have been obvious to a skilled person, since document E3 disclosed the same step in order to obtain the same effect with structures only slightly different from those known from document E1.

VII. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the claims as granted (main request) or on the basis of the first or second auxiliary request as filed on 19 June 1992 or on the basis of the third auxiliary request filed during the oral proceedings.

The Respondent requested that the appeal be dismissed (main request) or that the appeal be continued in writing in the event the third auxiliary request was found allowable with a consequential apportionment of costs.

### Reasons for the Decision

1. The appeal is admissible.

2. *Main Request*

Document E1 describes laminates of glass and a resin layer bonded by an adhesive EVA interlayer (Claim 1).

2.1 Three possible structures of these laminate products are illustrated in the drawings. Figure 1 shows a laminate of one-ply or lamina of glass and one-ply or lamina of polycarbonate resin bonded together by an EVA copolymer adhesive. Figure 2 shows a laminate which consists of two layers of glass bonded to a core of polycarbonate resin by two layers of EVA copolymer adhesive; this structure corresponds to the laminate defined in Claim 1 of the patent in suit. Figure 3 shows a multi-ply laminate which also contains an abrasion resistant layer (column 2, lines 22 to 28 and lines 46 to 56).

2.2 Although the resin is referred to as being a polycarbonate and only polycarbonate resins are mentioned in the various examples and drawings, this term in fact encompasses polyesters. This appears, firstly from the general definition of the resin, which is said to contain a plurality of carbonyl dioxy groups, e.g. carbonate groups, or carbonyl monoxy



groups, e.g. ester groups (column 4, line 72 to column 5, line 10), as well as from the three general formulae of suitable polymers, of which formula II represents polyesters (Claim 7) and from the structure defined by formula VII in column 6. It follows that the teaching of document E1 clearly and unambiguously extends to polyesters.

2.3 Therefore the question arises whether, as argued by the Appellant, the claimed subject-matter can be regarded as a selection within this broad teaching of a particular polymer within a particular structure, or whether, as contended by the Respondent, Figure 2 in the light of claim 7 should be construed as an implicit disclosure of the claimed subject-matter.

2.4 In the Board's view, the specific teaching of Examples 1 to 13 and column 4, line 69 to column 6, line 59, in particular column 4, line 71 to column 5, line 10 provides sufficient answer to that question. The examples all describe the preparation of a laminate from 2 panes of plate-glass bonded to a core of polycarbonate resin by means of sheets of an EVA copolymer, which are structurally related to Figure 2. Since according to the general teaching of the citation polyesters are equivalent to polycarbonates, that is, equally suitable for the preparation of such laminated assemblies, laminates according to Figure 2, but comprising a polyester as the core layer, must be regarded as being directly derivable from E1, hence as having been made clearly and unambiguously available by E1.

2.5 It follows that document E1 must be interpreted as disclosing a two-ply glass/polycarbonate resin laminate as well as a two-ply glass/polyester resin laminate. As the latter, in the examples in which the adhesive layer contains an organic peroxide (Examples 2, 11 to 14, 16), anticipates claim 1 of the main request, this must therefore be rejected.

3. *First Auxiliary Request*

In substance this request differs from the main request by the fact that polycarbonates are disclaimed from the definition of the polyester resin (see point III above). Since according to the conclusion regarding the main request document E1 has to be interpreted as disclosing both a polycarbonate resin based laminate and a polyester resin based laminate, the explicit exclusion of polycarbonate resin laminates results in laminates based on carbonyl monoxy groups containing resins being positively claimed. As demonstrated above, such subject-matter is no longer novel, so that the first auxiliary request has to be rejected.

4. *Second Auxiliary Request*

In substance this request differs from the main request in that the polyester is specified as a polyethylene terephthalate. Since the Appellant concedes that neither the patent specification, nor the application as originally filed make any reference to polyethylene terephthalate, the issue of admissibility under Article 123(2) EPC boils down to the question whether in the present case the generic term "polyester" can be equated with the specific term "polyethylene terephthalate".

4.1 The sole document added by the Appellant in support of such an interpretation is not relevant. As pointed out by the Respondent, the norm JIS C 2318-1975 only concerns polyester films for **electrical** purposes. This clearly appears from (i) the applications envisaged for these polyester films (page 1, paragraph 1 "Scope"), (ii) the processing method, e.g. hot rolling of polyethylene terephthalate containing no substance detrimental to electrical insulation into film form (page 1, paragraph 2 "Materials and Processing Methods"), and (iii) the specific parameters discussed, in particular volume resistivity, breakdown voltage, insulation defects, dielectric dissipation factor and permittivity (page 8 to 13, points 6.3.6 to 6.3.10 including Figures 2 to 6).

4.2 The patent in suit is not concerned with films for electrical insulation, let alone with films made by hot rolling, but with sandwich glass having good safety, durability, scuff resistance and penetration resistance properties (patent specification, column 1, lines 3 to 9), thus a combination of good mechanical properties.

4.3 Moreover, according to page 1, paragraph 1 "Scope", the document **specifies** polyester films for electrical purposes, which implies that the polyethylene terephthalate films are a species of the generic term polyester films. Therefore, even if the document were appropriate, it only states that polyethylene terephthalate is a polyester (which was never under discussion) and not the converse, as the appellant alleges.

4.4 It follows that the term "polyester" cannot be interpreted as implicitly meaning "polyethylene terephthalate", so that the latter does not derive

clearly and unambiguously from the content of the application as originally filed. Consequently, the definition of the polyester resin contravenes Article 123(2) EPC, so that the second auxiliary request has to be rejected.

5. *Third Auxiliary Request*

5.1 The subject matter of the third auxiliary request corresponds to matter that had already been claimed at the filing date of the patent in suit (see below) and its submission was the consequence of the discussions at the oral proceedings. For these reasons the third auxiliary request cannot be considered as late-filed.

5.2 Claim 1 of this request differs from Claim 1 as granted by the presence of following characterizing clause: "characterized in that a thin layer of a metal or metal oxide is deposited on the surface of the said polyester film for the reflection of heat radiation and/or conductivity". This additional step corresponds to Claim 4 as granted, which itself corresponds to Claim 8 as originally filed, so that no objection arises as regards Articles 123(2) and (3) EPC.

6. Since following the amendment the issue of novelty was no longer raised by the Respondent and the Board concurs with that opinion, there is no reason to consider this matter in further detail.

7. The patent in suit concerns a sandwich glass, for use in particular as windscreens for automobiles and window glass for houses.

7.1 Such laminated assemblies are described in document E1 which the Board, in common with the parties and the Opposition Division, regards as being the closest state

of the art. As already established when dealing with the main request, this citation is to be read as describing a glass-resin laminate which consists of two laminae of glass bonded to a core of polyester by two laminae of EVA copolymer adhesive (Claims 1 and 7; Figure 2; Examples 1 to 13). Although such structures meet the requirements in terms of safety and resistance properties for windscreens in motor vehicles, they would not be suitable as window glasses in vehicles or houses because of their poor conductivity and heat-reflecting properties.

- 7.2 In the light of this shortcoming the technical problem underlying the patent in suit may thus, in accordance with column 2, lines 31 to 33 of the description, be seen to be the provision of a sandwich glass having improved heat-reflecting and conductivity properties.
- 7.3 According to the patent in suit (third auxiliary request) this problem is solved by depositing a thin layer of metal or metal oxide on the polyester layer as specified in Claim 1.
- 7.4 In view of the comparative test carried out in Example 5 of the patent specification, which shows that the effect of applying an electrical current to a sandwich glass subjected to a change of temperature in a humid environment is greatly improved by deposition of a metal oxide layer on the surface of the polyester film, or in other words, that the modified sandwich glass qualifies as a safety glass with improved conductivity properties, the Board is satisfied that the above defined technical problem is effectively solved.

8. It remains to be decided whether the claimed subject-matter is obvious to a person skilled in the art having regard to the documents relied upon by the Respondent.

8.1 Although document E1 mentions the possibility to cover the resin layer with a metal oxide layer (column 12, lines 30 to 65, in particular lines 52 to 54), this option cannot lead to a sandwich glass falling within the claims of the patent in suit for the following reasons.

First, this embodiment does not aim at improved heat reflecting or conductivity properties, but at providing the resin layer with a layer of an abrasion resistant material; this may be necessary for specific applications since the resin materials are relatively soft. Secondly, as appears from Examples 14 to 17 and Figure 3, which are all related to this particular embodiment, this abrasion resistant layer is not applied directly to the surface of the resin film, but as a substitute to one of the upper layers, resulting in the laminate structure no longer being symmetrical.

The application of a metal oxide layer as an abrasion resistant layer thus modifies the structure, the composition and the properties of the sandwich glass in a direction opposite to the requirements of the patent in suit. It follows that a skilled person would have had no incentive to operate along that line for the solution of the technical problem, which means that document E1 cannot by itself contribute to that solution.

8.2 E3 describes a glass laminate comprising two sheets of glass with a sheet of plastic sandwiched between them, the plastic film (preferably made of polyethylene terephthalate) being bonded to both sheets of glass by

a copolymer of ethylene with one or more specifically defined esters of acrylic or methacrylic acid. A third monomer e.g. vinyl acetate, can be present (Claim 1, page 1, lines 68 to 76 and page 2, lines 12 to 23). No mention is made of an organic peroxide in the adhesive layer. The laminate described by E3, although different in the adhesive layer, thus has a structure similar to that of the patent in suit. Its application lies especially in the field of wind screens for cars and window glass for buildings (page 2, lines 104 to 123). According to a particular useful form of the laminate the plastic film is lightly metallized on at least one of its surfaces, so that it has anti-glare and anti-dazzle properties and also gives good protection from infra-red radiation (page 1, lines 62 to 67; page 2, line 128 to page 3, line 5). Thus, this document teaches that the metallization of the core polyester layer of a five-layer laminate used for e.g. safety glass applications, results in improved heat reflecting and anti-glare properties.

- 8.3 It is a well-known fact that metals, apart from their heat reflecting properties, also have good conductive properties so that the metal layer used in E3 must be inherently possessed of good conductivity as well. Therefore it can be safely concluded that, also in line with the wording of the patent in suit (Claim 1 and column 2, lines 31 to 33), heat reflection and conductivity are closely related properties. Consequently, although E3 does not explicitly mention conductivity as such, the skilled person would have known that the metal layer used in E3 would not only provide the desired heat reflection, as explicitly taught by E3, but also the equally desired conductivity. In view of the above, if the skilled person would have wished to impart heat reflecting properties to a similar laminate only differing from

the one of E3 in the composition of the adhesive layer, it would have been obvious to him to provide the polyester core layer with a metal coating.

- 8.4 It follows that the claimed subject-matter derives in an obvious manner from documents E1 and E3 and, therefore, does not involve any inventive step.
9. Claim 1 not being allowable, the third auxiliary request is also rejected.

#### Order

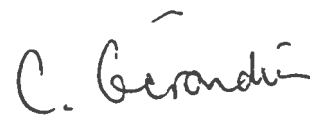
For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

  
E. Gorgmaler

The Chairman:

  
C. Gérardin