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Datasheet for the decision of 7 August 2006

Case Number: T 0991/03 - 3.3.03

Application Number: 95115306.3

Publication Number: 0712887

IPC: C08K 5/00

Language of the proceedings: EN

Title of invention:
Light stable aliphatic thermoplastic urethane elastomers and method of making same

Patentee:
Davidson Textron Inc.

Opponents:
Bayer MaterialScience AG
BASF Aktiengesellschaft

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Novelty (yes)"
"Inventive step (no) - main request, auxiliary request I"
"Inventive step (yes) - auxiliary request II"

Decisions cited:
G 0010/91, T 0279/89, T 0653/93

Catchword:
-

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Case Number: T 0991/03 **-** 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 7 August 2006

Appellant: (Patent Proprietor)
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Representative:
-

Decision under appeal:
Decision of the Opposition Division of the European Patent Office dated 5 June 2003 and posted 31 July 2003 revoking European patent No. 0712887 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: C. Idez
Members: W. Sieber
E. Dufrasne

Summary of Facts and Submissions

I. The mention of the grant of European patent No. 0 712 887, in respect of European patent application no. 95 115 306.3, in the name of Davidson Textron Inc, filed on 28 September 1995 and claiming a US priority of 7 October 1994 (319614), was published on 17 May 2000 (Bulletin 2000/20). The granted patent contained 22 claims, whereby Claims 1, and 14 read as follows:

1. A polyether/polyol based aliphatic thermoplastic urethane elastomer, said elastomer comprising

a first and a second ultraviolet (UV) stabilizing agent wherein the first UV-stabilizing agent is a hindered amine light stabilizer (HALS) and the second UV-stabilizing agent is a hydroxyphenyl benzotriazole light stabilizer;

an antioxidant and a pigment;

characterized in that

said elastomer comprises said pigment in a total concentration in the range of 1.0 wt% to 2.0 wt%, based on the total weight of the elastomer;

said first and second ultraviolet stabilizing agents are present in a ratio in a range of 1:1 to 2:1 in a total amount of greater than 1.0 wt% to 2.0 wt%, based on the total weight of the elastomer; and

said antioxidant is present in an amount of 0.1 wt% to 1 wt% based on the total weight of the elastomer;

whereby said elastomer is provided with a resistance to Xenon arc artificial weathering with a DE ≤ 3.00 after 2 450 kilojoules of output exposure.

14. A light stable automotive interior trim component, said component comprising an urethane elastomer according to anyone of the proceeding claims 1 to 13.

Claims 2-13 were directed to preferred embodiments of the elastomer of Claim 1. Claim 15 related to a method of fabricating an elastomer according to Claims 1-13, Claim 16 to a method for preparing an elastomer according to Claims 1-13 into castable, spheroidal particles, Claim 20 to a process for manufacturing thermoplastic microspheres and Claim 22 to an article

manufactured from microspheres of the process of Claim 20. Claims 17-19 and 21 were dependent claims.

II. Notices of opposition were filed by Bayer AG, now Bayer MaterialScience AG (opponent 01), on 12 February 2001, and by BASF AG (opponent 02) on 14 February 2001. The opponents requested revocation of the patent in its entirety based on the grounds of Article 100(a) EPC, ie lack of novelty and lack of inventive step, and on the grounds of Article 100(b) EPC.

The following documents were ***inter alia*** cited in the opposition procedure:

D1: UV Stabilizer Systems, Ciba-Geigy 1986;

D5: Polymere Werkstoffe: Technologie 1, Band II, Georg Thieme Verlag 1984, page 347;

D8: Tinuvin® B 75; Liquid heat and light stabilizer for Polyurethanes (preliminary product information), Ciba-Geigy, January 1992;

D10: ***F.R. Stohler, K. Berger***, "Neueste Ergebnisse über die Stabilisierung von Polyurethan-Systemen gegen photooxidative Einflüsse", Angewandte Makromolekulare Chemie, 1988, pages 233-246;

D16: Affidavit of William Humphrey dated 26 March 2003 including experimental data.

III. By a decision which was announced orally on 5 June 2003 and issued in writing on 31 July 2003, the opposition division revoked the patent because the subject-matter of Claim 1 as granted lacked an inventive step.

(a) The opposition division rejected the objection raised under Article 100(b) EPC against the parameter DE in Claim 1 as granted. DE was considered not to be an essential parameter of the claim but rather described an effect obtained when mixing the different components according to Claim 1. Although the method of measurement of the parameter DE might be unclear, the skilled person was still able to perform the invention simply by mixing an aliphatic thermoplastic urethane elastomer with the specific additives according to Claim 1.

(b) D8 was considered to be a document according to Article 54(2) EPC. The proprietor's objection that D8 was a compilation of different, individual documents compiled at an unknown date by an unknown person was not taken into account because this objection was raised for the first time at the oral proceedings before the opposition division which deprived opponent 02 of any possibility to provide further evidence concerning D8.

D16 filed by the proprietor in reply to the summons to oral proceedings was admitted into the proceedings.

(c) Novelty of the claimed subject-matter was acknowledged. As regards the disclosure of D1 and D8, these documents described stabilizer blends comprising a hindered amine light stabilizer (HALS), a hydroxyphenyl benzotriazole light

stabilizer (HBENZ) and an antioxidant (AO). Polyurethane (PUR) compositions containing these stabilizer blends were also disclosed in these documents. However, none of the compositions of D1 and D8 disclosed all the parameters required in Claim 1 as granted. For example, it was not clear whether the PUR used in these compositions was a polyether polyol based PUR, as required in Claim 1 as granted, or a polyester polyol based PUR. Furthermore, although pigments were present in at least some of the compositions, the amount was not disclosed.

(d) D10 was considered to represent the closest prior art since it dealt with the stabilisation of PUR, including aliphatic PUR, using a mixture of stabilizers, preferably a ternary mixture comprising AO, HALS and HBENZ. Neither the examples in the patent in suit nor the experiments in D16 showed a "synergistic" effect as alleged by the proprietor. In fact, the examples and the comparative examples could not demonstrate that one of the specific features of Claim 1 achieved a surprising technical effect. Thus, the objective technical problem had to be formulated as being the provision of further, alternative thermoplastic PUR elastomer compositions having good weathering resistance.

A person skilled in the art starting from D10 as the closest prior art and aiming at solving the objective problem would inevitably come to the product information sheet D8. The skilled person would use the stabilizer blend disclosed in D8 in

any PUR composition, including a pigmented aliphatic polyether polyol based PUR. Hence, the subject-matter of Claim 1 as granted was an arbitrary selection within the ambit of D10.

IV. On 17 September 2003, the appellant (proprietor) filed a notice of appeal against the above decision with simultaneous payment of the prescribed fee.

With the statement of grounds of appeal filed on 10 December 2003, the appellant submitted an amended Claim 9 and amended pages 4 and 7 of the patent specification. The arguments of the appellant may be summarized as follows:

(a) The opposition division grossly misinterpreted the subject-matter described and disclosed in the examples of the patent in suit and did not understand the experimental results presented in D16. The data in Tables 1-4 of the patent in suit revealed to a person skilled in the art that the combination of the presence of the two different UV stabilizers HALS and HBENZ as well as the AO in specified levels and ratios within the elastomer material was of importance to achieve the weathering resistance defined in granted Claim 1 in terms of DE. Additionally, the experiments in D16 demonstrated the criticality of the pigment concentration.

None of the documents on file pointed to the specific combination of features required in Claim 1 as granted. Therefore, whatever document was combined with the closest prior art D10, there

was no pointer to the subject-matter of Claim 1 as granted.

(b) In order to demonstrate the chemical nature of the stabilizers used in Table 1 of the patent in suit, the appellant filed the following documents:

D17: Data sheet Ciba® Tinuvin® 1130 dated 28.07.99 (filed by the appellant on 12 December 2003);

D18: Brochure from Ciba Specialty Chemicals, "Additives for Polyurethane", pages 24-26 (filed by the appellant on 12 December 2003);

V. The submissions of respondent 01 (opponent 01) presented in a letter dated 15 March 2004 may be summarized as follows:

D10 disclosed that a combination of HALS, HBENZ and AO avoided discolouration in pigmented PUR. A person skilled in the art would apply this stabilizer blend to any PUR, including polyether polyol based aliphatic PUR. Furthermore, nothing inventive could be seen in finding the optimal amount of pigment.

VI. The submissions of respondent 02 (opponent 02) presented in a letter dated 23 April 2004 may be summarized as follows:

(a) The subject-matter of Claim 1 was not novel over D8. This document disclosed the use of Tinuvin® B75 in aliphatic PUR, eg thermoplastic PUR, which might be pigmented. Furthermore, D8 disclosed compositions containing 2 wt% of Tinuvin® B75 which

meant that the amount of HBENZ, HALS and AO was within the limits required in Claim 1 as granted. As regards the feature polyether polyol based, D8 described the use of Tinuvin® B75 for PUR in general. This applied both to polyether polyol based and polyester polyol based PUR which were the only two relevant types in PUR chemistry. As regards the amount of pigment, a concentration of 1.0 to 2.0 wt% could not establish novelty over D8 because this was the usual amount in pigmented materials.

(b) The subject-matter of Claim 1 was obvious over a combination of D10 and D8. A person skilled in the art faced with the problem of providing further light stable PUR compositions would inevitably use the stabilizer blend disclosed in D8. In order to demonstrate that the amount of pigment had no influence on the UV stability of a polyether polyol based aliphatic PUR, an experimental report (hereinafter referred to as D19) was filed.

D19: Experimental report.

VII. In a communication dated 14 June 2006, the board raised questions with regard to the validity of D8, the criticality of the amount of the UV stabilizers (greater than 1.0 wt% to 2.0 wt%) in relation to inventive step and the basis for the lower limit of greater than 1.0 wt% of the range of the UV stabilizers and the definition of the elastomer without the mandatory presence of a chain extender in Claim 1 as granted. With regard to the latter issue, the board noted that Article 100(c) EPC was not a ground of

opposition and that, in such a case, a fresh ground of opposition might be considered at the appeal stage only with agreement of the proprietor.

VIII. In a letter dated 7 July 2006, the appellant filed amended sets of claims for a main request, auxiliary request I and auxiliary request II.

(a) The claims of the main request (Claims 1-22), corresponded to Claims 1-22 as granted, except that Claim 9 had been amended as follows (amendments shown by strikethrough):

"The elastomer of anyone of claims 2 to 8 wherein said organic diisocyanate is selected from the group consisting of ~~(TMXDI) meta-tetramethylxylene diisocyanate, paratetramethylxylene diisocyanate,~~ isophorone diisocyanate (IPDI), ~~dibenzyl diisocyanate, xylene diisocyanate (XDI), 3, 3'-bis-toluene-4,4-diisocyanate,~~ hexamethylene diisocyanate (HDI), hydrogenated MDI, hydrogenated XDI, cyclohexane diisocyanate, ~~paraphenylene diisocyanate,~~ mixtures and derivatives thereof."

(b) The claims of auxiliary request I were withdrawn later in the appeal proceedings (see point X(a), below). Consequently, they will not be discussed in further detail.

(c) Auxiliary request II comprised 20 claims whereby Claim 1 read as follows:

"A polyether/polyol based aliphatic thermoplastic urethane elastomer, said elastomer comprising

the reaction product of:

a) a polyol;
b) a chain extender;
c) an organic diisocyanate;
d) a urethane catalyst;

a first and a second ultraviolet (UV) stabilizing agent wherein the first UV-stabilizing agent is a hindered amine light stabilizer (HALS) and the second UV-stabilizing agent is a hydroxyphenyl benzotriazole light stabilizer;

an antioxidant and a pigment;

characterized in that

said elastomer comprises said pigment in a total concentration in the range of 1.0 wt% to 2.0 wt%, based on the total weight of the elastomer;

said first and second ultraviolet stabilizing agents are present in a ratio in a range of 1:1 to 2:1 in a concentration of 2.0 wt%, based on the total weight of the elastomer; and

said antioxidant is present in an amount of 0.1 wt% to 1 wt% based on the total weight of the elastomer;

whereby said elastomer is provided with a resistance to Xenon arc artificial weathering with

a DE ≤ 3.00 after 2450 kilojoules of output exposure."

Claims 2-6 and 8-20, corresponded to Claims 3, 5-8 and 10-22 as granted whereby the dependencies had been amended accordingly. Claim 7 corresponded to Claim 9 of the main request (point VIII(a), above) whereby the dependency had been amended accordingly.

(d) The appellant questioned the validity of D8 which was at best a compilation of different, individual documents compiled at an unknown date by an unknown person to what had been presented in the opposition proceedings as D8.

As regards inventive step, the appellant pointed out that the amount of UV stabilizers was critical in order to achieve the artificial weathering requirements of greater than 2450 kJ exposure with a DE ≤ 3.00 without cracking. This was supported by the examples (Tables 1-4) in the patent in suit.

Furthermore, the present invention recognized that the level of pigments of 1-2 wt% was sufficient to provide the claimed DE values. The test results submitted as D19 by respondent 02 demonstrated at best that some useful elastomer material outside the claimed range could be made.

IX. In a letter dated 3 August 2006, respondent 02 filed a declaration of Mr Stohler (hereinafter referred to as D20) to demonstrate that D8 had been made available to the public in 1992.

D20: Declaration of Mr Stohler dated 3 August 2006.

X. On 7 August 2006, oral proceedings were held before the board.

(a) The appellant withdrew auxiliary request I filed with letter dated 7 July 2006 and submitted a new auxiliary request I (Claims 1-12) and an auxiliary request III (Claims 1-18).

(b) Claim 1 of auxiliary request I read as follows:

"A light stable automotive interior trim component, said component comprising a polyether/polyol based aliphatic thermoplastic urethane elastomer, said elastomer comprising

the reaction product of:

a) a polyol;
b) a chain extender;
c) an organic diisocyanate;
d) a urethane catalyst;

a first and a second ultraviolet (UV) stabilizing agent wherein the first UV-stabilizing agent is a hindered amine light stabilizer (HALS) and the second UV-stabilizing agent is a hydroxyphenyl benzotriazole light stabilizer;

an antioxidant and a pigment;

characterized in that

said elastomer comprises said pigment in a total concentration in the range of 1.0 wt% to 2.0 wt%, based on the total weight of the elastomer;

said first and second ultraviolet stabilizing agents are present in a ratio in a range of 1:1 to 2:1 in a total amount of greater than 1.0 wt% to 2.0 wt%, based on the total weight of the elastomer; and

said antioxidant is present in an amount of 0.1 wt% to 1 wt% based on the total weight of the elastomer;

whereby said elastomer is provided with a resistance to Xenon arc artificial weathering with a DE ≤ 3.00 after 2450 kilojoules of output exposure."

Claims 2-12 of auxiliary request I were dependent claims directed to elaborations of the component according to Claim 1. They corresponded in substance to granted Claims 3-8, 9(with the amendments shown in point VIII(a), above) and 10-13, whereby the dependencies had been amended accordingly.

(c) The claims of auxiliary request III are not of importance for this decision and will therefore not be discussed in further detail.

(d) As regards the issue of Article 100(c) EPC raised by the board in its communication (point VII, above), the chairman asked the appellant whether it agreed that this fresh ground of opposition, was to be considered. The appellant did not agree to the introduction of the fresh ground for opposition.

(e) The appellant still challenged the validity of D8. But even if D8 were to be considered under Article 54(2) EPC, it did not disclose the combination of features required in Claim 1 of the main request. The same applied to the disclosure of D1.

Respondent 02 maintained its novelty objection in view of D8 and basically relied upon its written submissions.

Respondent 01 raised a novelty objection in view of D1. A person skilled in the art would understand from D1 that the stabilizer combinations disclosed therein would be suitable for all polyurethanes, ie for aliphatic and aromatic, polyether polyol based or polyester polyol based, pigmented or not pigmented. The claimed subject-matter was not a purposive selection from the general disclosure of D1 and did not meet the criteria of a selection invention.

(f) As regards inventive step, the appellant argued that the urethane elastomer was basically used in the area of automotive interior trim components where the sample thickness was of importance. The

invention aimed at a low level of discolouration without cracking. As regards the question as to whether or not the technical effect "without cracking" was achieved over the whole range claimed, in particular at a concentration of 1.01 or 1.1 wt% of HALS + HBENZ, the appellant argued that a person skilled in the art would not consider 1.01 wt% as being within the range of "greater than 1.0 wt% to 2.0 wt%" because the limits in Claim 1 were given to a precision of only one decimal place whereas the value 1.01 wt% was given to two decimal places. Furthermore, 1.1 wt% of HALS + HBENZ would certainly provide the effect "without cracking".

Respondent 01 argued that D10 represented the closest prior art. Nothing inventive could be seen in selecting the specific PUR or the specific levels of UV stabilizers and/or pigment. As regards the sample thickness, this feature was not relevant to the composition of Claim 1.

Respondent 02 argued that D8 equally qualified as closest prior art. Since no technical advantages of the claimed subject-matter over D8 were derivable from that patent in suit ("without cracking" was too vague to be taken into account), the problem to be solved could only be seen in the provision of further light stable PUR elastomers. Nothing inventive could be seen in selecting the specific PUR or the specific levels of UV stabilizers and/or pigment from the general disclosure in D8.

(g) As regards auxiliary request I, the respondents raised no objections under Article 84, 123 and 54 EPC. However, their argumentation presented for the main request would equally apply to auxiliary request I, in particular because D8 also referred to automotive interior trim components.

The appellant argued that there was no pointer in the prior art that a composition with the combination of features presented in Claim 1 would be especially suitable for automotive interior trim components.

(h) As regards auxiliary request II, the respondents raised no objections under Article 84, 123 and 54 EPC. Respondent 01 questioned the criticality of the amount of UV stabilizers and respondent 02 was of the opinion that "cracking" was too vague in order to support the presence of an inventive step.

According to the appellant it was apparent from the patent in suit that 2.0 wt% was a critical amount as regards the UV stabilizers. Paragraph [0026], for example, referred to this value as the preferred concentration, and all examples with 2.0 wt% of UV stabilizers provided light stability as defined according to the claims without cracking.

XI. The appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of

- the main request (Claims 1-22 filed with letter dated 7 July 2006 and pages 4 and 7 filed with letter dated 10 December 2003), or in the alternative,

- auxiliary request I (Claims 1-12) filed at the oral proceedings on 7 August 2006; or

- auxiliary request II (Claims 1-20) filed with letter dated 7 July 2006; or

- auxiliary request III (Claims 1-18) filed at the oral proceedings on 7 August 2006.

XII. Respondent 01 and respondent 02 requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal complies with Articles 106 and 108 EPC and Rule 64 EPC and is therefore admissible.

Main request

2. *Amendments (Main Request)*

2.1 The claims of the main request correspond to the claims as granted except that in Claim 9 the references to the aromatic diisocyanates have been deleted (point VIII(a),

above). This amendment was not necessitated by any of the grounds of opposition raised by the opponents under Article 100 EPC but was introduced to remove an inconsistency between Claims 1 and 9 as granted (Claim 1 is directed to an aliphatic thermoplastic urethane elastomer but Claim 9 lists aromatic diisocyanates). The board did not object to this amendment especially because it was filed in response to objections raised during the opposition procedure before the opposition division. Furthermore, the amendment did not give rise to any objection under Articles 84 and 123 EPC. Nor was any objection in this respect raised by the respondents.

2.2 As to the question whether or not the lower limit of **greater than** 1.0 wt.% for the amount of the first and second ultraviolet light stabilizing agents and the definition of the elastomer without the mandatory presence of a chain extender in Claim 1 have a valid basis in the application as originally filed at all, the board is not empowered to examine this issue because Article 100(c) EPC was not a ground of opposition and the appellant did not agree that this fresh ground for opposition was to be considered (G 10/91, OJ EPO 1993, 420, opinion, point 3).

3. *Novelty (main request)*

3.1 D1 and D8 are the only documents relied upon by the respondents for novelty against the subject-matter of Claim 1 of the main request.

3.2 D1

3.2.1 D1 is a product information on UV stabilizers which can help to improve significantly the resistance of urethane polymers to sunlight and heat. D1 discloses on page 2 in general terms that the combined use of Tinuvin® 765, a liquid hindered amine light stabilizer (HALS), and Tinuvin® 328, a hydroxybenzotriazole UV absorber (HBENZ), often together with other stabilizers such as Irganox® 245, an antioxidant (AO), improves resistance to discoloration and increases retention of physical properties in polyurethanes (PUR) exposed to light. Furthermore, D1 also discloses specific PUR compositions containing various stabilizers.

3.2.2 However, none of these PUR compositions has **all** the requirements of Claim 1 of the main request. Thus, the only reference to a pigmented PUR composition can be found in Figure 5 of D1 which describes the light stability of blue pigmented **aromatic** polyether PUR, ie not an **aliphatic** PUR as required in Claim 1 of the main request. In addition, the amount of pigment is not disclosed for the composition of Figure 5. (Claim 1 of the main request requires a pigment concentration in the range of 1.0-2.0 wt%). Figure 10 discloses the only aliphatic polyether based PUR composition. However, this figure describes compositions which neither contain a pigment nor the combination of HALS, HBENZ and AO. Hence, the subject-matter of Claim 1 of the main request is novel over D1.

3.2.3 Respondent 01 argued that a person skilled in the art would understand from D1 that the stabilizer combinations disclosed therein, in particular HALS,

HBENZ and AO, are suitable for all polyurethanes, ie for aliphatic and aromatic and for polyether polyol based and polyester polyol based PUR. As regards the amount of pigment of 1.0-2.0 wt%, such an amount was generally used for pigments and could not justify a selection invention, in particular no technical effect was associated with the selected range of pigment. However, this argumentation is not convincing for the following reasons:

The argumentation of respondent 01 ignores the fact that one would have to pick and choose, ie make a "multiple selection", from the generic disclosure and the figures in D1 in order to arrive at something falling within the scope of Claim 1. For example, one would have to select i) polyether polyol based, ii) aliphatic, iii) the combination of HALS, HBENZ and AO in the appropriate amounts and iv) the appropriate amount of pigment. Apart from that, the amount of pigment was not disclosed at all in D1. It may be known from D5 that pigments are generally added in an amount of a few hundreds of a percent to a few percent, however, such a general statement is not a pointer to the range required in Claim 1, namely 1.0-2.0 wt%.

According to decision T 653/93 of 21 October 1996 (not published in the OJ EPO, point 3.2 of the reasons), in case of a "multiple selection", the question of novelty cannot be answered by contemplating the ranges of various parameters separately. Moreover, one would have to show that the "combined selection" emerges from the prior art. In the present case, a person skilled in the art had no reason, when applying the teaching of D1, to concentrate on the combination of the above mentioned

features i) to iv). Such a "combined selection" is neither explicitly disclosed nor hinted at in D1.

As regards the criteria for selection inventions referred to by respondent 01 and briefly summarised in T 279/89 of 3 July 1991 (not published in the OJ EPO, point 4.1 of the reasons), these criteria have been developed for a so-called "selection" of only one **single** parameter from a numerical range. These criteria are therefore not applicable in the case of a "multiple selection" (in this context see T 653/93, ***supra***, point 3.6 of the reasons).

3.2.4 In summary, the combination of features as defined in Claim 1 of the main request is neither explicitly nor implicitly disclosed in D1. Hence, the subject-matter of Claim 1, and by the same token, the subject-matter of Claims 2-22 of the main request is novel over D1.

3.3 D8

3.3.1 D8 is a preliminary product information from Ciba-Geigy concerning Tinuvin® B 75, a liquid light stabilizer blend. The appellant questioned the validity of this document because it was at best a compilation of different, individual documents compiled at an unknown date by an unknown person to what has been presented in the opposition proceedings as D8.

Although the layout of D8 and the fact that it contains more than one date ***prima facie*** support the appellant's view, it is evident from the declaration of Mr Stohler (D20) that D8 had been made available to the public at the Kunststoffmesse K92 in Düsseldorf in 1992.

Mr Stohler was responsible for the marketing of heat and light stabilizers for polyurethanes within Ciba-Geigy AG at the relevant date.

The appellant's criticism that D20 was filed to late (ie only shortly before the oral proceedings before the board) and, therefore, should not be taken into account, is not acceptable for the following reasons: Firstly, D20 was filed in reaction to a communication of the board. Secondly, the enquiry of respondent 02 had to be made during the holiday season and involved an employee of a third party, namely Ciba-Geigy AG and its successor Ciba Specialties Inc., respectively. Hence, the statement of respondent 02 that D20 had been filed at the earliest possible date is convincing. In fact, the declaration is dated 3 August 2006 and was filed by respondent 02 via fax on the same day. Finally, respondent 02 has argued already in the notice of opposition that D8 had been made available to the public at the above mentioned fair in 1992, and had offered to provide further evidence in case the patent proprietor had any doubt as to the availability of D8. However, D8 was only challenged at the oral proceedings before the opposition division, which was, according to the decision under appeal, too late to be taken into account. Thus, the appellant itself is, in a way, responsible for the fact that this issue has not been clarified in an early stage of the opposition procedure.

In view of the above, D8 is considered to be a valid document in accordance with Article 54(2) EPC.

3.3.2 D8 relates to Tinuvin® B 75, a liquid light stabilizer blend consisting of 20% of an antioxidant

(Irganox® L 135), 40% of a HALS stabilizer (Tinuvin® 765) and 40% of a HBENZ stabilizer (Tinuvin® 571). This blend prevents the processing, light and weather induced degradation of polyurethane products such as shoe soles, instrument and door panels, steering wheels, window encapsulations, head and arm rests. It can be easily added to aromatic or aliphatic polyurethane systems for thermoplastic mouldings, semi-rigid integral foams, in-mould skinning, dope applications and can be used with natural and pigmented materials (page 2). Furthermore, D8 discloses various specific polyurethane materials containing Tinuvin® B 75 or other stabilizer blends (Figures 1-10) and the evaluation of these materials after exposure to light (yellowness index, loss of gloss, DE values).

3.3.3 However, D8 does not disclose a PUR composition which has **all** the requirements of Claim 1 of the main request. Figures 1-6 describe pigmented aliphatic PUR but neither the pigment level nor the exact nature of the polyurethane (polyether polyol based) is disclosed. Figures 7-8 describe one component transparent PUR films containing an antioxidant (Irganox® L 135), a HALS stabilizer (Tinuvin® 765) and a HBENZ stabilizer (Tinuvin® 571) in an amount as required in Claim 1 but the films (transparent!) apparently contain no pigment. In addition, the nature of the polyurethane (polyether polyol based, aliphatic) is not disclosed in Figures 7-8. Figures 9-10 relate to white integral foams but neither the amount of pigment nor the exact nature of the polyurethane (polyether polyol based, aliphatic) is indicated. Furthermore, the concentration of HALS+HBENZ in these figures is outside the scope of Claim 1.

3.3.4 As in D1, one would have to pick and choose, ie make a "multiple selection", from the generic disclosure and the figures in D8 in order to arrive at something falling within the scope of Claim 1. A person skilled in the art had no reason, when applying the teaching of D8, to concentrate on the combination of features as required in Claim 1 of the main request. Such a combination is neither explicitly disclosed nor hinted at in D8.

3.3.5 As regards the argumentation of respondent 02 that the skilled person would apply the teaching of D8 to all types of polyurethanes (polyether polyol based or polyester polyol based, aliphatic or aromatic, pigmented and not pigmented) and that the subject-matter of Claim 1 was not a purposive selection, in particular with regard to the pigment concentration, such a novelty objection must fail for the same reasons as given in the context of D1 (point 3.2.3, above).

3.3.6 In summary, the combination of features as defined in Claim 1 is neither explicitly nor implicitly disclosed in D8. Hence, the subject-matter of Claim 1, and by the same token, the subject-matter Claims 2-22 of the main request is novel over D8.

4. *Problem and Solution (Main Request)*

4.1 Claim 1 of the main request is directed in general terms to a polyether polyol based aliphatic thermoplastic urethane elastomer. Due to the use of a specific stabilizer blend comprising a HALS stabilizer, a HBENZ stabilizer and an antioxidant, the elastomer

has improved light stability (eg paragraph [0001] of the patent specification). This light stability is expressed in Claim 1 as resistance to Xenon arc artificial weathering with a DE ≤ 3.00 after 2450 kJ of output exposure.

4.2 As set out in point 3.3.2, above, D8 discloses that the stabilizer blend Tinuvin® B 75 (consisting of HALS, HBENZ and AO) prevents the processing, light and weather induced degradation of polyurethane products such as shoe soles, instrument and door panels, steering wheels, window encapsulations, head and arm rests. It can be easily added to aromatic or aliphatic polyurethane systems for thermoplastic mouldings, semi-rigid integral foams, in-mould skinning, dope applications and can be used with natural and pigmented materials. Furthermore, D8 evaluates various PUR materials containing Tinuvin® B 75 or other stabilizer blends with respect to yellowness index, loss of gloss and DE values. Especially the latter parameter is used in the patent in suit to define the light stability of the polyurethanes.

4.2.1 Thus, apart from using the same combination of stabilizers as required in Claim 1 of the main request (HALS, HBENZ and AO), D8 discloses technical effects, purpose and intended use most similar to the claimed subject-matter. Therefore, the board regards D8 as representing the closest prior art.

4.2.2 D10 was considered by the opposition division as the closest prior art. However, this document is, in the board's view, not the proper starting point for

assessing inventive step, because D10 does not refer to the relevant property expressed in terms of DE.

4.3 It is clear from the above analysis that the PUR of both the patent in suit and the closest prior art exhibits good light stability. However, the appellant alleged that the patent in suit not only aimed at PUR having good light stability but aimed at PUR that was able to withstand the artificial weathering (Xenon arc) exposure without cracking as apparent from the examples and in particular from paragraphs [0038] to [0041] of the patent specification. Thus, the salient point in the present case is whether these effects are achieved by the combination of features of Claim 1 of the main request. The outcome of this issue is important because in this step of the problem-solution approach the technical effect(s), if any, that the patent in suit provides over the closest prior art is (are) taken into account when formulating the objective technical problem.

4.3.1 It is evident from the examples in the patent in suit that polyurethanes according to Claim 1 of the main request have good light stability (eg Table 1).

4.3.2 As regards the technical effect "without cracking" it is apparent from the examples in the patent in suit that all test specimens with a total concentration of 2.0 wt% of HALS + HBENZ have good light stability (ie DE $\leq$ 3.00 after 2450 kJ of output exposure) and did not crack up to an exposure of 2450 kJ. On the other hand, the composition NB REF 1000 110-1 in Table 4 of the patent specification with a total concentration of 1.0 wt% of HALS + HBENZ (ie just outside the scope of

Claim 1 of the main request) has good light stability (a DE value below 3.00) but cracked at an exposure of 2016.00 kJ.

Thus, if 1.0 wt% of HALS + HBENZ does not achieve certain technical effects, it is in principle not plausible that any value above 1.0 wt%, eg 1.01 or 1.1 wt%, would achieve such technical effects. In the board's view, it has not been plausibly demonstrated that the alleged technical effect "without cracking" is achieved over **the whole range claimed**, namely in the range of greater than 1.0 wt% to 2.0 wt% of HALS + HBENZ.

The appellant's argument that a person skilled in the art would not consider 1.01 wt% as being within the range of "greater than 1.0 wt% to 2.0 wt%" because the limits in Claim 1 are given to a precision of only one decimal place whereas the value 1.01 wt% is given to two decimal places is not convincing. The patent in suit and the application as originally filed, respectively, do not define how the lower limit "greater than 1.0 wt%" has to be interpreted. As regards the appellant's statement that 1.1 wt% of HALS + HBENZ would certainly provide the alleged effect, this statement has not been substantiated by any experimental data and can therefore not be taken into account.

4.3.3 Since no improvement with respect to the technical effect "without cracking" can be seen across the **whole** range claimed, this effect cannot be taken into account. Since furthermore, D8 already discloses that the addition of a stabilizer blend of HALS, HBENZ and AO

improves the light stability, the objective technical problem can only be seen in the mere provision of further light stabilized polyurethanes.

4.3.4 From the examples in the patent in suit, eg Table 1, it is evident that this objective technical problem is solved by the features of Claim 1 of the main request.

5. *Inventive Step (Main Request)*

5.1 It remains to be decided whether or not the proposed solution, ie the subject-matter of Claim 1 is obvious from the prior art.

5.2 As explained in points 3.3.2 and 4.2, above, D8 recommends the addition of the stabilizer blend Tinuvin® B 75 to aliphatic and aromatic polyurethane systems which may be pigmented. Nothing inventive can be seen in choosing from this general disclosure particular combinations of polyurethane, stabilizer and pigment, especially because no surprising technical effect is associated with this particular combination.

The appellant's argument that the specific pigment concentration of 1 to 2 wt% plays an important role in the synergistic effect for stabilizing the aliphatic polyurethane is not convincing. Both respondents have filed experimental data which demonstrate that the pigment level of 1-2 wt% is not critical for achieving light stability (respondent 01: already with the notice of opposition; respondent 02: D19).

As regards the appellant's argument that the composition of Claim 1 was basically used in the area

of automotive interior trim components where the sample thickness was of importance, this argument cannot be taken into account because Claim 1 relates to a thermoplastic urethane elastomer per se having no restriction with respect to intended use or sample thickness.

5.3 Consequently, the subject-matter of Claim 1 of the main request is obvious in view of D8.

6. Claim 1 of the main request being not allowable, the main request has to be refused.

Auxiliary Request I

7. *Amendments (Auxiliary Request I)*

Claim 1 of auxiliary request I (point X(b), above) corresponds to Claim 14 as granted whereby the definition of the polyurethane of Claims 1 and 2 as granted has been included. Dependent Claims 2-12 are based on a combination of granted Claim 14 with granted Claims 3-8, 9 (with the amendments shown in point VIII(a), above) and 10-13. Since Claim 14 as granted contains a reference to the urethane elastomer "*according to anyone of the proceeding claims 1 to 13*", and Article 100(c) EPC is not part of the present appeal proceedings (see point 2.2, above), no objection under Articles 84 and 123 EPC can arise against this combination of granted claims. Nor was any objection in this respect raised by the respondents.

8. *Novelty (Auxiliary Request I)*

The respondents did not raise a novelty objection against the subject-matter of the claims of auxiliary request I. Nor does the board see any reason to raise an objection in this respect.

9. *Inventive Step (Auxiliary Request I)*

9.1 As set out in point 3.3.2, above, D8 discloses that the stabilizer blend Tinuvin® B 75 prevents the processing, light and weather induced degradation of polyurethane products such as - ***inter alia*** - instrument and door panels, steering wheels, window encapsulations, head and arm rests, ie articles which are considered to include automotive interior trim components. Therefore, D8 also represents the closest prior art for the subject-matter of auxiliary request I.

9.2 The appellant argued that the restriction of the claims of auxiliary request I to light stable automotive interior trim components meant to a person skilled in the art that the mechanical properties were even more critical, especially because the components were rather thin.

However, the thickness of the automotive interior trim components is not a decisive parameter of Claim 1. Furthermore, it has not been plausibly demonstrated that the mechanical effect "without cracking" is achieved over the whole range claimed, ie in the range of greater than 1.0 to 2.0 wt% of HALS + HBENZ (point 4.3.2, above), the objective technical problem for auxiliary request I can only be seen in the

provision of further light stable automotive interior trim components.

9.3 Since D8 recommends the addition of the stabilizer blend Tinuvin® B 75 to aliphatic and aromatic polyurethane systems which may be pigmented (points 3.3.2 and 4.2, above) in the production of polyurethane products that include automotive interior trim components, nothing inventive can be seen in choosing from this general disclosure a particular combination of polyurethane, stabilizer, pigment, and product application, especially because no surprising technical effect is associated with this particular combination.

9.4 Consequently, the subject-matter of Claim 1 of auxiliary request I is obvious over D8.

9.5 Claim 1 of auxiliary request I being not allowable, auxiliary request I has to be refused.

Auxiliary request II

10. *Amendments (Auxiliary Request II)*

10.1 Claim 1 of auxiliary request II (point VIII(c), above) is directed to a polyether polyol based aliphatic thermoplastic urethane elastomer based on a combination of Claims 1, 2 and 4 as granted.

Claim 1 now requires a chain extender and the amount of stabilizer is exactly 2.0 wt%, as disclosed in Claim 4 as granted and Claim 3 as originally filed, respectively.

10.2 Claims 2-6 and 8-20, correspond to Claims 3, 5-8 and 10-22 as granted whereby the dependencies have been amended accordingly. Claim 7 corresponds to Claim 9 of the main request (point VIII(a), above) whereby the dependency has been amended accordingly.

10.3 Consequently, no objection under Articles 84 and 123 EPC arises against the claims of auxiliary request II. Nor was any objection in this respect raised by the respondents.

11. *Novelty (Auxiliary Request II)*

As explained in points 3.2 and 3.3, above, the subject-matter of Claim 1 of the main request is novel over D1 and D8. This finding equally applies to the subject-matter of Claim 1 of auxiliary request II which is even more restricted than the subject-matter of Claim 1 of the main request. Hence, the subject-matter of Claim 1, and by the same token, the subject-matter of Claims 2-20 of auxiliary request II is novel. Nor was any objection in this respect raised by the respondents.

12. *Inventive Step (Auxiliary Request II)*

12.1 Claim 1 of auxiliary request II is directed in general terms to a polyether polyol based aliphatic thermoplastic urethane elastomer including a specific stabilizer blend (HALS, HBENZ and AO). Thus, D8 remains the closest prior art for the subject-matter of Claim 1 of auxiliary request II.

12.2 It is evident from the examples in the patent in suit, eg Tables 1 and 4, that the addition of 2.0 wt% HALS and HBENZ in combination with an antioxidant yields aliphatic polyurethanes which exhibit good light stability and are able to withstand the artificial weathering (Xenon arc) exposure as defined according to the claims without cracking. Table 4 also shows that a polyurethane that differs only in the amount of HALS + HBEZ, ie 1.0 wt%, cracks. Thus, for the **limited** scope of Claim 1 of auxiliary request II it is plausible that the combination of features in Claim 1 yields a PUR elastomer with good light stability and improved mechanical properties with respect to cracking.

Hence, in contrast to the main request, the objective technical problem for auxiliary request II has to be seen in the provision of light stabilized polyurethanes that are also improved with regard to cracking properties.

12.3 In D8 itself, there is no hint that a specific amount of HALS and HBENZ stabilizer would provide advantageous effects associated with cracking, let alone to such an amount of HALS and HBEZ in combination with the other features required in Claim 1. Furthermore, none of the other documents in the appeal proceedings addresses the problem of avoiding cracking in polyether polyol based aliphatic thermoplastic urethane elastomers. Consequently, they cannot provide a pointer to the solution of the objective problem.

12.4 Hence, the solution to the stated problem does not arise in an obvious way from the state of the art. Consequently, the subject-matter of Claim 1 of

auxiliary request II, and by the same token, the subject-matter of Claims 2-20 involves an inventive step.

13. Because the appellant succeeded on auxiliary request II, there was no need to consider its further auxiliary request III.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent on the basis of Claims 1 to 20 of auxiliary request II (filed with letter dated 7 July 2006) and after any necessary consequential amendment of the description.

The Registrar: The Chairman:

R. Schumacher C. Idez