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**Datasheet for the decision
of 24 May 2007**

Case Number: T 0555/05 - 3.3.03

Application Number: 97907474.7

Publication Number: 0892831

IPC: C08L 23/16

Language of the proceedings: EN

Title of invention:
Thermoplastic elastomer

Patentee:
DSM IP Assets B.V.

Opponent:
Advanced Elastomer Systems L.P.

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 84, 123(2), 123(3)
EPC R. 57(a)

Keyword:
"Main request - Amendments justified by grounds of opposition (no)"
"First auxiliary request - clarity (no)"
"Second auxiliary request - inventive step (no)"
"Referral to the Enlarged Board of Appeal (no)"

Decisions cited:
G 0009/91, G 0001/99, T 0301/87, T 0472/88, T 0412/93,
T 0681/00, T 0520/01, T 0988/02

Catchword:
-



Case Number: T 0555/05 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 24 May 2007

Appellant: Advanced Elastomer Systems L.P.
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office dated
15 December 2004 and posted 1 March 2005
concerning maintenance of European patent
No. 0892831 in amended form.

Composition of the Board:

Chairman: R. Young
Members: C. Idez
C. Heath

Summary of Facts and Submissions

I. The grant of the European patent No. 0 892 831 in the name of DSM N.V (later DSM IP Assets B.V) in respect of European patent application No. 97 907 474.7 filed on 18 March 1997 and claiming priority of the EP patent application No. 96200994 and of the US patent application No. 15295 P, both filed on 12 April 1996 was announced on 10 May 2000 (Bulletin 2000/19) on the basis of 16 claims.

Independent Claims 1, 13 and 16 read as follows:

"1. Thermoplastic elastomer comprising a blend of a rubber and a thermoplastic resin, the rubber being at least partially cured, characterized in that it comprises:

A) a thermoplastic resin,
B) an amorphous polyolefin, selected from an amorphous α -olefin homopolymer, in which the α -olefin has 3-20 C-atoms, and an amorphous α -olefin copolymer, based on ethylene and a α -olefin having 3-20 C-atoms, and
C) an at least partially cured rubber, wherein the ratio of component B to components (A + B) is between 15 and 75 wt.%, the component C is present between 25 and 90 wt.% (based on (A + B + C)), and wherein the amorphous polyolefin (component B) is uncured.

13. Process for the preparation of a thermoplastic elastomer according to anyone of claims 1-12 characterized in that the thermoplastic elastomer is prepared by mixing the components and subjecting the blend to a dynamic curing process.

16. Elastomeric fiber comprising a thermoplastic elastomer according to anyone of claim 1-12."

Claims 2 to 12 and 14 to 15 were dependent claims wherein Claims 2, 7, 10 and 11 read as follows:

"2. Thermoplastic elastomer according to claim 1, characterized in that the thermoplastic resin has a DSC-crystallinity of at least 25%."

7. Thermoplastic elastomer according to any one of claims 1-6, characterized in that the rubber is selected from the group of EADM and butylrubber.

10. Thermoplastic elastomer according to anyone of claims 1-9, characterized in that the rubber is cured to the extend that not more than 15% of the rubber is extractable.

11. Thermoplastic elastomer according to claim 10, characterized in that not more than 5% of the rubber is extractable."

II. On 12 February 2001, a Notice of Opposition against the patent was filed by Advanced Elastomer Systems, L.P.

The Opponent requested revocation of the patent in its entirety on the grounds of lack of novelty and lack of inventive step (Article 100(a) EPC) and on the ground of insufficient disclosure (Article 100(b)) EPC.

The opposition was supported by the following documents:

D1: US-A-4 220 579; and

D2: EP-A-0 527 589.

III. By a decision announced orally on 15 December 2004 and issued in writing on 1 March 2005, the Opposition Division held that the grounds of opposition did not prejudice the maintenance of the patent in amended form on the basis of Claims 1 to 16 submitted as main request at the oral proceedings of 15 December 2004. Claim 1 of the main request differed from Claim 1 as granted in that it had been indicated that the crystallinity of the amorphous polyolefin is (measured by DSC) less than 10%. Claim 2 as granted had been deleted and replaced by a dependent Claim 2 in which the crystallinity of the amorphous polyolefin (measured by DSC) had been limited to less than 3%. Claim 7 of the main request differed from Claim 7 as granted in that the term "EADM" had been replaced by "EPDM". Claims 10 and 11 of the main request differed from granted Claims 10 and 11 in that the expression "in boiling xylene" had been inserted after the term "extractable". The remaining Claims 3 to 6, 8 to 9, and 12 to 16 of the main request corresponded to Claims 3 to 6, 8 to 9 and 12 to 16 as granted, respectively.

IV. According to the decision, the main request met the requirements of Article 123(2) and 123(3) EPC. According to the decision, the invention was sufficiently disclosed since the skilled person would

know in view of the worked examples what was meant by thermoplastic elastomer and would further know which heating rate should be used for determining the crystallinity of the polyolefin component (B) by DSC. Concerning novelty, it was held that the subject-matter of the main request was novel over documents D1 and D2. Concerning inventive step, document D1 was considered as the closest state of the art. Starting from D1, the technical problem was seen in the provision of elastomers having a lower hardness without deterioration of the other properties. According to the decision the combination of D1 with D2 would not suggest the elastomer composition according to the patent in suit.

- V. A Notice of Appeal was filed on 29 April 2005 by the Appellant (Opponent) with simultaneous payment of the prescribed fee.
- With its Statement of Grounds of Appeal filed on 7 July 2005, the Appellant submitted the following documents:
- D3: ASTM Standard D 3418-03 "Standard Test Method for Transition temperature of Polymers By Differential Scanning Calorimetry"; and
- D4: I. Chodak et al. "Peroxide-Initiated Crosslinking of Polypropylene in the Presence of p-Benzoquinone"; Journal of Applied Polymer Science, Vol.32, 1986; pages 5431 to 5437.

It also argued essentially as follows:

(i) Concerning sufficiency of disclosure:

(i.1) In Claim 1 of the patent in suit it had been specified that the amorphous polyolefin had a crystallinity of less than 10 % as measured by DSC.

(i.2) This feature had become an essential and distinguishing feature of Claim 1.

(i.3) However, the application as filed and the patent as granted did not contain any information concerning the method and the conditions of measurement of the crystallinity by DSC.

(i.4) In contrast document D2 clearly specified the conditions for the measurement.

(i.5) Document D3 disclosed the measurement parameters which had to be reported in order to establish reproducibility of the measurement.

(i.6) Since the claims and the patent in suit lacked the specific measurement method, the claims could not be compared to the prior art and, additionally, the scope of the claims could never clearly be determined.

(i.7) Furthermore, according to Claim 1 the amorphous polyolefin was defined by its crystallinity which had to be adjusted to be less than 10 %.

(i.8) There was however no teaching in the patent in suit in order to enable the skilled person to adjust the crystallinity of the polyolefin to less than 10%.

(i.9) Consequently, the patent in suit did not disclose the invention in a manner sufficiently clear for it to be carried out over the whole range claimed, contrary to the provisions of Article 83 EPC.

(ii) Concerning novelty:

(ii.1) The subject-matter of Claim 1 lacked novelty in view of the general description of D1 which disclosed clearly and unambiguously all the features of claim 1 (cf. column 1, lines 48 to 51, line 52, lines 54 to 56; column 2, lines 36 to 44; column 3, lines 21 to 45; column 3, lines 61 to 65; column 1, lines 63 to 64; column 2, lines 44 to 50).

(ii.2) The subject-matter of Claim 1 also lacked novelty over Example 2 of D1.

(ii.3) The amorphous polypropylene of Sample D in Example 2 of D1 was not curable by the treatment according to the example (cf. also D4) and the thermoplastic elastomer of Sample D was inevitably present in a non-cured form.

(ii.4) Furthermore, Claim 1 did not comprise the order of addition of the components as an essential feature.

(ii.5) Sample D of Example 2 of D1 (cf. Table III) was according the invention of D1 (cf. column 14, lines 28 and 29). It could hence be combined with the general

disclosure concerning the crystallinity of the amorphous polypropylene to be used (paragraph bridging columns 4 and 5).

(iii) Concerning inventive step:

(iii.1) The subject-matter of the claims was not based on an inventive step, since no technical effect was evident over the whole range claimed as shown by the Examples in Table III of the patent in suit.

(iii.2) Examples III to VI of the patent in suit had been carried out in accordance with the claimed invention.

(iii.3) The alleged technical improvement, i.e. the provision of a thermoplastic elastomer with a hardness of less than 35 Shore A was not achieved for any possible ratio of the resins (A) and (B) (cf. Examples III and IV).

(iii.4) Hence, this alleged improvement had to be disregarded in defining the technical problem underlying the claimed invention which thus had to be reformulated in less ambitious terms as the provision of an alternative thermoplastic elastomer.

(iii.5) D1 would represent the closest state of the art.

(iii.6) Since D1 further taught how to improve the processability of elastomers, the subject-matter of Claim 1 was obvious over D1. The same would apply to the subject-matter of Claim 2 since no effect had been

shown in relation to a crystallinity lower than 3% of the component B.

(iv) The amendments made in Claims 10 and 11 were not admissible under Rule 57a EPC, since they had not been generated by a ground of opposition.

VI. In its letter dated 25 January 2006, the Respondent (Patent Proprietor) argued essentially as follows:

(i) Concerning sufficiency of disclosure:

(i.1) Measurements of the crystallinity of the amorphous polyolefin (B) by DSC was considered to be clear within the meaning of Art 83 EPC because DSC-measurements were very well known in the art.

(i.2) Evidence for this was given e.g. by the document US-A-6 776 997 in the name of Advanced Elastomer Systems (i.e. the Opponent) where neither in the claim nor in the description any DSC measurement specifications relating to the mass of specimen, the heating rate and the instrument used was given for determining the crystallinity of the polyolefin component.

(i.3) Measurements carried out by the Respondent on an ethylene-alpha olefin copolymer (Exact 8201) showed only a difference of 0.6% in crystallinity depending on the sample weight and the heating rate.

(i.4) Reference was also made to the Guidelines CIII-4.10a.

(ii) Concerning novelty:

(ii.1) D1 did not disclose that the amorphous polyolefin (component B) was uncured.

(ii.2) D1 did not disclose the crystallinity of the amorphous polyolefin (B) in combination with the other features of claim 1. The crystallinity referred to in D1 in column 4-5 lines 66-68 and lines 1 to 3 could not be compared with a crystallinity measured via DSC.

(ii.3) In Example 2 of D1 curing was carried out after preparing the blend in contrast to the present invention in which an at least partially cured rubber (C) was blended together with components (A) and (B) of the present claim 1.

(ii.4) Furthermore, it was disclosed nowhere in Example 2 that the amorphous polyolefin had a crystallinity of less than 10 wt%.

(ii.5) It was not permissible to combine separate items belonging to different embodiments in the same document unless such a combination had specifically been suggested.

(iii) Concerning inventive step:

(iii.1) D1 would represent the closest prior art for the present invention.

(iii.2) The difference between present Claim 1 and D1 was that the amorphous polyolefin was uncured, and that

the amorphous polyolefin had a crystallinity measured by DSC of less than 10 wt%.

(iii.3) The objective technical problem solved by these distinguishing features was to provide thermoplastic elastomers with a low hardness without sacrificing other physical properties (cf. page 2, lines 10 to 15 and see page 4 lines 37 to 40).

(iii.4) In D2 no thermoplastic elastomer was disclosed and no indication was given at all that an amorphous polyolefin would lower the hardness of a thermoplastic elastomer.

(iii.5) Claim 1 was inventive in view of D1, since the teaching of D1 would have dissuaded a skilled person from using an amorphous polyolefin because D1 taught that the incorporation of an amorphous polyolefin did not lower the hardness of the thermoplastic elastomer composition (cf. column 5 lines 29 to 61).

VII. With its letter dated 20 June 2006, the Appellant submitted the following documents:

D4.1: Data Sheet of EXACT 8201, dated March 2002;

D4.2: Polymer Handbook, Fourth Edition, 1999, page V/28.

It also argued essentially as follows:

(i) Concerning sufficiency of disclosure:

(i.1) Document US-A-6 776 997 could not be considered an evidence that, in general, no measurement details must be given.

(i.2) In the Statement of Grounds of Appeal it had not only been objected to the fact that the claims of the patent in suit did not refer to DSC measurement method at all, but furthermore that the patent in suit as a whole did not provide any disclosure or information as to how the DSC measurement was carried out.

(i.3) The measurements made on Exact 8201 submitted by the Patent Proprietor in its letter dated 25 January 2006 had shown a difference in the Delta H between Sample 3 and Sample 5 of 14.2 % which was far away from being not significant.

(i.4) The heat of fusion of Exact 8201 according to the technical brochure as determined according to ASTM D 3418 was 105 J/g, while the values reported by the Respondent in its letter of 25 January 2006 were between 63 J/g and 72 J/g, i.e. a difference of 67 %.

(i.5) Independently of this, the measurements of the heat of fusion of homopolypropylene carried by the Appellant showed that the heat of fusion was significantly dependent on the heating rate of the samples.

(ii) Concerning clarity:

(ii.1) The crystallinity had become an essential and distinguishing feature of Claim 1.

(ii.2) Due to the fact that the patent in suit did not contain any disclosure concerning the measurement of the crystallinity said feature must be considered unclear under Article 84 EPC.

(iii) Concerning novelty and inventive step:

(iii.1) D1 did not contain any clear and positive disclosure that the amorphous polyolefin was in fact cured. Hence, in the absence of such disclosure, the amorphous polyolefin should be considered to be uncured.

(iii.2) D1, in particular, stated that the rubber component could be cured before it was blended with the amorphous polyolefin. This clearly meant that the amorphous polyolefin was not cured.

(iii.3) Thus, Example 2 of D1 could be combined with the information disclosed at column 2, lines 36 et seq.).

(iii.4) D2 unequivocally suggested compositions comprising a thermoplastic resin (component (b) in D2), an amorphous polyolefin (component (a) in D2) and a rubber which may be crosslinked. Typically, blends of a rubber and a thermoplastic resin would encompass "thermoplastic elastomers" (cf. also D1, col. 1, lines 23 to 37).

(iii.5) The teaching of D2 that the addition of the amorphous polyolefin to the resin composition of D2 would be suitable to lower the hardness (see D2, page 4, lines 21 to 27), would also apply to blends of a crystalline polyolefin, (cured) rubber and said amorphous polyolefin, i.e. to thermoplastic elastomers.

(iii.6) The skilled person would also expect that the hardness would decrease significantly if in a thermoplastic polyolefin/rubber composition part of the crystalline polyolefin (for instance, polypropylene) would be replaced by amorphous polyolefin. The same teaching was given in D1 (cf. comparison between Example 1 Samples G and P).

VIII. With its letter dated 22 January 2007, the Respondent submitted six auxiliary requests.

It also argued essentially as follows:

(i) Concerning sufficiency of disclosure:

(i.1) In the Notice of Opposition, under "lack of sufficient disclosure of the invention", Appellant (Opponent) only observed that the opposed patent did not disclose any measurement by which a skilled person would be able to determine the hardness of the compositions of the invention.

(i.2) The Appellant had thus failed to provide an indication of the facts, evidence and arguments that properly support an objection under Art 100(b) EPC, as required under R. 55(c) EPC, in the Notice of Opposition.

(i.3) Consequently, the ground for appeal under Art. 100(b) EPC was not admissible, because the Notice of Opposition did not contain the indication of facts, evidence and arguments in support of this ground as required by Rule 55(c) EPC.

(i.4) The Appellant had alleged that the scope of the claims could never clearly be determined because the claims and the Patent lack the DSC method for determining the crystallinity of component B (the amorphous polyolefin).

(i.5) This was however not a matter of sufficient disclosure, but a matter of clarity.

(i.6) The requirements of Article 83 EPC were met because the skilled person was able to provide a composition according to the Patent without undue burden, based on the disclosure of the Patent, common general knowledge and optionally the publications cited therein.

(i.7) Even though heating rates played a role, the skilled person should reasonably know what heating rates should be used in order to know whether he worked within the scope of the present claims or not.

(i.8) Furthermore, the description provided a further definition and several examples of suitable polyolefins.

(i.9) The patent in suit not only taught which polyolefins were suitable in general (those having a random structure) but also mentioned various sources

for the amorphous polyolefin and even provided a plurality of specific examples that allowed the skilled person to reduce the claimed subject-matter to practice without undue burden.

(i.10) The Appellant had alleged that the claims defining a feature in terms of the results to be achieved, but crystallinity was not a feature of the composition as such, but of a component thereof, these components being readily available.

(ii) Concerning clarity:

(ii.1) The Appellant should have indicated the ground of lack of clarity in the written statement within four months from the appealed decision.

(ii.2) It was requested that the Board of Appeal rejected this objection as being late-filed and hence not admissible.

(ii.3) According to decision T 301/87 (OJ EPO 1990, 335), Article 102(3) EPC did not allow objections to be based upon Article 84 EPC, if such objections did not arise out of the amendments made (Headnote 1).

(ii.4) The claims as granted (cf. Claim 2) already referred to crystallinity (measured by DSC).

(ii.5) Since crystallinity (measured by DSC) was a parameter that was already present in the claims as granted, clarity was not an issue that should be taken into consideration during opposition proceedings.

(ii.6) Even if the inaccuracy of the DSC technique might be decreased by specifying specific measurement conditions, the absence of such conditions in itself such did not result in a lack of clarity.

(ii.7) Any analytical technique inherently had some level of inaccuracy, even if measurements were repeated using the same measurement conditions.

(ii.8) The measurements presented in Patentee's letter of 25 January 2006 indicated that the crystallinity of the used polymer was 22.9 ± 1.1 wt.%, which represented an acceptable accuracy.

(ii.9) The outcome of the DSC test was that, regardless the sample weight and heating rate, outcome of the DSC measurement was that the test polymer was not an amorphous polyolefin as defined in present Claim 1.

(ii.10) The same conclusion applied to DSC measurements presented by the Appellant in its letter of 20 June 2006.

(iii) Novelty

(iii.1) Reference was made to the arguments presented in the letter dated 25 January 2006.

(iii.2) It was not disclosed in the "general disclosure" of D1 that the concentrations of the components had to be such that the ratio of the weight of the amorphous polyolefin to the sum of weights of the amorphous polyolefin and thermoplastic resin was between 15 and 75 wt.% and the concentration of the

rubber based on weight of the sum of weights of the thermoplastic resin, the amorphous polyolefin and the rubber was between 25 and 90 wt.%.

(iii.3) D1 contained a clear and positive disclosure that the amorphous polyolefin might be cured, especially when curing the blend.

(iii.4) In D1, the rubber did not need to be at least partially cured (cf. column 1, lines 48 to 63; Example 1); column 9, lines 43 to 44).

(iii.5) In D1, the rubber could be present in a concentration below the lower limit of 25 wt. %, specified in claim 1 of the patent in suit.

(iii.6) Example 2 of D1 did not anticipate Claim 1 of the patent in suit, since this example taught curing of the blend, containing the amorphous polyolefin, and it did not disclose that the crystallinity of the amorphous polyolefin, as measured by DSC as being less than 10 %.

(iii.7) Example 2 disclosed an embodiment wherein curing of the rubber and amorphous polyolefin took place making use of a peroxide curing agent (cf. Table II and column 13, lines 34-35). Such curing agents were known to be capable of causing curing of amorphous polyolefin (cf. paragraph [0015] of the patent in suit).

(iv) Concerning inventive step

(iv.1) Reference was made to the submissions made in the letter dated 25 January 2006.

(iv.2) D1 did not suggest that the amorphous polyolefin should be uncured, let alone that this would be relevant with respect to solving the problem underlying the invention. In fact, D1 explicitly taught that the amorphous polyolefin might be cured, without giving an indication whether this would affect the hardness (See e.g. column 8, lines 35-39).

(iv.3) With respect to the effect of using an amorphous polyolefin, D1 rather taught away from using such polyolefin in order to reduce hardness. (cf. column 5, lines 57-67).

(iv.4) In D1 a reduction in hardness was considered as an adverse effect (cf. column 5, lines 64-67).

(iv.5) Thus, D1 taught away from the present invention.

(iv.6) The examples of the patent in suit showed that in a composition wherein the polyolefin was uncured, the hardness of the elastomer was reduced when an amorphous polyolefin having a crystallinity as measured by DSC of less than 10 % was present.

(iv.7) The reference made by the Appellant to Examples 1G and 1P of D1 was not relevant when assessing inventive step, as these examples related to thermoplastic elastomers, wherein the rubber was uncured (see column 9, lines 43 and 44 of D1).

(iv.8) Furthermore, Examples 2E compared to 2F, respectively 2G compared to 2H in fact showed that in a composition according to D1, the Shore hardness was increased when 10 % of an amorphous polyolefin was added to the base polymer.

(v) Auxiliary Requests

(v.i) The phrase "in boiling xylene" had been deleted in Claims 10 and 11 of the first auxiliary request. This amendment did not broaden the scope of the claims of the first auxiliary claim request compared to the scope of the patent as maintained in amended form during the first instance of the opposition procedure.

(v.2) The second auxiliary request differed from the main request in that Claims 10 and 11 had been deleted.

(v.3) The third auxiliary request differed from the main request in that the feature "and wherein the crystallinity of the amorphous polyolefin is (measured by DSC) less than 10 %" had been removed from Claim 1 and wherein the range for the ratio $B/(A+B)$ had been limited to a value between 20 and 70 wt. %. Basis was to be found in paragraph [0021] of the Patent.

(v.4) The Examples of the patent in suit wherein the ratio $B/(A+B)$ was between 20 and 70 wt. % exhibited a low hardness.

(v.5) The fourth auxiliary request differed from the main request in that the range for the ratio $B/(A+B)$

had been limited to a value between 20 and 70 wt. %.
Basis was to be found in paragraph [0021] of the Patent.

(v.6) The fifth auxiliary request differed from the main request in that the feature "and wherein the elastomer has a hardness of less than 35 Shore A" had been introduced. Basis for this amendment was to be found in paragraph [0009] of the patent in suit.

(v.7) The claims of the sixth auxiliary request were based on a combination of the fourth and the fifth auxiliary requests.

IX. With its letter dated 12 March 2007, the Appellant submitted the following documents:

D5: Letter of Rexene Corporation dated 15 June 1995 with Data sheets relating to REXflex™ FPO polymers dated 5/95,

D6: Data sheets concerning the polypropylene Eltex P HV 202 of Solvay (dated 5/89), the polypropylenes Moplen H 32 GA (no date), Adstif V 2400 G (dated 8/97) and polypropylene Adstif T 2101 F (dated 8/97) of Montell and of polypropylenes Eltex P HL 200, Eltex P HP 200 and Eltex P HS 200 (dated 5/89) of Solvay; and

D7: Polymer Handbook, Second Edition, 1975, page V-27.

It also argued essentially as follows:

(i) Concerning the new documents D5 to D7:

(i.1) D5 contained technical information concerning the FPO D100 and D400 REXflex polymers used in Example I and Example II of the patent in suit.

(i.2) References D6 and D7 merely provided evidence concerning the level of the Shore D hardness of polypropylene homopolymers to be around 70 Shore D or above.

(ii) Concerning inventive step:

(ii.1) In view of the patent in suit (cf. page 2, lines 3 to 39), it seemed that the starting point for the subject-matter underlying the patent in suit had been thermoplastic elastomer compositions comprising a blend of a rubber and a thermoplastic resin, the latter being represented by a polypropylene homopolymer and copolymer, respectively.

(ii.2) Starting from these conventional thermoplastic elastomer compositions comprising a thermoplastic resin the problem underlying the patent in suit appeared to be to provide thermoplastic elastomers having a low hardness, in particular, a hardness of less than 35 Shore A.

(ii.3) The Shore D hardness of the polypropylene resin used for the Comparative Experiments A and B could be assumed to be 70 or above (cf. D6 and D7).

(ii.4) The REXflex polypropylene homopolymers used in Example I and Example II had a Shore D hardness of 42 (D100-type) and 34 (D400-type), respectively, as was apparent from Reference D5.

(ii.5) Thus, it would have been easily predictable by the skilled person that if in a thermoplastic elastomer the thermoplastic resin having a certain high Shore hardness (represented by Comparative Experiments A and B) was substituted with a thermoplastic resin having a much lower Shore hardness (invention Examples I and II), the resulting thermoplastic elastomer likewise had a lower Shore hardness.

(ii.6) The skilled person would have substituted the thermoplastic component with a commercially available thermoplastic component of lower hardness with very reasonable expectation of solving the technical problem underlying the patent in suit. had a composition that fell within the range claimed in the patent in suit.

X. With its letter dated 27 March 2007, the Respondent submitted the following document:

D8: Data Sheet of Exact 8201, dated March 2006.

According to the Respondent, this document showed that differences in the heat of fusion existed from batch to batch. It was not hence suitable to compare crystallinity measurements on different batches to assess whether the crystallinity of the amorphous polyolefin was sufficiently disclosed.

XI. In its letter dated 30 March 2007, the Respondent argued essentially as follows concerning the documents D5 to D7 submitted by the Appellant with its letter dated 12 March 2007:

(i) It was unclear which part of D5 represented a prior art.

(ii) It was unclear whether D6 constituted prior art.

(iii) None of D5 to D7 was detrimental to the novelty of the subject-matter claimed in the main request or any of the auxiliary requests. None of D5 to D7 suggested to provide a thermoplastic elastomer comprising components A and C with an amorphous polyolefin as defined in the claims of the main request or any of the auxiliary requests.

XII. Oral proceedings were held before the Board on 24 May 2007.

(i) At the oral proceedings the discussion first focussed on the question of allowability of Claims 2, 7, 10 and 11 of the main request under Rule 57(a) EPC. In that respect, the Appellant argued that the filing of these dependent claims had not been justified by a ground of opposition. The Respondent, while being prepared to delete in Claims 10 and 11 the reference to "boiling xylene", submitted that the objections against Claims 2 and 7 have been submitted for the first time at the oral proceedings and should not be admitted.

(ii) The Board, after deliberation, having informed the Parties that Claims 7, 10 and 11 were not allowable under Rule 57(a) EPC, and that the main request was

refused, the Respondent submitted a new first auxiliary request consisting of 16 Claims in order to replace its first auxiliary request submitted with letter of 22 January 2007.

Claims 1 to 16 thereof differed from Claims 1 to 16 of the main request in that the term "EPDM" in Claim 7 had been replaced by the term "EADM", and in that the reference to boiling xylene had been deleted in Claims 10 and 11.

(ii) The discussion then moved (α) to the question of whether the feature in Claim 1 that the amorphous polyolefin (B) should have a crystallinity measured by DSC of less than 10% was open to objection under Article 84 EPC, and (β) to the assessment of novelty of the subject-matter of Claim 1 over document D1.

While the Parties essentially relied on the arguments present in these respects during the written phase of the appeal, they made additional submissions which may be summarized as follows:

(ii.a) Concerning point (α):

(ii.a.1) By the Appellant:

(ii.a.1.1) Claim 1 differed from granted Claim 1 by the indication of the crystallinity of the component (B).

(ii.a.1.2) The measurement conditions for DSC were not indicated either in Claim 1 or in the description.

(ii.a.1.3) Document D3 (paragraph 6) showed that the indication of the conditions of measurement (e.g.

heating rate, cooling rate, sample weight) were compulsory, since they had an effect on the determination of the heat of fusion.

(ii.a.1.4) According to D3, the accuracy of the method disclosed therein was in the order of 3.4% (cf. D3, point 13.2.4).

(ii.a.1.5) In contrast, the experimental data submitted with letter dated 20 June 2006 showed a 30% difference in the measured value of the heat fusion of a propylene polymer depending on the conditions of measurement used.

(ii.a.1.6) The experimental data submitted by the Respondent with its letter dated 25 January 2006 also showed a 14% difference in the measured values of the heat of fusion of the ethylene polymer Exact 8201 depending on the heating rate and sample weight used.

(ii.a.2) By the Respondent:

(ii.a.2.1) The amendment in granted Claim 1 had been made at the oral proceedings before the Opposition Division. The Opponent (Appellant) had raised no clarity objection in that respect either at that time or in its Statement of Grounds of Appeal.

(ii.a.2.2) This objection had only be raised in the letter dated 20 June 2006 of the Appellant. It should be considered as late submitted.

(ii.a.2.3) In any case the skilled person would have used a method generally accepted in the art, i.e. the method according to the ASTM 3418 in order to determine

the crystallinity of the component (B). Reference was also made to the documents D4.1 and D8 in which the heat of fusion of Exact 8201 had been determined according to ASTM 3418.

(ii.a.2.4) DSC as all analytical techniques had a measurement error. This would not justify an objection under Article 84 EPC. Reference was made to the decision T 412/93 of 21 November 1994 (not published in OJ EPO) in that respect.

(ii.b) Concerning point (β):

(ii.b.1) By the Appellant:

(ii.b.1.1) Example 2 Sample F would be novelty destroying for the subject-matter of Claim 1, since the elastomer compositions disclosed therein met all the requirements set out in Claim 1 in terms of ratio of components, uncured state of the amorphous polyolefin, cure state of rubber, and crystallinity of the amorphous polyolefin.

(ii.b.1.2) The term amorphous encompassed a "zero" crystallinity. Furthermore according to D1, the crystallinity of the amorphous polypropylene should be up to 5% (column 5, lines 2 to 3).

(ii.b.2) By the Respondent:

(ii.b.2.1) In Example 2 Sample F, it could not be excluded that the amorphous polypropylene could be partially cured.

(ii.b.2.2) It was not clear which was the crystallinity of the amorphous polypropylene. The passage referred to by the Appellant at column 5 of D1 only mentioned that the conventional amorphous polypropylenes usually had a crystallinity of less than 5%.

(ii.b.2.3) Concerning the general disclosure of D1, the skilled person had to make several choices in order to come to the claimed invention according to the patent in suit. In particular, as shown by Example 1 of D1, the elastomeric composition might be uncured.

(iii) The Board having announced after deliberation that the first auxiliary request was not considered as allowable due to lack of clarity of Claim 1, the Respondent submitted a new second auxiliary request consisting of 15 claims.

Claim 1 of the second auxiliary request read as follows:

"1. Thermoplastic elastomer comprising a blend of a rubber and a thermoplastic resin, the rubber being at least partially cured, characterized in that it comprises:

A) a thermoplastic resin,
B) an amorphous polyolefin, selected from an amorphous α -olefin homopolymer, in which the α -olefin has 3-20 C-atoms, and an amorphous α -olefin copolymer, based on ethylene and a α -olefin having 3-20 C-atoms, and
C) an at least partially cured rubber,
wherein the ratio of component B to components (A + B) is between 15 and 75 wt.%, the component C is present between 25 and 90 wt.% (based on (A + B + C)), and
wherein the amorphous polyolefin (component B) is

uncured, wherein the elastomer has a hardness of less than 35 Shore A."

Claims 2 to 15 correspond to Claims 3 to 16 as granted.

The submissions made by the Parties in respect of the second auxiliary request may be summarized as follows:

(iii.a) By the Appellant:

(iii.a.1) Since the reference to the crystallinity of the component B had been deleted, the scope of Claim 1 of the second auxiliary request was broader than the scope of Claim 1 allowed by the Opposition Division.

(iii.a.2) If this request would be granted this would place the Appellant in a worse position than if it had not appealed.

(iii.a.3) The problem to be solved by the patent in suit was to provide elastomer composition with a low hardness.

(iii.a.4) The indication of the Shore A hardness in Claim 1 was a mere desideratum. It expressed the goal to be achieved, i.e. to the problem to be solved.

(iii.a.5) In the Examples of the patent in suit (cf. Table I) the amount of extender oil was greater (164 parts by weight) than the amount of components A, B and C (142 parts by weight).

(iii.a.6) Example 2 Sample F of D2 disclosed all the compositional features of Claim 1 but did not exhibit

the required hardness set out in Claim 1. The same was true with Examples III and IV of the patent in suit. Essential features were hence missing in Claim 1.

(iii.a.7) In Example 2 Sample F a low amount of extender oil (20 parts by weight) for 110 parts by weight of polymeric components of the elastomeric composition had been added. The Shore A was indicated as being 68, i.e. greater than the one required by Claim 1.

(iii.a.5) Starting from Example 2 Sample F, it would have been obvious to reduce the hardness of the elastomer composition by adding oil therein.

(iii.b) By the Respondent:

(iii.b.1) The amendment made in granted Claim 1 had been considered as allowable by the Opposition Division.

(iii.b.2) Since this amendment had been now considered as inadmissible under Article 84 EPC, the Respondent should be allowed to file a request in order to overcome this deficiency. Reference was made to the decision G 1/99 (OJ EPO 2001, 381).

(iii.b.3) Should the Board nevertheless be inclined to reject the second auxiliary request since Claim 1 thereof had a broader scope than Claim 1 allowed by the Opposition Division, the Respondent would request a referral to the Enlarged of Appeal in order to clarify whether the decision G 1/99 applied to cases where an amendment made in a granted claim was considered as admissible under Article 123(2) EPC by the Opposition

Division but was considered as contravening Article 84 EPC in the appeal procedure.

(iii.b.4) Table II of the patent in suit showed that the addition of an amorphous polyolefin reduced the hardness of elastomer compositions comprising crystalline polyolefin without affecting the other properties of the elastomer (e.g. compression set).

(iii.b.5) Examples VII, VIII, and IX showed that fibers made from the compositions according to the invention had a better tension set than those not containing an amorphous polyolefin.

(iii.b.6) Document D1 was not concerned with the reduction of the hardness of elastomer compositions. It further taught that the hardness would be maintained when adding an amorphous polyolefin in the elastomer composition.

(iv) The Board, after deliberation, having informed the parties that the subject-matter of Claim 1 of the second auxiliary request submitted at the oral proceedings was considered as not involving an inventive step, the Respondent indicated that it withdrew its remaining requests, i.e. the second, the third, the fourth, the fifth and sixth auxiliary requests submitted with letter dated 22 January 2007.

XIII. The Appellant requests that the decision under appeal be set aside and the European patent No. 0 892 831 be revoked.

The Respondent requests that the appeal be dismissed, or in the alternative, that the decision under appeal be set aside and the patent be maintained on the basis of auxiliary request 1, containing claims 1-16, or 2, containing claims 1-15, both filed at the oral proceedings.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. *Wording of the claims*

- 2.1 As indicated above in Section III, Claims 1 to 16 of the main request differ from Claims 1 to 16 as granted in that:

(i) it has been indicated in Claim 1 that the crystallinity of component (B) (determined by DSC) is less than 10%;

(ii) Claim 2 as granted in which the crystallinity (determined by DSC) of the thermoplastic resin (A) was indicated as being at least 25%, has been replaced by Claim 2 in which the DSC crystallinity of the component (B) is less than 3%;

(iii) in Claim 7 the term "EPDM" had replaced the term "EADM" used in granted Claim 7, and

- (iv) in Claims 10 and 11 the expression "in boiling xylene" had been added after the term "extractable".
- 2.2 While no objection either under Article 123(2) or 123(3) EPC have been raised by the Appellant against the claims of the main request, and while the Board is also satisfied that the requirements of these articles are met, it has been submitted by the Appellant that the amendments made in Claims 2, 7, 10 and 11 were not allowable under Rule 57(a) EPC.
- 2.3 In that respect, the Board observes at the oral proceedings before the Opposition Division, the Opponent (Appellant) had objected only to the compliance of the amendment (iv) made in Claims 10 and 11 (cf. Minutes of Oral Proceedings; paragraph 2.2), but that the Opposition Division has dealt in its decision with the question of the compliance of amendments (iii) and (iv) made in Claims 7, 10 and 11 with Rule 57(a) EPC (cf. decision under appeal, page 4, fourth paragraph).
- 2.4 At the oral proceedings before the Board, the Respondent had submitted that the Appellant had for the first time challenged the compliance of the amendment made in Claim 2 with Rule 57(a), and that this objection should be disregarded as late filed.
- 2.5 Nevertheless, as stated in decision G 9/91 (OJ EPO 1993, 408, point 19 of the decision), amendments to a claim in the course of opposition proceedings are to be fully examined as to their compatibility with the requirements of the EPC.

- 2.6 Consequently, the compliance of amendments (i) to (iv) with Rule 57(a) EPC is to be checked by the Board.
- 2.6.1 In that respect, it can firstly be deduced from the letter of the Patent Proprietor (Respondent) dated 15 November 2004 (page 2, Paragraph Ad 1.1), that amendment (i) made in Claim 1 had been made by the Respondent with the aim to meet the grounds of opposition under Article 100(a) EPC (lack of novelty, lack of inventive step).
- 2.6.2 In the Board's view, the potential suitability of the amendment in that respect is sufficient for the amendment to be allowable under Rule 57a EPC as a fair attempt to overcome the objection, irrespective of whether the attempt is successful or not.
- 2.6.3 Consequently, the above-mentioned amendment in Claim 1 is therefore considered acceptable under Rule 57a EPC.
- 2.6.4 While dependent Claim 2 has no counterpart in the claims as granted, the Board nevertheless considers the addition of this dependent claim as admissible under Rule 57a EPC, since it arises in relation to the limitation made in Claim 1 in terms of crystallinity of component (B), i.e. in relation to matter which have been amended in consequence of the issues under Article 100(a) EPC.
- 2.6.5 Concerning dependent Claims 7, 10 and 11, the Board fully concurs with the findings of the Opposition Division in its decision (page 4, fourth paragraph) that the amendments made in Claims 7, 10 and 11 are not

necessitated by a ground of opposition under Art. 100 EPC.

2.6.6 Since furthermore, these amendments are absolutely not linked with the amendments made in Claim 1 concerning the crystallinity of the component (B) and thus, in contrast to those made in Claim 2, they do not arise in relation to the limitation made in Claim 1 and they represent, in the Board's view, nothing other than an attempt "to tidy up" the patent.

2.6.7 Consequently, Claims 7, 10 and 11 are not acceptable under Rule 57(a) EPC.

2.7 It thus follows from the above that the main request must be refused.

First auxiliary request

3. Wordings of the claims

3.1 Articles 123(2) and 123(3) EPC

3.1.1 Claims 1 to 16 of the first auxiliary request differ from Claims 1 to 16 of the main request only in that dependent Claims 7, 10 and 11 now correspond to granted dependent Claims 7, 10, and 11, respectively.

3.1.2 No objections under Articles 123(2) and 123(3) EPC against the claims of the first auxiliary request have been raised by the Appellant.

3.1.3 The Board is also satisfied that the requirements of these articles are met by all the claims.

3.2 *Article 84 EPC*

- 3.2.1 When amendments are made to a patent during an opposition, Article 102(3) EPC requires consideration as to whether the amendments introduce any contravention of any requirement of the Convention, including Article 84 EPC. Article 102(3) EPC, however, does not allow objections to be based upon Article 84 EPC, if such objections do not arise out of the amendments made (cf. also decision T 301/87).
- 3.2.2 In the present case, Claim 1 differs from granted Claim 1, in that it contains the feature that the crystallinity of the amorphous polyolefin is (measured by DSC) less than 10%, and the Appellant has submitted that this amendment results in a lack of clarity of Claim 1.
- 3.2.3 While it is true as submitted by the Respondent that granted Claim 2 contained a reference to the determination of crystallinity by DSC, the amendment carried out in granted Claim 1 is however related to the crystallinity determined by DSC of the amorphous polyolefin (component B), while Claim 2 was directed to the crystallinity of the thermoplastic resin (i.e. component A).
- 3.2.4 Since the feature incorporated in Claim 1 was intended to restrict the subject-matter of Claim 1 over the subject-matter of granted Claim 1, and hence to define the matter for which protection is sought, and since it was not present in a granted dependent claim, it is

evident that the issue of clarity arises from the said amendment made in Claim 1.

3.2.5 Thus, it follows, that this amendment is susceptible to objections being raised under Article 84 EPC and that it must be checked whether it complies with Article 84 EPC (cf. also T 472/88 of 10 October 1990, not published in OJ EPO; point 2 of the Reasons; and T 681/00 OF 26 March 2003, not published in OJ EPO; point 5.1).

3.2.6 As can be understood from the arguments presented by the Respondent in the course of the appeal proceedings (cf. Section VIII (ii.3) above), the level of crystallinity of the amorphous polyolefin polymer (B) is a characterizing feature relied on for a distinction over the prior art, and its role in indicating the limits of the claimed subject-matter, or, in other words, in defining the matter for which protection is sought, is hence a crucial one.

3.2.7 According to Article 84 EPC, the claims shall define the matter for which protection is sought (first sentence) and for this purpose they shall, inter alia, be clear and supported by the description (second sentence). This implies that the claims must be clear in themselves when being read with the normal skills, but not including any knowledge derived from the description of the patent application (cf. decision T 0988/02 of 30 October 2003, not published in OJ EPO; Reasons point 3.3.1).

3.2.8 In the Board's view, the unambiguous characterization in a claim of a product by a parameter (here the level

of crystallinity) necessarily requires that the parameter can be clearly and reliably determined. It thus follows that the knowledge of the method and conditions of determination of the parameter is necessary for the unambiguous definition of the parameter. In that context, the Board further notes that the Respondent has also stressed the importance of the method for determining the crystallinity in that crystallinity determined by a different method (solubility in hydrocarbon solvent) does not lead to comparable results (cf. Section VI (ii.2)) above).

3.2.9 Thus, in order to allow the matter for which protection is sought to be defined, it must be clear from the claim itself when being read by the person skilled in the art exactly how the crystallinity should be determined.

3.2.10 This would imply that the method of determination and the conditions of measurement which might have an influence on the value of the crystallinity should be indicated in the claim, either expressly or, if appropriate, by way of reference to the description according to Rule 29(6) EPC. Such indication would only become superfluous, provided it could be shown that the skilled person would know from the outset which method and conditions to employ because, for instance, this methodology was the methodology commonly used in the technical field, or that all the methodologies known in the relevant technical field for determining this parameter would yield the same result within the appropriate limit of measurement accuracy.

- 3.2.11 In the present case, Claim 1 indicates that the crystallinity of the amorphous polyolefin (B) is the crystallinity determined by DSC.
- 3.2.12 In this connection, the Board firstly notes that the Appellant has submitted that in particular the cooling rate and the heating rate are important features of the DSC measurement. This is also corroborated by document D3 (page 2, paragraph 6.1) which states that heating and cooling rates have an effect on the enthalpy of fusion and that departure from conditions specified for a given polymer is not permitted, and by the experimental report submitted by the Appellant with its letter dated 20 June 2006, which shows that the enthalpy of fusion of an homopolypropylene determined by DSC (second scan) varies between 82.53 J/g for a heating rate and cooling rate of 40°C/min and 113.7 J/g for a heating rate and cooling rate of 10°C/min, i.e. a 37% variation depending on the cooling and heating rates applied.
- 3.2.13 The Board further observes that the test results presented by the Respondent in its letter dated 25 January 2006 show a variation between 63 J/g and 72 J/g (i.e. a 14% variation) of the enthalpy of fusion determined by DSC for the ethylene polymer Exact 8201 related to differences in heating rate and sample weight (the cooling rate not being indicated).
- 3.2.14 Under these circumstances, the Board can only come to the conclusion that at least the heating rate, the cooling rate and the sample weight have a significant influence on the enthalpy of fusion determined by DSC, and that conversely different heating rate, cooling

rate or sample weight would inevitably lead to significantly different values of enthalpy of fusion, and thus, to significantly different values of crystallinity.

- 3.2.15 It must therefore be concluded that the crystallinity value determined by the enthalpy of fusion by DSC is inevitably dependent on the cooling rate and the heating rate applied and on the weight of the sample used, and that, therefore, the knowledge of the exact conditions concerning the cooling rate, the heating rate and the sample weight are essential to a clear and reliable determination of the crystallinity, and hence, to the unambiguous definition of the crystallinity.
- 3.2.16 The Board however notes that Claim 1 does not contain any indication concerning these measurement conditions.
- 3.2.17 The Board further notes that the description of the patent in suit gives absolutely no information on the cooling rate, heating rate or sample weight applied in the determination of the crystallinity by DSC, let alone the fact that the examples of the patent in suit do not disclose the crystallinity by DSC of the propylene polymers used therein, but merely rely on determination by solubility in cyclohexane (cf. Example 1), so that a reference in Claim 1 to the description according to Rule 29(6) EPC could not even be envisaged.
- 3.2.18 Thus, the question of the unambiguous characterization of the claimed elastomer composition by the use of the crystallinity of the amorphous polyolefin used in its manufacture boils down to the question of whether the

skilled person would inevitably know which heating rate, which cooling rate and which sample weight should be applied when determining the crystallinity of the amorphous polyolefin (B).

- 3.2.19 In that respect, it has been submitted by the Respondent that the skilled person would have used the conditions defined in D3 (i.e. heating and cooling rates of 10°C/min; sample weight 5 mg; cf. page 3, paragraph 10 of D3) since it is the method (i.e. according to the standard ASTM 3418) commonly used in the art (cf. also documents D4.1 and D8).
- 3.2.20 Independently of the fact that, as submitted by the Appellant in its Statement of Grounds of Appeal (page 2, second paragraph), there might be other standards for such determination, and of the fact of whether ASTM standards belong to the general knowledge of the person skilled in the art, there is absolutely no evidence that the conditions defined in the standard ASTM 3418 are those which the skilled person would inevitably use when determining the enthalpy of fusion of polymeric products, such as the amorphous polyolefin (B).
- 3.2.21 On the contrary, document D2 shows that totally different conditions might be used for determining the enthalpy of fusion of amorphous polyolefin (first heating rate 50°C/min, cooling rate 10°C/min, second heating rate 20°C/min, sample weight 10mg).
- 3.3 Consequently, the Board can only come to the conclusion that there is a lack of information regarding the exact conditions, in particular the cooling rate, the heating

rate and the sample weight under which the parameter crystallinity in Claim 1 is to be determined.

3.3.1 Since the determined value of enthalpy of fusion and hence that of the crystallinity is significantly dependent on the measurement conditions used, the indication of the measurement conditions is part of the clear definition of the parameter crystallinity, and hence of the clear definition of the claimed product in accordance with Article 84 EPC.

3.4 This lack of information results in uncertainty as to the definition of the parameter crystallinity, and therefore the crystallinity of the amorphous polyolefin (B) cannot limit the subject-matter of Claim 1 in any clear way. In other words, Claim 1 is not clear as required by Article 84 EPC.

3.5 This conclusion could not be altered by the further argument submitted by the Respondent, by reference to the decision T 412/93, that DSC, like any analytical method, suffers from measurement error, and that, even there would be a grey area where measurement error might make it difficult to determine whether a product fell within a claim or not, this would not justify an objection under Article 84 EPC.

3.5.1 This is because, in the Board's view, the circumstances of the present case totally differ from those underlying this decision for the following reasons:

(a) In the decision T 412/93, the Board stated that the feature that the claimed recombinant polypeptide had "a **higher** molecular weight by SDS-

PAGE from erythropoietin isolated from urinary sources" (emphasis by the present Board) was not objectionable under Article 84 EPC, even if measurement error may make difficult to determine whether a particular product fell within a claim or not (cf. Reasons point 60).

- (b) It is hence clear that the feature considered in T 412/93 was defined in relative terms in respect to a product of the prior art as reference.
- (c) Such a comparison evidently presupposes that the conditions of measurement by the SDS-PAGE method remain the same when determining the molecular weight of both the claimed product and the reference, so that the conditions of measurement are implicitly defined, and hence that the only grey area remaining is related to the measurement error which affects the SDS-PAGE method, like any analytical method.
- (d) In contrast in the present case, the objected feature (i.e. level of crystallinity measured by DSC) is, however, defined in absolute terms.
- (e) While in the method according to D3 in which the conditions of measurement are precisely specified, differences in the determination of enthalpy of fusion in the order of 3.4% can be achieved (cf. D3, paragraphs 10, 12, 13 and in particular 13.2.4), the experimental reports submitted either by the Appellant or by the Respondent indisputably show that very significant differences in the measured values of the enthalpy of fusion arise

(between 14 and 30%) when the conditions of measurements are changed (e.g. different heating and cooling rates, different sample weight).

(f) Consequently, while it is true that DSC like any analytical method also suffers from measurement error (cf. D3), this inherent inaccuracy is, however, further associated in the present case with an even stronger inaccuracy due to the complete lack of information on the conditions of measurement under which the DSC determination of the enthalpy of fusion should be carried out. In other words, the grey area in the present case extends well beyond the grey area linked to the measurement error inherent to any analytical method, and hence justifies an objection of lack of clarity under Article 84 EPC.

3.6 Since Claim 1 does not meet the requirements of Article 84 EPC, it thus follows from the first auxiliary request must be refused.

Second auxiliary request

4. *Wording of the claims*

4.1 Claim 1 of the second auxiliary request differs from Claim 1 of the first auxiliary request in that the feature that the crystallinity of the amorphous polyolefin is (determined by DSC) less than 10% has been deleted from the claim, and it has been indicated that the elastomer has a hardness of less than 35 Shore A.

4.2 Claims 2 to 15 of the second auxiliary request correspond to claims 3 to 16 of the first auxiliary request.

4.3 No objections under Articles 123(2) and 123(3) EPC against the claims of the first auxiliary request have been raised by the Appellant.

4.4 The Board is also satisfied that the requirements of these articles are met by all the claims.

5. *State of the art*

5.1 Document D1 relates to thermoplastic elastomer which is a blend of:

(A) a monoolefin copolymer rubber which is a copolymer of ethylene and an alpha-monoolefin of the formula $\text{CH}_2=\text{CHR}$ where R is an alkyl radical having 1 to 12 carbon atoms, and a copolymerizable non-conjugated diene termonomer, said rubber having a Brookfield viscosity in excess of 5,000,000 cps at 375° F;

(B) an amorphous non-elastomeric polypropylene resin having a number average molecular weight of from 500 to 35,000 or amorphous non-elastomeric resinous copolymer of propylene with another monoolefin having a Brookfield viscosity less than 500,000 cps at 375°F, said amorphous non-elastomeric resin being soluble below 100°C in aliphatic, aromatic and halogenated hydrocarbon solvents; and

(C) a crystalline polyolefin plastic insoluble in the aforesaid solvents below 100°C;

the said ingredients (A), (B) and (C) being present in the following proportions, expressed as percent by weight based on the sum of the weights of (A), (B) and

- (C): from 15 to 80% of (A), from 5 to 45% of (B), and from 15 to 80% of (C), the said thermoplastic elastomer being in a dynamically partially cured state (Claim 1).
- 5.2 According to D1, these elastomeric compositions exhibit good processability and physical properties (column 1, lines 48 to 51). Nevertheless, the only explicit references to the value of the Shore A hardness of the elastomer compositions according to the invention of D1 are to be found in the compositions exemplified in Tables III and VI of D1.
- 5.3 In that respect, D1 discloses in its Example 2, Sample F a composition obtained by first preparing a cured base polymer by curing a composition comprising 80 parts by weight of an EPDM rubber 20 parts of a crystalline polypropylene resin elastomer, 0.8 parts by weight of a curing agent, and 1.5 parts of an antioxidant, secondly destroying the residual traces of curing agent, and afterwards mixing the 100 parts of the cured composition with 10 parts of an amorphous polypropylene and 20 parts of an extender oil (cf. Example 2, Tables II and III).
- 5.4 It can hence be deduced that the final composition of Sample F of Example 2 contains 80 parts by weight of a at least partially cured elastomer, 20 parts by weight of a crystalline polypropylene resin thermoplastic resin, and 10 parts by weight of an amorphous polypropylene resin, i.e. based on the total weight of these components 73% of an at least partially cured elastomer, and based, on the total amount of crystalline thermoplastic resin and amorphous polypropylene, 33% by weight of an amorphous

polypropylene and 67% by weight of a crystalline thermoplastic resin.

- 5.5 Since the amorphous polypropylene resin had been added after the curing step of the base polymer, and since the curing agent had been destroyed at the end of the curing step, there can be no doubt, in the Board's view, that the amorphous polypropylene resin used in Sample F has not been submitted to a curing reaction during the preparation of the composition of Sample F.
- 5.6 In this connection, the Board does not accept the argument of the Respondent that this amorphous polypropylene might be as such partially cured.
- 5.6.1 This is primarily because the amorphous polypropylene resin to be used in the composition according to the invention of D1 must be soluble in aliphatic, aromatic and halogenated hydrocarbon solvents below 100°C.
- 5.6.2 This is also because the same amorphous polypropylene resin (i.e. A-Fax (trademark) 500; cf column 10 ,lines 11 to 13) is used in the compositions of Example 1 of D1 (cf. Table 1) which as submitted by the Respondent itself (cf. Section XII (ii.b.2.3) above) are said to be in an uncured state (cf. also column 9, lines 43 to 45).
- 5.7 It thus follows that the amorphous polypropylene resin in Sample F of Example 2 of D1 must be considered as being in an uncured state.
- 5.8 While the amorphous polypropylene resin used is presented as being an essentially amorphous

polypropylene resin, the amorphous polyolefins used in the claimed composition according to the patent in suit are said to exhibit **in general** a crystallinity (by DSC) of less than 10% (patent in suit page 2, lines 54 to 55) (emphasis by the Board).

- 5.9 Independently of the fact that the term "in general" does not exclude that the amorphous polyolefin may exhibit a level crystallinity higher than 10%, the level of crystallinity measured by DSC relied on in the patent in suit is, for the reasons indicated above in respect of the first auxiliary request, in any case vague and cannot provide a distinction from the amorphous polypropylene resin used in Sample F of Example 2 of D1 and the amorphous polyolefin component according to the patent in suit.
- 5.10 Consequently, the Board comes to the conclusion that the elastomer composition of Sample F of Example 2 meets all the requirements in terms of compositional features (i.e. type and amounts of the components) set out in Claim 1 of the second auxiliary request.
- 5.11 However, the composition of Sample F of Example 2 is described as having a Shore hardness of 68, i.e. higher than required by Claim 1 of the second auxiliary request (cf. Table III).
- 5.12 Consequently, the subject-matter of Claim 1 is to regarded as novel over D1.

6. *Inventive step*

6.1 As indicated above, the claimed elastomer composition according to Claim 1 of the second auxiliary request only distinguishes from Sample F of Example 2 of D1 by a lower Shore A hardness.

6.2 As indicated in the patent in suit, its aim is to provide elastomer compositions with a reduced hardness without sacrificing properties (cf. paragraphs [0004] and [0033] of the patent in suit).

6.3 Thus, starting from Sample F of Example 2 of D1, the technical problem could primarily be seen in the provision of elastomer composition having a lower hardness while still maintaining good processability and physical properties.

6.4 The Board can, however, only state that there is no comparison on file between the composition according to Sample F of Example 2 and compositions according to the patent in suit. In that respect, the fact that comparisons made in the patent in suit between elastomer compositions comprising an amorphous resin (Examples I to II, V and VI) and elastomer compositions not comprising an amorphous resin (Compositions A and B) might show that the hardness of elastomers compositions could be reduced without essentially affecting the other properties of the elastomer by addition of an amorphous polyolefin resin, is totally irrelevant for the assessment of inventive step, since this comparison is not made with the closest state of the art.

- 6.5 It thus follows that the technical problem starting from Sample F of Example 2 of D1 must hence merely be seen in the provision of elastomer compositions having a lower Shore A hardness.
- 6.6 In that respect, the Board notes that the compositions according to Examples I, II, V and VI which effectively show a Shore A hardness of less than 35 contain a drastically greater amount of extender oil based on the components (A), (B) and (C) (164 parts by weight of extender oil for 142 parts by weight of resin components) than the composition of Sample F (20 parts of extender oil for 110 by weight of resin components).
- 6.7 On that basis it can hence be deduced that the solution provided by the patent in suit was to increase the amount of extender oil in the elastomer composition.
- 6.8 Independently of the fact that this technical feature is not as such reflected in Claim 1, the proposed solution would have been in any case obvious to the person skilled in the art since it is known to use extender oil to reduce the hardness of elastomer compositions.
- 6.9 Consequently, the subject-matter of Claim 1 does not involve an inventive step over D1. Therefore, the second auxiliary request must be refused.
- 6.10 Since none of the requests of the Respondent are allowable, the patent must be revoked.

7. *Referral to the Enlarged Board*

7.1 As indicated above in Section XII (iii.a), the Appellant has submitted that the subject-matter of Claim 1 of the second auxiliary request was broader in scope than the subject-matter of Claim 1 of the request on the basis of which the Opposition Division intended to maintain the patent, since the limitation concerning the crystallinity of the amorphous polyolefin had been deleted therefrom, and that therefore if the second auxiliary request would be granted, this would put the Appellant in a worse position than if it had not filed an appeal.

7.2 As indicated above in Section XII (iii.b), the Respondent has argued that Claim 1 should be ruled admissible in view of the considerations made in the decision G 1/99, and has indicated its intention to request referral to the Enlarged Board of Appeal, should the Board be inclined to consider Claim 1 as not admissible.

8. However, since the question as to whether or not Claim 1 of the second auxiliary request should have been rejected in view of the rule against *reformatio in peius* is not decisive for the issue of the present appeal, there is no necessity either for the Board to deal with this question in the present decision or for a referral in that respect to the Enlarged Board of Appeal (cf. also decision T 520/01 of 29 October 2003; not published in OJ EPO; point 4).

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:

E. Görgmaier

R. Young