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**Datasheet for the decision  
of 20 July 2010**

**Case Number:** T 0279/08 - 3.2.08

**Application Number:** 98309295.8

**Publication Number:** 0916801

**IPC:** E06B 3/663

**Language of the proceedings:** EN

**Title of invention:**

Insulating glass units and process of making insulating glass units

**Patent Proprietors:**

DOW CORNING EUROPE S.A. and DOW CORNING CORPORATION

**Opponent:**

Sika Technology AG

**Headword:**

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**Relevant legal provisions:**

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

EPC Art. 56

**Keyword:**

"Late filed documents (admitted)"  
"Inventive step (no)"

**Decisions cited:**

-

**Catchword:**

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Case Number: T 0279/08 - 3.2.08

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.08  
of 20 July 2010

**Appellant:**  
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**Representative:** Sika Patent Attorneys  
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**Respondent:**  
(Patent Proprietors) DOW CORNING EUROPE S.A.  
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and

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**Representative:** Donlan, Andrew Michael  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 6 December 2007  
rejecting the opposition filed against European  
patent No. 0916801 pursuant to Article 102(2)  
EPC.

**Composition of the Board:**

**Chairman:** T. Kriner  
**Members:** M. Alvazzi Delfrate  
E. Dufrasne

## Summary of Facts and Submissions

- I. With its decision posted on 6 December 2007 the opposition division rejected the opposition against European patent No. 916 801.
- II. The appellant (opponent) lodged an appeal against this decision on 5 February 2008, paying the appeal fee on the same day. The statement setting out the grounds for appeal was filed on 16 April 2008.
- III. Oral proceedings before the board of appeal were held on 20 July 2010.
- IV. The appellant requested that the decision under appeal be set aside and that the patent be revoked.
- V. The respondent (patent proprietor) requested that the decision under appeal be set aside and that the patent be maintained on the basis of claim 1 of the main request filed during the oral proceedings and of claims 2 to 9 of the patent as granted or, in the alternative, on the basis of one of the first to third auxiliary requests, filed by letter dated 21 September 2007, claim 1 of these requests being amended as claim 1 of the main request filed during the oral proceedings.
- VI. Claim 1 of the main request is identical to claim 1 of the first auxiliary request and reads as follows:  
  
"An insulating glass unit (48) having two glass panes (42,44), spaced apart by a spacer (40), and a layer of silicone elastomer (46) whereby the spacer is a

thermoplastics material formed in place by hot melt application which provides both spacing and forms an inner seal (40) and as such is located adjacent to but spaced from the edge portions of the panes (42,44) and the layer of silicone elastomer (46) is located between the edge portions of the glass panes (42,44) and the spacer (40), such that the layer of silicone elastomer (46) is in contact with external surface of the spacer (40) characterised in that an inert or heavy gas is trapped within the unit (48) and the spacer of thermoplastics material (40) has a water vapour permeability of not more than about  $0.2 \text{ l/m}^2/\text{day}$ , measured at  $20 \text{ }^\circ\text{C}$  for 4mm thickness, a shear strength of more than 0.2 MPa as determined at a sealant thickness of 0.5mm at  $23 \text{ }^\circ\text{C}$ , a shear speed of 100mm/min, and that at least 90% of the gas trapped within the unit is argon, xenon, krypton or  $\text{SF}_6$  or mixtures thereof."

Claim 1 of the second auxiliary request is identical to claim 1 of the third auxiliary request and differs from claim 1 of the main request only by the addition of the following feature: the spacer of thermoplastics material has a minimum average thickness of about 7 mm measured in a direction parallel to the plane of a first of the glass panes and is in continuous contact with each glass pane.

VII. The following documents are relevant for the present decision:

D13: G.Ortmanns "Der TPS-Randverbund- Wie ist die "wärmere Glaskante" physikalisch zu deuten?", Glaswelt 9/1996, pages 10,12,14; and

D14: G.Schmidt "Sealants For IG Units Performance Parameters and Requirements", Glass Processing Days, 13-15 Sept. '97, pages 247-251.

VIII. The appellant's arguments can be summarised essentially as follows:

The objections under Art. 83 and 84 raised during the written procedure were not maintained at the oral proceedings.

*Admissibility of documents D13, D14*

D13 and D14 had been filed with the statement setting out the grounds for appeal as reaction to the decision of the opposition division. They were both prior art and relevant to the issue of inventive step. Therefore, they should be admitted into the appeal proceedings.

*Inventive step - Main request and first auxiliary request*

Starting from the insulating glass unit described in D13, the object to be achieved by the unit according to claim 1 had to be seen as improving the resistance to sunlight. This object was achieved by the use of silicone elastomer for the layer in contact with the external surface of the spacer, this being the sole feature distinguishing the claimed invention from the unit known from D13.

D14 taught that silicone secondary seals were used for the same purpose. Moreover, it disclosed that any secondary seal system, i.e. including silicone, could

be used in inert gas filled units as long as the primary seal was not leaking. Therefore, in order to achieve the object above, it would have been obvious to make the layer in contact with the external surface of the spacer of the insulating glass unit of D13 out of silicone elastomer. Accordingly, the subject-matter of claim 1 did not involve an inventive step.

*Inventive step - Second auxiliary request and third auxiliary request*

The choice of the thickness of the spacer according to claim 1 was an arbitrary choice which could not justify an inventive step. Moreover, the thickness of 7 mm was disclosed in D13.

- IX. The respondent's arguments can be summarised essentially as follows:

*Admissibility of documents D13, D14*

No reason could be seen for the late submission of documents D13 and D14. Moreover, even if it was no longer disputed that these documents were prior art, they were no more relevant than those already in the proceedings. Therefore, D13 and D14 should not be admitted into the appeal proceedings.

*Inventive step - Main request and first auxiliary request*

Even if D13 and D14 were admitted into the proceedings, they failed to render the subject-matter of claim 1 obvious.

It was true that the subject-matter of claim 1 was distinguished from the unit disclosed in D13 solely by the use of silicone elastomer for the layer in contact with the external surface of the spacer. However, it was not obvious to choose this material for an insulating glass unit filled with inert gas such as that known from D13.

D13 itself disclosed in table 2 the high diffusion rate of Ar in silicone, and therefore taught away from the use of this material.

D14 described, in particular under point 7, the poor performance of silicone secondary seals in insulating gas units filled with inert gas. For these units it suggested instead the use of polysulfide, whose low moisture and noble gas transmission rates could offset the possible leaks in the primary seals. Accordingly, it led away from the choice of silicone for the layer in contact with the external surface of the spacer.

Therefore, the subject-matter of claim 1 involved an inventive step.

*Inventive step - Second auxiliary request and third auxiliary request*

No further argument was provided in respect of the second and third auxiliary requests.

## Reasons for the Decision

1. The appeal is admissible.
  
2. Prior art documents D13 and D14, both filed with the statement setting out the grounds for appeal, can be considered as a reaction to the finding in the appealed decision that the claimed insulating glass unit was novel and involved an inventive step represented by the distinguishing feature that an inert or heavy gas is trapped within the unit. Since both these documents disclose said feature, they are prima facie relevant for assessing inventive step. Therefore, they are admitted into the appeal proceedings.

3. Inventive step

- 3.1 D13 relates to insulating glass units with a TPS sealing system and undisputedly discloses all the features of claim 1 with the exception of the use of silicone elastomer for the layer in contact with the external surface of the spacer.

The insulating glass unit described in D13 has two glass panes spaced apart by a spacer (see for example page 10, paragraph bridging the middle and the right-hand columns, "Kunststoffdistanzstück") and a layer, usually made in polysulfide (see for example page 12, right-hand column, third paragraph). The spacer is a thermoplastics material formed in place by hot melt application which provides both spacing and forms an inner seal and as such is located adjacent to but spaced from the edge portions of the panes (see for example page 12, right-hand column, first full



paragraph). The layer is located between the edge portions of the glass panes and the spacer, such that the layer is in contact with the external surface of the spacer (see page 12, right-hand column, last paragraph). An inert or heavy gas is trapped within the unit at least 90% of which is argon, xenon, krypton or SF<sub>6</sub> or mixtures thereof (see for example page 10, right-hand column first paragraph and page 12, middle column, second paragraph).

The spacer is made of polyisobutylene (PIB) with a desiccant as molecular sieve (see for example table 1 or page 12, right-hand column, last paragraph). This material is of the same type of the preferred material for the spacer according to paragraph [0019] of the patent in suit, and undisputedly inherently has water vapour permeability, shear strength, and shear speed falling within the ranges according to present claim 1.

- 3.2 Starting from the insulating glass unit known from D13, the object underlying the claimed invention can be seen to lie in improving resistance to sunlight (see paragraph [0015] of the patent in suit).

This object is achieved by making the layer in contact with the external surface of the spacer out of silicone elastomer (see paragraph [0009] of the patent in suit).

- 3.3 D14 describes insulating glass units sealed by an inner spacer comprising a primary seal (see for example point 4 on page 248) and an external layer comprising a secondary seal (see for example points 5 and 6 on pages 248 to 250). According to this document, most of the inner spacers are still made with metal or plastic

spacer bars and a polyisobutylene (PIB) based primary seal. Nonetheless, it also mentions a new approach, consisting of the TPS system, wherein the entire spacer is replaced by an extruded PIB/molecular sieve formulation (see page 248, point 4.). Therefore, the person skilled in the art would have considered that the teaching of this document was relevant for the TPS system.

D14 discloses the properties of the different materials which can be used for the external layer providing the secondary seal (see point 6 on pages 249 and 250). While the most frequently used materials are polysulfide-based, silicone elastomer (SIR) is suggested when an outstanding UV resistance is required. Therefore, the person skilled in the art is taught to use silicone elastomer to improve resistance to sunlight.

- 3.4 The respondent's argument that the prior art teaches away from the use of silicone elastomer in insulating glass units filled with inert gas like that of D13 is not convincing.

It is true that, according to point 7 of D14 (see page 250), silicone-based secondary seals cannot offset noble gas leaks in the case of IG units which are not properly made and that polysulfide-based seals should be used in this case. However, the last paragraph of the same point 7 makes it clear that any secondary seal system can be used as long as the primary seal is not leaking. In the unit disclosed in D13 the TPS inner seal provides an excellent resistance to the transmission of both Ar and moisture (see page 12,

right-hand column). Therefore, there is no further need to offset inert gas leaks. As a consequence, D14 does not teach against the use of silicone elastomer for the layer in contact with external surface of the spacer in the unit of D13.

Moreover, the fact that table 2 of D13 discloses high transmission rates of Ar through silicone would also not dissuade the person skilled in the art from using it for said layer, since, as explained above, the barrier to the diffusion of Ar is already provided by the spacer.

- 3.5 Therefore, the teaching of D14 made silicone elastomer an obvious choice for the layer in contact with the external surface of the spacer in order to improve the resistance to sunlight of the unit of D13.

Accordingly, the subject-matter of claim 1 of the main request and the first auxiliary request lacks an inventive step.

- 3.6 The spacer of thermoplastics material disclosed in D13 is in continuous contact with each glass pane (see page 12, right-hand column, first full paragraph).

Turning to the minimum average thickness of about 7 mm measured in a direction parallel to the plane of a first of the glass panes for the spacer, as acknowledged by the respondent itself, there is no evidence of the significance of this choice in the patent in suit. Therefore, the range according to claim 1 of the second and third auxiliary request is an arbitrary choice. The act of picking out at random a

minimum value for the average thickness of the spacer is within the routine activity of the person skilled in the art faced with the task of choosing the dimensions of the sealing for the insulating glass unit of D13.

Therefore, the subject-matter of claim 1 of each of the second and third auxiliary requests does not involve an inventive step either.

## **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:

V. Commare

T. Kriner