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**Datasheet for the decision
of 19 May 2009**

Case Number: T 0241/07 - 3.3.09

Application Number: 92109485.0

Publication Number: 0519278

IPC: C09J 7/02

Language of the proceedings: EN

Title of invention:

Use of a sheet for protecting the surface of an automobile
paint film

Patentee:

NITTO DENKO CORPORATION, et al

Opponent:

American Biltrite Inc.

Headword:

-

Relevant legal provisions:

EPC Art. 56

Relevant legal provisions (EPC 1973):

-

Keyword:

Main request: Inventive step (no)"

Decisions cited:

-

Catchword:

-



Case Number: T 0241/07 - 3.3.09

D E C I S I O N
of the Technical Board of Appeal 3.3.09
of 19 May 2009

Appellant:

(Patent Proprietor)

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Decision under appeal:

Interlocutory decision of the Opposition
Division of the European Patent Office posted
28 November 2006 concerning maintenance of
European patent No. 0519278 in amended form.

Composition of the Board:

Chairman:

N. Perakis

Members:

J. Jardón Álvarez

W. Sekretaruk

Summary of Facts and Submissions

I. Mention of the grant of European patent No 0 519 278 in respect of European patent application No 92109485.0 in the name of NITTO DENKO CORPORATION and KANSAI PAINT CO., LTD., which had been filed on 4 June 1992 claiming the JP priorities of 19 June 1991 (JP 174617/91), 18 October 1991 (JP 299954/91, JP 299955/91) and 19 May 1992 (JP 152717/92), was announced on 27 February 2002 (Bulletin 2002/09). The patent, entitled "Use of a sheet for protecting the surface of an automobile paint film", was granted with eight claims. The sole independent Claim 1 read as follows:

"1. Use of a sheet for protecting the surface of an automobile paint film, said sheet comprising a substrate having formed on one side thereof a rubber-based pressure-sensitive adhesive layer having a dynamic modulus at 60°C, measured at a frequency of 1 Hz, of 2 to 70 MPa (2×10^5 to 7×10^6 dyne/cm²) and an adhesion strength to the paint film of from 130 to 700 g/20 mm, said rubber-based pressure-sensitive adhesive layer comprising polyisobutylene which is not curable as a rubber-based polymer."

Claims 2 to 8 were dependent, directly or indirectly, on Claim 1.

II. A Notice of Opposition was filed against the patent by American Biltrite Inc. on 27 November 2002. The Opponent requested the revocation of the patent in its entirety since its subject-matter was not patentable within the terms of Article 52 to 57 EPC, in particular was not novel and did not involve an inventive step

(Article 100(a) EPC) and the European patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 100(b) EPC).

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

- D1 : English translation of JP 48-37132
- D2 : I. Skeist: *Handbook of Adhesives*, 3rd Ed., Van Nostrand Reinhold, New York, 1990, pp. 185-205
- D3 : D. Satas: *Handbook of Pressure Sensitive Adhesive Technology*, 2nd ed., Van Nostrand Reinhold, New York, 1989, p. 173
- D4 : H.L. Anderson: *A Physicist's Desk Reference*, 2nd Ed., American Institute of Physics, New York, 1989, p. 220
- D5 : K.F. Foley and S.G. Chu: *Rheological Characterization of Elastomer Latexes for PSAs*, *Adhesives Age*, September 1986, pp. 24-28
- D7 : US 2 082 791
- D8 : C.A. Dahlquist: *Adhesion Fundamentals and Practice*, Gordon and Breach Science Publishers, New York, 1966, pp. 143-151
- D9 : *Vistanex Polyisobutylene, Properties and Applications*, Exxon Corporation, 1993
- D11: US 2 463 452
- D12: M. Chandra and S.K.Roy: *Solubility Behaviour of Polymers*, *Plastics Technology Handbook*, Marcel Dekker Inc., New York, 1987, pp. 41, 42, 46 and 49
- D13: English translation of JP 61-281163

III. The following translations of the priority documents of the opposed patent were also submitted on 12 July 2006 by the Opponent:

D17: English translation of the priority document
JP Hei 3-174617

D18: English translation of the priority document
JP Hei 3-299954

D19: English translation of the priority document
JP Hei 3-299955

IV. At the oral proceedings held before the Opposition Division on 12 September 2006 the Patent Proprietor filed a new Main Request and a first Auxiliary Request.

The Main Request corresponded to the granted claims in which the numeral values for the dynamic modulus in Claim 1 were correctly converted from dyne/cm² into MPa: they read "0,02 to 0,70 MPa".

The first Auxiliary Request was based on the granted claims. It comprised two independent claims, Claim 1 and Claim 2. The subject-matter of Claim 1 corresponded to the combination of the subject-matter of granted Claim 1 with that of granted Claim 2. The subject-matter of independent Claim 2 corresponded to the combination of the subject-matter of granted Claim 1 with that of granted Claim 4. The remaining dependent claims were renumbered and their dependency adapted to the higher ranked new claims.

At those oral proceedings the Opponent withdrew the previously raised ground for opposition concerning the

insufficient disclosure of the claimed invention under Articles 100(b) and 83 EPC.

- V. With an interlocutory decision orally announced on 12 September 2006 and issued in writing on 28 November 2006 the Opposition Division maintained the European patent on the basis of Claims 1 to 7 of the first Auxiliary Request filed on 12 September 2006.

With regard to the Main Request, the Opposition Division considered that the subject-matter of Claim 1, although novel over the opposed disclosure of D1, did not involve an inventive step. The Opposition Division based its reasoning on the experimental part of the opposed patent, Examples 1 to 11, and Comparative Example 2 of the priority documents D18 and D19, which showed that the set technical problem, namely the provision of a sheet which had an excellent ability to maintain the initial adhesive strength even when exposed to temperature-rising conditions, was not solved over the whole claimed scope.

Examples 6 to 11 of that experimental part related to a rubber-based pressure-sensitive adhesive layer comprising an additional constituent, namely a silicone oil or an acrylic polymer and corresponded in particular to the first auxiliary request. These examples demonstrated that the initial adhesive strength was maintained even after exposure to three months outdoor weathering in Okinawa. This fact constituted the technical proof of the solution of the technical problem involved in the evaluation and the acknowledgement of the inventive step of the subject-matter of the first Auxiliary Request.

Nevertheless, examples 1 to 4 related to an adhesive layer which did not contain any further constituent and therefore corresponded only to the Main Request. These examples showed that the initial adhesive strength was not maintained even after exposure to the milder conditions of 100-hour irradiation in a sunshine weatherometer.

The Opposition Division also referred to Comparative Example 2 of each of the priority documents D18 and D19 in order to establish a link between the exposure conditions used in the examples of the patent and to enable the comparison of the adhesive strength variation in each series of examples 1 to 4 and 6 to 11. The Comparative Example 2 corresponded to the subject-matter of the Main Request (as the adhesive layer did not comprise any further constituent) and could thus be included in the series of examples 1 to 4 of the opposed patent. According to the Comparative Example 2 the initial adhesive strength was not maintained when exposed to the harsher conditions of a three months outdoor exposure in Okinawa, which were applied to examples 6 to 11 of the opposed patent, and thus the technical problem was not solved when the adhesive sheet was subjected to those conditions.

VI. On 8 February 2007 the Patent Proprietors (Appellants) lodged an appeal against the decision of the Opposition Division and paid the appeal fee on the same day. They requested that the decision be set aside and that the European patent be maintained on the basis of Claims 1 to 8 submitted as Main Request on 12 September 2006.

With the Statement setting out the Grounds of Appeal filed on 10 April 2007 and the letter dated 16 March 2009 the Appellants provided arguments defending the position that the subject-matter of the Main Request did involve an inventive step. They essentially argued that D1 and not D11 should be considered to represent the closest state of the art and that the claimed use was not obvious either on the basis of D1 considered alone or on the basis of its combination with D7 or D13.

The Appellants did not provide any comments on the arguments of the Opposition Division relating to the technical evidence of the contested patent which showed that the set technical problem of providing a sheet with the excellent ability to maintain the initial adhesion strength when exposed to temperature-rising conditions was not solved over the whole claimed subject-matter. The arguments of the Appellants focused only on the relevance of the test used for measuring the adhesion strength. In this context the Appellants considered that the most appropriate test indicating the industrial applicability of the protective sheet was the 100-hour sunshine weatherometer test. In support of this argument they filed a further document with the Grounds of Appeal:

D20: partial English Translation of *Weather/Light resistance and Color*, Nagaichi Suga,
20 February 1988, pp. 124,126,127,132,136

Moreover, the Appellants contested the analysis provided by the Opponent concerning D11 and in particular with regard to the contribution of dibutyl

phthalate (DBP), a plasticizer, on the dynamic modulus of the adhesive sheet. In support of their argument they filed additional technical evidence (Document D21) with the letter dated 16 March 2009.

VII. With a letter dated 2 September 2007 the Respondent (Opponent) filed observations on the Grounds of Appeal. It essentially agreed with the reasoning of the Opposition Division concerning the lack of inventive step of the Main Request as set out in the contested decision.

With a further letter dated 5 May 2009 the Respondent submitted Annex AS (Document D22), which was a sheet containing automotive specifications. Based on this, the Respondent argued in response that the 100-hour sunshine weatherometer test used in the opposed patent was not the most relevant test. According to the Respondent this was only a provisional test and not a test allowing the selection of sheets which fulfilled the quality requirements of car manufacturers for car protection during transport.

Furthermore, the Respondent submitted a Test Report (Document D23) in reply to the criticisms of the Appellants and in support of its point of view with regard to the influence of the plasticizer dibutyl phthalate (DBP) on the dynamic modulus of polyisobutylene used in the adhesive sheets of D11.

VIII. On 19 May 2009 oral proceedings were held before the Board.

IX. The arguments put forward by the Appellants in their written submissions and at the oral proceedings can be summarized as follows:

- D1 should be considered to represent the closest state of the art as it disclosed a sheet or film comprising polyisobutylene rubber and a polyolefin-based substrate for protecting the surface of a sign.
- D1 addressed the problem of providing a sheet protecting a surface of a sign from damage by mechanical impact during storage and/or transportation, typically occurred under indoor conditions. At the same time the adhesiveness of the sheet did not change over time and the protective surface did not become discoloured over time.
- Thus D1 related to a similar purpose, namely the protection of a surface, which according to the preferred embodiments was either an aluminum-coated bronze material or an acrylic sign board. Concerning the protective sheet, it related to a similar one, ie a protective sheet comprising a substrate and an adhesive layer which contained polyisobutylene. According to the examples of D1, the technical problem encountered was the rapid decrease of adhesiveness with time.
- D11 should not be considered to represent the closest state of the art.
- D11 was published in 1943 and belonged to outdated technology. D11 addressed the problem of preventing deterioration of the transparency of acrylic-type

resin sheets by protecting them from sunlight and other influences which could otherwise scratch the surface during handling and assembling. It was therefore not related to the technical field of protecting the surface of an automobile paint film. D11 solved the set problem by providing a removable adhesive sheet comprising a fibrous backing material, such as Kraft paper, having a tacky coating essentially consisting of polyisobutylene with a molecular weight of 80,000 to 110,000 and of dibutyl phthalate (DBP) as an anti-adhesive transfer agent.

- The skilled person would not consider the masking papers of D11 as suitable for protecting automobile paint films because the use of Kraft paper as backing material was disadvantageous and the use of anti-adhesive transfer agents was not suitable for the claimed purpose. Indeed, it could be seen from D21 (filed at the appeal phase) that the addition of DBP decreased the adhesion strength drastically to 1/10 of its original value and that the use of Kraft paper likewise resulted in a significant decrease of the adhesion strength.

- Furthermore the skilled person would have no motivation to consider any further modification of D11, in order to arrive at the technical teaching of the claimed invention.

- The claimed use differed from the use disclosed by D1 firstly as regards the type of the surface to be protected, namely the surface of an automobile paint film, and secondly as regards the selection of the

polyisobutylene, which had a specific dynamic modulus.

- The problem underlying the opposed patent was to provide a protective sheet for an automobile paint film which had an excellent ability to maintain the initial adhesion strength thereof even when exposed to temperature-rising conditions, which retained an excellent balance between protective properties and which protected the paint film covered with the sheet from deformation.
- On the basis of paragraphs [0014], [0015] and [0019] of the patent specification "to maintain the initial adhesion strength when exposed to temperature-rising conditions" only meant that the value of the adhesion strength should remain within the claimed value range of 130 to 700 g/20mm.
- That problem was solved by the features of Claim 1 of the Main Request.
- The examples of the patent specification showed that the problem was solved over the whole claimed scope. They demonstrated, when compared with the comparative examples and the reference examples, that the protective sheet had the required adhesion strength and enabled its use for protecting an automobile paint film without paint film deformation and without adhesive remaining after removal of the sheet from the surface of the automobile paint film.

- The relevant process for the evaluation of the adhesion strength was the 100-hour irradiation test in a sunshine weatherometer, which was the most important test indicating industrial applicability of the protective sheet and whose results were rarely different from that of the 300-hour sunshine weatherometer test. Even D20, submitted at the appeal phase to counter the Opponent's submissions, showed that the 100-hour simulation test was comparable to one year of weather exposure and thus surpassed the three months which were normally necessary for the distribution process in the automobile industry, ie from the factory to the consumer. It could therefore be concluded that the 100-hour test was sufficient for the evaluation of the adhesion strength.

- Examples 1 to 4 of the patent had passed that test. On the basis of examples 6 to 8, it could be further concluded that even harsher conditions, ie three months outdoor weathering in Okinawa, did not lead to a situation that the protective sheets of the patent showed undesirable results.

- With regard to Comparative Example 2 of each of the priority documents D18 and D19, it was confirmed that the adhesion strength value after exposure to the milder conditions of the 100-hour irradiation test in the sunshine weatherometer lay within the claimed range, despite the fact that this was not mentioned in D18 or D19. It should thus be concluded that also this example fell within the scope of claimed subject-matter.

- The solution of the technical problem was not obvious to the skilled person on the basis of D1 considered alone since D1 addressed a different problem and did not recognize the importance of the specific dynamic modulus at 60°C measured at a frequency of 1 Hz.

- In respect of the latter, the Opponent failed to show that the values for dynamic modulus as claimed were common in the art and therefore inherent to the polyisobutylene of D1. With regard to documents D3 to D5, to which the Opponent made reference to support such an allegation, these documents did not make any reference to polyisobutylene. Furthermore, the WLF (William-Landel-Ferry) equation disclosed in those documents, which would enable the comparison of dynamic modulus values measured under different conditions, did not apply to polyisobutylene.

- The claimed solution was also not obvious on the basis of the combination of D1 with D7 or D13.

- D7 not only belonged to an outdated technology but it would add nothing relevant to the teaching of D1 as it disclosed the protection of individual parts of an automobile during their assembly by the formation of a permanent coating on them. Consequently the combination of D1 with D7 would not lead to the claimed subject-matter.

- D13 addressed the problem of providing an adhesive composition for surface protective material showing a very small difference in the adhesive force at temperature change and causing no residue of

adhesive when the surface protective material was released. The problem was solved by an adhesion composition which did not comprise polyisobutylene. Furthermore, D13, by disclosing that polyisobutylene was economically and environmentally disadvantageous, taught away from the claimed use.

X. The Respondent essentially argued as follows:

- All arguments set out in the decision of the Opposition Division's decision were considered as correct and as completely justifying the rejection of Appellant's Main Request.

- Additionally neither the claims of that request nor the specification of the opposed patent contained a clear definition of what "adhesion strength" was supposed to mean, ie at what time and under what conditions the indicative adhesive strength had to be present. It was considered that the adhesion strength had a definite meaning only if it was the initial adhesion strength at room temperature, which however did not provide any information as to how it would change when the sheet was used on a car paint under outdoor conditions, ie as to whether the stated problem would be solved or not.

- Furthermore, the term "dynamic modulus" used in the opposed patent was not clearly defined by reference to a suitable standard and by explaining the mathematical procedure to obtain the values for the "dynamic modulus". There were two different components considered as "dynamic modulus", namely the storage modulus G' and the loss modulus G''

which were used in combination in form of the complex modulus G^* , which was the square root of the sum of the squares of the storage and loss moduli. The dynamic modulus at 60°C, measured at a frequency of 1Hz was an arbitrary selection of a parameter which did not constitute an exhaustive description of the adhesive, which anyway remained the same if other values were determined for the dynamic modulus under different conditions of measurement such as different temperatures.

- D11 should be considered to represent the closest state of the art. Contrary to the allegation of the Appellants, D11 did not describe an outdated technology, as polyisobutylene had never disappeared from the market. On the contrary it remained in constant use because it provided inherently good, non-curable, inert adhesives and had remained the adhesive of choice for self-adhesive sheets since the days of D11.

- The only technical difference which distinguished the claimed subject-matter from the disclosure of D11 was the specific protective use, which concerned the protection of the surface of an automobile paint film.

- The sheet disclosed by D11 was the sheet to be used in accordance with Claim 1 of the Main Request.

- The polyisobutylene of D11 could be directly compared with that claimed. On the basis of D9 and in view of D2 and the information in the patent, the polyisobutylene of D11 gave a dynamic modulus at

60°C, measured at a frequency of 1 Hz, of about 3×10^6 dyne/cm², ie a value lying in the middle of the range of the dynamic modulus according to Claim 1 of the Main Request.

- Besides, the definition of the polyisobutylene in Claim 1 was so broad that it did not constitute any specific selection from any range of values for the dynamic modulus of polyisobutylene layers which the skilled person would seriously consider as being potentially useful.

- In that respect, the skilled person knew (see D8) that an adhesive layer showed no tack if its dynamic modulus exceeded values of about 10×10^6 dyne/cm² and that its tack built up rapidly as the dynamic modulus approached 10×10^5 dyne/cm², this being correct at any temperature at which the adhesive had to have the desired property of being pressure-sensitive. The skilled person knew (see D13) that the higher the temperature the lower was the dynamic modulus of an adhesive layer on the basis of a non-curing plastic material and *vice versa*.

- Thus the claimed range of 2×10^5 to 7×10^6 dyne/cm² measured at 60°C was nearly identical with the complete range over which potential pressure-sensitive adhesives showed the required tack, bearing in mind that the higher value of 7×10^6 dyne/cm² measured at 60°C according to Claim 1 would, for the same adhesive at room temperature, shift towards the limiting value of 10×10^6 dyne/cm² of D8, whereas the lower value of 2×10^5 dyne/cm²

according to Claim 1 would increase in a similar way and approach the value of 10×10^5 dyne/cm² of D8.

- Additionally D3 disclosed a value range for the dynamic modulus of pressure sensitive tape adhesive containing polyisobutylene which, converted on the basis of the WLF formula of D4, extended from about 1.5×10^5 to about 1.8×10^6 dyne/cm².
- The criticism of the Appellants with regard to the validity of the conversion, on the basis of D4, of disclosed dynamic modulus values for polyisobutylene at 60°C, measured at a frequency of 1 Hz, namely that the WLF equation did not apply to polyisobutylene, might be correct if considered in a strict sense in order to obtain exact numbers. However, this equation showed a correct tendency which applied also to polyisobutylene.
- The thus converted range of D3 overlapped almost completely (at 97%) with the broad range of 2×10^5 to 7×10^6 dyne/cm² of Claim 1 of the opposed patent. Consequently, even if some correction of the converted values would be needed due to a possible inaccuracy of the values obtained, when the WLF equation was strictly applied to polyisobutylene, this did not change the basic situation, namely that there was an almost complete overlap.
- The slight non overlapping range would be situated at the low dynamic modulus values, which the skilled person would, in practice, not seriously consider because, according to its basic technical knowledge, the risk of cohesion failure of an adhesive layer at

the lowest dynamic modulus values increased considerably.

- Furthermore the presence of dibutyl phthalate, a plasticizer, in amounts of 5-10 % of the weight of polyisobutylene in the adhesive composition of D11, would not lead to a value of the dynamic modulus outside the range of Claim 1 of the opposed patent.

- As shown by D23, a test report filed by the Respondent at the appeal, the influence of dibutyl phthalate on the dynamic modulus of polyisobutylene was very low, lower than the normal fluctuation of dynamic modulus values among identical adhesive sheets.

- Concerning the experimental data (D21), filed by the Appellants at the appeal, they did not contradict the Respondent's argument because they did not disclose the influence of either the Kraft paper, used as substrate for the polyisobutylene, or that of the dibutyl phthalate on the dynamic modulus of the polyisobutylene. Indeed in D21 only adhesion strength was discussed.

- A similar line of argumentation was followed taking D1 to represent the closest state of the art since the disclosed adhesive layer, which contained only polyisobutylene, should implicitly be considered, for the reasons already given, to have dynamic modulus values which overlapped to a great extent with those of the claimed value range.

- The sole differentiating feature of Claim 1, namely the "use", did not involve an inventive step. The prior art already disclosed self-adhesive surface protective sheets using polyisobutylene as pressure sensitive additives (D1, D11) which were also contemplated for all sorts of uses, be it on metal or a plastic material (D13), and that among prominent known uses was that for protecting the surfaces of cars (D13). Consequently the use claimed as broadly as in Claim 1 of the Main Request was obvious.

- Examined under the "problem and solution approach" the alleged invention was so broadly claimed that the claims covered not only embodiments which provided solutions to the stated problem, namely that the initial adhesion strength was essentially maintained under conditions which were comparable with conditions as they were encountered with the outdoor transportation of automobiles, but at the same time also covered a broader range of embodiments which did not solve the stated problem at all.

- The allegation of the Appellants, that the patent specification contained information that the maintenance of the initial adhesion strength under conditions encountered with the outdoor transportation of automobiles should be understood to mean that the value of the adhesion strength varied within the claimed range, was not correct because no support for such an interpretation could be found in the originally filed documents.

- Examples 1 to 4 showed a considerable increase of the initial adhesion strength even when the exposure test was conducted under milder conditions than the remaining examples 6 to 11. Also Comparative Example 2 of the priority documents D18 and D19, which contained all limitations required for a sheet to be used according to Claim 1, showed that a sheet subjected to the harsher conditions of the exposure test of Examples 6 to 11 of the opposed patent clearly did not maintain the initial adhesion strength, with the consequence that the stated problem in the opposed patent was not solved.

- With regard to the exposure test to be used for the evaluation of the adhesion strength, the one used in Examples 1 to 4 of the opposed patent was not the correct test to use. It was contested that the 100-hour irradiation test was sufficient for evaluating the adhesion strength of pressure sensitive adhesive sheets for the protection of cars. The reason was that it could take six months or longer to deliver an automobile to a dealership and that the protective film might not be removed for several more months until the consumer took physical possession of the vehicle. That was the reason why all Auto Original Equipment Manufacturers required a minimum of 300-hour, in fact most a minimum of 500-hour irradiation and a six months outdoor exposure (see D22 filed at the appeal phase).

- The 100-hour test in a weatherometer as applied in examples 1 to 4 of the opposed patent, were at best a provisional test useful for a first screening to eliminate unsuitable sheets, but not a test to

select sheets which fulfilled the quality requirements of car manufacturers for the transport protection.

- Since the set technical problem was not solved it had to be redefined.
- Such a modified problem could be just to find a further or alternative use for a self-adhesive sheet with an adhesive layer on the basis of polyisobutylene as disclosed in D11 or D1. The solution of that problem was obvious to the skilled person and did not involve an inventive step.
- The use of pressure-sensitive adhesives to protect the surface of cars was disclosed in D13.
- With regard to the surfaces disclosed in D11 or D1 they were similar to that of the Claim 1.
- The subject-matter of Claim 1 of the Main Request did not contain any limitation concerning the automobile paint film to which the sheet was to be applied. Automobile paint systems based on methacrylates were and had been used extensively. D12 showed that the SP values (Solubility Parameter) for all paint film materials, including polymethyl methacrylate films, lay essentially in the same value range.
- The acrylic resins of D11 and the acrylic signboard surface of D1 were very similar to automobile paint films also because they had similar SP values and therefore the skilled person would have at least

tried to protect similar surfaces following the teaching of D11 or D1 taken alone or combined with either D7 or D13.

XI. The Appellants requested that the decision under appeal be set aside and that the Patent be maintained on the basis of Claims 1 to 8 filed as Main Request on 12 September 2006.

XII. The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.
2. *Novelty (Article 54 EPC)*

The Board agrees with the finding in the appealed decision (see point A.3) that the subject-matter of Claim 1 of the Main Request is novel over the cited state of the art. Neither D1 nor D11 disclose the use of a sheet such as defined in Claim 1 of the Main Request for protecting the surface of an automobile paint film.

As the novelty of the subject-matter of Claim 1 was not contested by the Respondent during the appeal proceedings no further comments are needed in this respect.

3. *Inventive step (Article 56 EPC)*

3.1 Claim 1 may be analysed as containing the following features:

- (a) use of a sheet for protecting the surface of an automobile paint film, said sheet comprising
- (b) a substrate having formed on one side thereof a rubber-based pressure-sensitive layer comprising polyisobutylene which is not curable as a rubber-based polymer and having
- (c) a dynamic modulus at 60°C, measured at a frequency of 1 Hz, of 0.02 MPa to 0.7 MPa (2×10^5 to 7×10^6 dyne/cm²), and an adhesion strength to the paint film of from 130 to 700 g/20 mm.

3.2 The closest state of the art

3.2.1 The parties have expressed different views with regard to which document should be considered to represent the closest state of the art. The Appellants have argued that D1 should be considered as such, whereas the Respondent has held that this should be D11.

As explained in detail below, both D1 and D11 disclose adhesive sheets which cannot be differentiated from the adhesive sheets of Claim 1 (cf features (b) and (c)); however, they do not disclose the claimed use (feature (a)).

3.2.2 Firstly, with regard to the structure of the adhesive sheet (feature (b)), the claimed subject-matter requires that it comprises a substrate having formed on one side thereof a rubber-base pressure-sensitive layer comprising polyisobutylene which is not curable as a rubber-based polymer. This structure is however disclosed by D1 and D11 when the general technical knowledge of the person skilled in the art is also taken into consideration.

D1 (page 2, first and third paragraphs; page 3, lines 1-2, 6-8 and 20-21; page 4, second preferred embodiment), discloses an adhesive sheet which contains a substrate based on polyolefin carrying on one side a rubber-based pressure-sensitive additive layer. The latter is based on a polyisobutylene rubber of 50,000-150,000 mol wt further containing ethylene, propylene and rubber.

D11 (claims 1 to 4; column 1, lines 1-6; column 2, lines 23-37; column 4, lines 36-40; examples I-V) discloses an adhesive sheet which contains a fibrous substrate having a tacky coating on it. The coating essentially consists of polyisobutylene having a molecular weight of 80,000 to 110,000 and further contains an anti-adhesive transfer agent and an extender.

The Board also considers, as was acknowledged by the Appellants, that a person of ordinary skill in the polymer field is well aware that the polyisobutylene has the inertness of paraffinic hydrocarbons and cannot be cured using standard rubber technology (see D2: page 187, left column, last paragraph; Appellants'

letter in examination phase dated 28 May 1998: page 2, 4th paragraph).

Consequently the structure of the adhesive sheet is disclosed in both D1 and D11.

3.2.3 Secondly, with regard to the definition of the rubber-base pressure-sensitive layer, feature (c), the claimed subject-matter requires that it has a dynamic modulus at 60°C, measured at a frequency of 1 Hz, of 2×10^5 to 7×10^6 dyne/cm² (0.02 to 0.70 MPa) and an adhesion strength to the paint film of from 130 to 700 g/20 mm. The Board considers, on the basis of what follows, that these properties are inherent in the layer disclosed by D1 and D11.

The Board's starting point, in agreement with the Respondent, is that:

- both dynamic modulus and adhesion strength are properties which are not specifically defined in the patent and which should be given the broadest interpretation by the skilled person when comparing the claimed subject-matter with the prior art
- these properties can only relate to polyisobutylene, which is the sole claimed constituent of the pressure-adhesive layer
- the dynamic modulus is an intrinsic property of the layer constitution, whereas the adhesive strength is a property related to the intended use of the polyisobutylene containing adhesive layer because it equally depends on the surface to be protected,

which in the present case has been acknowledged to be the differentiating feature of the claimed subject-matter

- the dynamic modulus has been measured at specific conditions, namely 60°C at a frequency of 1 Hz, which does not allow a direct comparison with the state of the art and is thus an arbitrary selected parameter

- the adhesion strength can only be interpreted to mean the initial adhesion strength since this is disclosed in the definition of the technical problem to be set (patent specification: paragraphs [0008] and [0032]), and only this interpretation makes technical sense because it is known to the skilled person that adhesion strength is a property which can vary with time and with the environmental conditions during the use of the adhesive sheet, such conditions not being specified in the claimed subject-matter.

Turning to the disclosure of D1 and D11 the Board can only agree with the parties that these properties are not explicitly disclosed therein. The Board has thus examined, as a second step, whether the skilled reader would consider that these properties were inherent to the adhesive sheets of D1 or D11. The Board confirms that on the basis of the definition of the polyisobutylene in these documents, whose molecular weight is narrower than that of Claim 1, the disclosed polyisobutylene anticipates the claimed polyisobutylene in every respect (see D1: claim; page 2, 3rd paragraph;

page 3, first paragraph and D11: claims 1-4; examples I-V; column 4, lines 36-40).

The Board, in this context, cannot concur with the Appellants who at the oral proceedings before the Board argued that the polyisobutylene of the claimed subject-matter differed from that of D1 and D11 in view of a selection based on the restricted value range of the dynamic modulus. Contrary to this argument, the Board in agreement with the Respondent considers that the claimed value range of the dynamic modulus of 2×10^5 to 7×10^6 dyne/cm² is very broad. It therefore does not constitute any specific selection from a considerably broader range of values for the dynamic modulus of PIB layers which the skilled person would seriously contemplate as being potentially useful. In fact, the claimed range coincides or overlaps to a great extent with the expected useful range of the dynamic modulus of an adhesive sheet providing the efficient adhesion strength of that sheet envisaged by the skilled person.

In this context the Board refers to D13 (abstract; page 1, claim 1) which discloses that the useful storage elastic modulus of an adhesive composition, which cannot be differentiated from the dynamic modulus of the claimed subject-matter in view of the reasons already given above and in view of the units in which it is expressed and the conditions under which it is measured, lies above 2.0×10^5 dyne/cm² measured at 60°C and a frequency of 1 Hz and below 2.0×10^7 dyne/cm² at 0°C measured at a frequency of 1 Hz. The Board also refers to D8 (page 147, lines 7-11), which discloses that the useful range of the dynamic modulus lies between 10×10^5 dyne/cm² and 10×10^6 dyne/cm² measured

at room temperature and a frequency of 1 Hz - the limiting values of that range being those towards which the limit values of the claimed range would shift at room temperature.

Under these circumstances the Board concurs with the Respondent, in the absence of any convincing technical evidence submitted by the Appellants, that the claimed range of 2×10^5 to 7×10^6 dyne/cm² measured at 60°C and a frequency of 1 Hz is nearly identical with the complete range over which potential pressure-sensitive adhesives show the required tack.

Thus the claimed values of the properties of dynamic modulus and adhesion strength are considered to be inherent in the polyisobutylene disclosed in D1 and D11.

3.2.4 Finally turning to the use of the adhesive sheets in these documents it is noted that D1 (page 2, lines 2-4; page 3, lines 1-3) aims at providing a sheet for protecting the surface of a sign whose adhesiveness does not change over time and that D11 (column 1, line 55 to column 2, line 20) aims at providing a masking paper for the protection of articles made from acrylic-type resins, the adhesive coating of which is more stable against the deteriorating effect of sunlight and aging than those previously known, and which permits the stripping of the masking paper from the masked surface without exhibiting any adhesive transfer.

3.2.5 The Board considers that both D1 and D11 can be taken as an appropriate starting point for the assessment of inventive step. The reason is that both relate to the

use of an adhesion sheet comprising polyisobutylene in the adhesive layer in order to provide surface protection of an article. As the Appellants have chosen D1 as the closest prior art, this document is used in the following discussion on inventive step. In any case the Board would arrive at the same conclusion if D11 were to be considered the closest prior art document.

As already set out above the subject-matter of Claim 1 differs from the disclosure of D1 by the different protective use of the known sheet (feature (a)), or, in other words by the surface to be protected by the known adhesion sheet.

3.3 The technical problem

3.3.1 The Appellants define as technical problem (see also in the opposed patent paragraphs [0008] and [0032]) the provision of an automobile paint film protective sheet which has an excellent ability to maintain the initial adhesion strength of the protective sheet even when exposed to temperature-rising conditions, which retains an excellent balance between protective properties due to good adhesion and strippability over a long period of time, and which protects the paint film covered with the sheet from deformation.

3.3.2 The Respondent states that the subject-matter of Claim 1 embraces a considerable range of sheets which do not maintain the initial adhesion strength under conditions which are comparable with conditions as they are encountered with the outdoor transportation of automobiles.

The latter conclusion is drawn from the technical evidence of the Appellants themselves, namely the results of several examples in the patent and the priority documents of the patent (D18 and D19). Thus examples 1 to 4 and in particular examples 3 and 4 of the patent show that the set technical problem of maintaining the initial adhesion strength of the adhesive sheet has not been solved. On the contrary the results of examples 3 and 4 clearly show that the initial adhesion strength increases considerably after exposure conducted by the milder test of 100-hour irradiation in a sunshine weatherometer - compared with the harsher test of three months outdoor weathering in Okinawa applied to examples 6-11. Specifically, the initial adhesion strength value of example 3 after a 100-hour exposure was multiplied by nearly 4 and that of example 4 was multiplied by 3. A similar situation arises when considering Comparative Example 2 in both priority documents D18 and D19. In this case the adhesive strength under the exposure conditions of Okinawa increased to values of 1500 g/20 mm.

Under these circumstances the fact that the value of the adhesion strength after exposure of examples 3 and 4 of the patent in suit remained within the claimed value range is immaterial. Nor does the Board concur with the Appellants, who at the oral proceedings before the Board argued that the set technical problem should be interpreted on the basis of paragraphs [0014], [0015] and [0019] of the patent specification, namely that the adhesion strength value should be maintained within the claimed range. This interpretation, which finds support neither in the specified paragraphs (which do not make a single reference to the initial adhesion strength)

nor elsewhere in the patent specification is rejected as non substantiated.

3.4 Reformulation of the technical problem

In view of the above the Board concludes in agreement with the Respondent and the Opposition Division that the technical problem as formulated by the Appellants has not been solved across the whole range of the claimed subject-matter. Under these circumstances the problem has to be reformulated in terms of a less ambitious objective, not involving the maintenance of the initial adhesion strength.

This objective technical problem can thus be reformulated on the basis of the content of the originally filed application, namely as the provision of a further/alternative use of the protective sheets disclosed by D1.

3.5 Solution to the problem

It is not disputed that this less ambitious problem has been solved. As already discussed above some of the sheets show an undesired increase of the adhesion strength but the reformulated problem no longer requires the maintenance of the adhesion strength.

3.6 Obviousness

- 3.6.1 The question which remains to be answered is whether the skilled person starting from D1 as closest state of the art would find the further/alternative protective use of the known adhesive sheet obvious, ie whether he

would be motivated on the basis of his general technical knowledge or the state of the art to use the protective adhesive sheet of D1, which includes a PIB adhesive layer, in order to protect the surface of an automobile paint film.

The Board in agreement with the Respondent considers that the skilled person in the field of adhesive sheets starting from the teaching of D1 would be motivated to use the disclosed adhesive sheet to protect other surfaces such as the surface of a paint film for automobiles with a reasonable expectation of success. D1 discloses the use of an adhesive sheet comprising a PIB adhesive layer for the protection of the surface of a sign. According to example 2 this is an acrylic surface which is chemically related to certain paint films of the claimed subject-matter since according to the opposed patent (see paragraph [0032]) the paint film can be of the melamine-acrylic type.

It is therefore considered that the skilled person acting within the scope of his ordinary endeavours would at least try to find out if the protective sheet known from D1 was also effective in protecting an automobile paint film. The protection of automobile parts or automobile paint films by application of a removal adhesive layer has long been known in the art (D7: page 1, left hand column, lines 18-30 and right hand column, lines 10-37; D13: paragraph bridging pages 2-3). He would thus arrive at the claimed subject-matter without involving an inventive step.

3.6.2 The Board does not concur with the Appellants when they argued that the skilled person on the basis of D13 (page 2, lines 11-16) would not be motivated to use polyisobutylene as an adhesive for surface protective materials. To the Board's understanding, the cited passage of D13 simply renders the skilled reader aware of the hazards involved in the use of polyisobutylene, such as the danger of fire, pollution and the economic aspects which are technically unrelated to the set technical problem of the provision of a further protective use of the known adhesive sheets comprising polyisobutylene.

3.7 As the subject-matter of Claim 1 of the Main Request does not involve an inventive step, this Request is not allowable.

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

G. Röhn

N. Perakis