BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [X] To Chairmen
(D) [ ] No distribution

DECISION
of 7 April 2005

Case Number:	T 0066/03 - 3.3.3
Application Number:	96915023.4
Publication Number:	0770106
IPC:	C08L 23/16
Language of the proceedings:	EN

Title of invention:
Dynamically vulcanizable polyolefin compositions

Patentee:
Basell Technology Company B.V.

Opponent:
ExxonMobil Chemical Patents Inc.
DuPont Dow Elastomers L.L.C.

Headword:

Relevant legal provisions:
EPC Art. 54(2),(3); 56; 83; 114(1),(2); 123(2),(3)

Keyword:
"Novelty - yes"
"Inventive step - yes"
"Late submitted material - evidence admitted - no"
"Amendments - added subject-matter - no"

Decisions cited:
G 0010/91, T 0279/89, T 0666/89, T 1002/92, T 0786/00

Catchword:
-

Case Number: T 0066/03 - 3.3.3

DECISION
of the Technical Board of Appeal 3.3.3
of 7 April 2005

Appellant 01: (Opponent 01)	ExxonMobil Chemical Patents Inc. 5200 Bayway Drive Baytown TX 77522-2149 (US)
Representative:	UEXKÜLL & STOLBERG Patentanwälte Beselerstrasse 4 D-22607 Hamburg (DE)
Appellant 02: (Opponent 02)	DuPont Dow Elastomers L.L.C. 300 Bellevue Parkway Wilmington Delaware 19809 (US)
Representative:	Geary, Stephen W.H. Beck, Greener & Co. 7 Stone Buildings Lincoln's Inn London WC2A 3SZ (GB)
Respondent: (Proprietor of the patent)	Basell Technology Company B.V. Hoeksteen 66 NL-2132 MS Hoofddorp (NL)
Representative:	Gaverini, Gaetano Basell Poliolefine Italia S.p.A. Intellectual Property Via Pergolesi 25 I-20124 Milano (IT)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted 12 November 2002 concerning maintenance of the European patent No. 0770106 in amended form.**

Composition of the Board:

Chairman: R. J. Young
Members: M. C. Gordon
E. J. Dufrasne

Summary of Facts and Submissions

I. Mention of the grant of European patent No. 0 770 106 in respect of European patent application No. 96915023.4 in the name of Montell Technology Company bv, later Basell Technology Company bv was announced on 14 July 1999 (Bulletin 1999/28) on the basis of 20 claims.

Independent claims 1, 16, 18, 19 and 20 read as follows:

"1. Polyolefin composition comprising:
(A) 20 to 50 parts by weight of a crystalline propylene polymer having an isotacticity index greater than 80, selected from polypropylene homopolymer and propylene copolymers containing 0.5-15 mol-% of ethylene and/or an α-olefin having 4 to 10 carbon atoms, the said propylene polymer having a molecular weight distribution (MWD) greater than 3.5; and
(B) 50-80 parts by weight of an elastomeric ethylene copolymer with olefins CH_2=CHR, in which R is alkyl having 1 to 10 carbon atoms, and, optionally, containing minor proportions of units derived from a polyene, the said copolymer containing 40 to 70% by weight of units derived from ethylene and 30 to 60% by weight of units derived from an α-olefin, and having the following characteristics: (a) a molecular weight distribution lower than 3.5, (b) a crystallinity content, expressed as the enthalpy of fusion, lower than 20 J/g and (C) a content of 2-1 regioinversions of the α-olefin of lower than 5%."

"16. Process for the preparation of vulcanized thermoplastic elastomeric compositions, which comprises subjecting a composition according to Claim 1 to kneading or other shear forces in the presence of crosslinking agents and, if appropriate, coadjuvents thereof, at temperatures of between 140 and 240°C."

"18. Vulcanized thermoplastic elastomeric compositions obtainable by the process according to Claim 16."

"19. Manufactured products obtained from compositions according to claim 18."

"20. Moulded articles obtained from compositions according to claim 18."

Dependent claims 2-15 were directed to preferred embodiments of the composition of claim 1 and dependent claim 17 to a preferred embodiment of the process of claim 16.

II. Notices of Opposition were filed on 12 April 2000 by Exxon Chemical Patents, Inc. (Opponent I) and on 14 April 2000 by DuPont Dow Elastomers L.L.C. (Opponent II).

Both Opponents requested revocation of the patent, Opponent I on the grounds of Article 100(a) and (b) EPC, Opponent II on the grounds of Article 100(a)-(c) EPC.

III. The following documents were, *inter alia*, cited in support of the oppositions:

D1: WO-A-96/11218
D3: EP-A-643078
D6: WO-A-94/06859
D10: US-A-4130535
and the later filed, but admitted documents
D15: M. Galimberti *et. al.* "New Polyolefin Elastomers from Metallocenes", Macromol. Symp. 89, pp. 259-275 (January 1995)
D16: WO-A-93/19107

D1 and D3 being cited by Opponent I, D6 and D10 by Opponent II with the respective notices of Opposition. D15 and D16 were cited by Opponent I in a letter of 23 August 2002.

IV. By its decision announced orally on 23 October 2002 and issued in writing on 12 November 2002, the Opposition Division allowed the sole request of the Patentee maintaining the Patent in amended form based on claims 1 to 18 as filed during the oral proceedings and claims 19 and 20 of the patent specification as granted. Claim 1 had been amended, compared with the granted version, by changing the capital "C" in the final line of claim 1 as it appeared in the patent publication into a small "c". Claims 2-18 corresponded to claims 2-18 as granted. With respect to Article 123(2) EPC, it was held that the characteristic denoted by (B)(c) (content of 2-1 regioinversions in the α-olefin component of the elastomeric ethylene copolymer) was disclosed in claim 13 of the application as originally filed.

The Opposition Division held that the patent met the requirements of Article 83 EPC. Although the content of 2-1 regioinversions of the α-olefin units was not expressly referred to in the examples of the patent in suit, it was held that there was no reason to consider that said examples did not fulfil this requirement and the Opponents had not provided evidence that the examples did not comply with characteristic (B)(c).

The subject-matter of the claims was regarded as novel. D1 disclosed a multistage process for polymerisation of one or more olefins, which process was the preferred one for preparing the composition of the patent in suit (patent page 4, lines 47, 48). D1 described the same olefins as in the patent, the amounts partially overlapping with the claims of the patent. The Opponents had provided no evidence to support the contention that characteristics (B)(a)-(c) necessarily resulted when carrying out the process of D1.

It was also held that the subject-matter claimed was founded on an inventive step.

The technical problem was formulated, with reference to paragraph [0005] and Table 2 of the patent in suit, as being to provide polyolefin compositions capable of giving, after dynamic vulcanisation, thermoplastic elastomeric compositions having improved elastomeric properties and a better balance of elastomechanical properties, the solution being to provide a high crystalline propylene polymer together with a specific elastomeric ethylene copolymer.

D10 represented the closest state of the art. The blends of D10 comprised a high crystalline propylene polymer and ethylene-propylene-diene rubber (EPDM) in a weight ratio within that required by the patent in suit but did not disclose the content of α-olefin in the EPDM or the enthalpy of fusion of the rubber. The examples and comparative examples reported in Tables 1 and 2 of the patent in suit showed that when the content of ethylene and the enthalpy of fusion of component (B) were within the ranges defined in the claims the ultimate tensile strength, elongation at break, tension and compression sets and blooming were clearly improved. The combination of D10 and D16 would not have been considered by the skilled person since D16 concerned only EP(D)M copolymers, not heterophasic compositions of crystalline polypropylene and concerned rubbers having satisfactory properties in the non-vulcanised state.

Regarding claim 16, it was held that the process of preparing vulcanised thermoplastic elastomeric compositions starting from the composition of claim 1 was neither known nor suggested in the prior art.

V. Notices of Appeal were filed against this decision by Opponent I (Appellant I) and Opponent II (Appellant II) both on 13 January 2003, the appeal fees being paid on the same day.

Statements of Grounds of Appeal were submitted on 11 March 2003 (Appellant I) and 21 March 2003 (Appellant II) respectively. Together with the Statement of Grounds, Appellant I notified a change of name from "Exxon Chemical Patents Inc" to "ExxonMobil

Chemical Patents Inc.", supporting documents being attached.

Both Appellants requested that the decision be set aside and the patent in suit revoked and as an auxiliary measure that oral proceedings be appointed.

VI. The arguments of the Appellants presented in the written proceedings which are relevant for the present decision, may be summarised as follows:

(a) Article 123(2) and (3) EPC

Characteristic (B)(c) of claim 1 relating to the content of regioinversions of the α-olefin units in component (B) had been introduced into claim 1 during prosecution. There was no evidence that the compositions of the examples exhibited this characteristic. Paragraph [0047] referred to Table 2 and to the "compositions of the present invention". This meant that in the granted patent, these compositions did have characteristic (B)(c), however there was no statement in the application as filed that the compositions of the examples had this characteristic. The Patentee had denied before the Opposition Division that characteristic (B)(c) was the inevitable result of using metallocene to prepare the elastomers. If this were the case, characteristic (B)(c) would not have been implicitly disclosed by the examples of the application as filed, and matter would have been added.

(b) Novelty

As D1 was referred to in the patent as the preferred method of preparing a composition of the patent and since the patent contained no information about any modifications to be made to the process of D1, the skilled person would conclude that the process of D1 must result in compositions according to the patent in suit. Alternatively, the teaching of the patent in suit was deficient as it failed to give guidance on necessary modifications.

With regard to D6, while this did not disclose the characteristics (B)(a)-(c) of component (B) of claim 1 of the patent in suit, reference was made therein to further documents. These documents disclosed catalysts useful for preparing ethylene-α-olefin polymers. The Appellants had employed one of the catalysts disclosed in these further documents to prepare a polymer, which polymer exhibited less than 5% of regioinversions. This showed that the subject-matter of claim 1 of the patent in suit was not novel over the disclosure of D6.

(c) Inventive step

The problem was to provide compositions having improved elastomeric properties and better balance of elastomechanical properties (paragraph [0005] of the patent in suit). None of the examples of the patent in suit was shown to fall within the claim as they were not shown to have characteristic (B)(c). There was no evidence of an effect arising from the molecular weight distribution of the polypropylene component A. The examples were not repeatable since Intrinsic Viscosity data was given only for composition 3. The catalysts employed for compositions 3, 4, 5 (used in example 6 and comparative examples 7 and 8) were not indicated.

The examples of the patent in suit were not a fair comparison with the prior art, neither were the comparative examples of the patent fair comparisons with the examples according to the claims. The strength and compression set properties reported in Table 2 depended largely on molecular weight and curing state but there was no comparison based on similar molecular weight and diene contents.

The closest prior art was D10 which, contrary to the Decision of the Opposition Division, did disclose the α-olefin content of the EPDM employed (footnote to Table I and col. 8, lines 3-4). Compared to the results of D10, the patent in suit could not be said to solve the problem set out in paragraph [0005] thereof. The problem therefore had to be recast as to provide alternative polyolefin compositions giving after vulcanisation thermoplastic elastomeric products.

The solution was to use compositions in which the elastomer of D10 was replaced by one having characteristics (B)(b) and (c) which were simply properties of elastomers made employing metallocenes, as was confirmed by D15, page 260, lines 18-19 and D16 page 4. This was obvious in particular since D15 and D16 suggested that metallocene-catalyst produced elastomers could replace known EPDM rubbers.

(d) Sufficiency of disclosure

The patent did not disclose how to obtain less than 5% regioinversions (characteristic (B)(c)). The only information was on page 4 in paragraphs [0031] and [0037] which referred to known prior art process but did not disclose any relevant modification of these. Hence it followed that the skilled person would have to follow a prior art process, any deviation therefrom being without the exercise of inventive faculty, meaning that the subject-matter claimed was anticipated or at least obvious. If this were not the case, then some modification would have to be applied to the prior art teaching, which modification was not disclosed in the patent in suit.

VII. The Board issued on 22 December 2004 a summons to attend oral proceedings scheduled for 7 April 2005.

VIII. Appellant I filed a further submission on 4 March 2005. This was accompanied by further documents, including an experimental report which was stated to show that the influence of the content of regioinversions on the properties of the ethylene propylene rubbers was minor.

This was supplemented by a submission of 11 March 2005 providing further details of one of the components employed in the compositions of the experimental report.

IX. The Respondent (Patentee) filed its first submission on 7 March 2005 requesting dismissal of the Appeals. The failure to respond earlier to the Grounds of Appeal was due to an internal error. The arguments advanced can be summarised as follows:

(a) Article 123(2) EPC:

The basis for the amendment (section IV above) was in claim 13 and page 3, lines 21-22 of the description, of the application as filed.

(b) Novelty

The amounts of polymer fractions obtained in experimental examples 3 and 6 of D1 (i.e. the only examples in D1 carried out according to the teaching thereof) fell outside the ranges of claim 1 of the patent in suit. D1 did not disclose MWD, enthalpy of fusion or regioinversion content of component B (characteristics (B)(a)-(c) of claim 1 of the patent in suit).

With regard to the objection based on D6, it was argued that this document related to a composition containing a thermoplastic selected from a defined group, one member of which was polyolefins. The preferred content of ethylene/α-olefin elastomer (15-40 wt%) fell outside the scope of claim 1 of the patent in suit. There was no express reference in D6 to the other parameters defined in the claims of the patent in suit. The statement concerning the level of regioinversions in polymers that Appellant II had prepared with a certain catalyst was not supported by evidence, nor was it clear which polymers had been prepared under which conditions. There was no reference in D6 to the catalyst indicated by Appellant II and no evidence that this catalyst had been employed in the examples of D6.

(c) Inventive step

The formulation of the technical problem was that set out in the decision of the Opposition Division (see section IV above). Table 2 of the patent demonstrated that this problem was solved (examples 3 to 6 compared with Comparative example 8). D10 described thermoplastic elastomer compositions of 25-75 parts by weight of a thermoplastic polyolefin resin and 25-75 parts by weight of fully cured olefin rubber having increased strength. These compositions were traditional thermoplastic elastomers, wherein the copolymer rubber did not possess the combination of characteristics of Component (B) according to the claims of the patent in suit and did not suggest to select components (A) and (B) in the amounts claimed. As regards characteristic (B)(a) according to claim 1 of the patent in suit, D10 mentioned a polydispersity of less than about 3.5 but did not define how this was measured, so that this property was not directly comparable with the

MWD of the opposed patent, determined by gel permeation chromatography (GPC). No indication was provided in D10 of characteristics (B)(b) and (c) of claim 1 of the patent in suit.

The mechanical properties reported in D10 could not be compared to those of the patent due to differences in analytical methodology and measurement units.

It was disputed that the examples of the patent in suit failed to illustrate the invention or did not allow a fair comparison either with the comparative examples of the patent itself or with the prior art.

D15 and D16 did not describe a polyolefin composition comprising a crystalline component A; the EPDM component of these documents was different from component (B) of the compositions of the patent. Neither D15 nor D16 suggested to modify the blends of D10 to select an elastomeric copolymer (B) as in the patent in suit to solve the technical problem.

(d) Sufficiency of disclosure

Compositions satisfying characteristic (B)(c) of claim 1 of the patent in suit were obtained following the polymerization conditions exemplified in the patent in suit.

X. Oral proceedings were held on 7 April 2005.

(a) With regard to Article 123(2) EPC the Appellants argued essentially as follows:

(i) The inclusion of the level of regioinversions - characteristic (B)(c) - in claim 1 changed the information content of the examples;

(ii) there was no evidence that the Respondent had in fact determined the level of regioinversions;

(iii) the level of regioinversions had not been shown to be relevant to the problem underlying the patent in suit;

(iv) the conditions and catalyst employed to prepare composition 3 of the patent in suit (employed in example 6) were not known and hence it was impossible to ascertain whether this example met the regioinversion requirement.

The Respondent submitted:

(v) Characteristic (B)(c) had been in claim 13 and in the description as originally filed, so that the amendment did not contravene Article 123(2) EPC;

(vi) original claim 1 did not exclude the subject-matter of claim 13;

(vii) the level of regioinversions had been determined and the examples of the application and patent did have the required level;

(viii) the Appellants had provided no evidence that characteristic (B)(c) was not met by the examples;

(ix) it was accepted to disregard composition 3/example 6 of the patent in suit.

(b) Concerning novelty the Appellants argued essentially as follows:

(i) If the catalysts set out in paragraphs [0028]-[0030] of the patent yielded characteristics (B)(a)-(c) then at least claim 1 was not novel over D1;

(ii) D1 disclosed at page 15-16 heterophasic propylene copolymers prepared by a 2-stage process. The features of the polypropylene component (A) were derivable from page 16, line 14 of D1;

(iii) the example at page 20 of D1 employed the same catalysts as in the patent in suit under substantially the same conditions, and hence all features of the claim would automatically be met by the process of D1;

(iv) characteristics (B)(a)-(c) were not mentioned in D1 but according to the Respondent were obtained when following the process of D1, in particular due to the catalyst employed;

(v) D15 taught on page 260 that preparing an EPDM with metallocene catalyst led to a low content of 2,1-regioinversions, strongly suggesting that any metallocene would yield this result;

(vi) the amount of elastomeric copolymer in the composition, as disclosed on page 17 of D1, overlapped with the claimed range. There was no indication that the end points of the ranges disclosed in D1 were critical, and hence there would be no problem selecting the more restricted range;

(vii) if the subject-matter claimed were considered as a selection from D1, then it was not purposive since:
- the polypropylene employed according to the claims of the patent in suit was conventional;
- no effect had been shown for the selection of this;
- no effect was shown for the ratio of components (A) and (B);
- no effect was evident for the level of regioinversions (characteristic (B)(c)).

The Respondent clarified its position as being:

(viii) Following the examples of the patent would yield products with characteristics (B)(a)-(c), not that using ANY metallocene catalyst would suffice; it was acknowledged that not all metallocene catalysts would yield these properties;

(ix) the contents of the components in D1 broadly overlapped with the claimed invention, the definition of which represented a strict selection of the amounts;

(x) while D1 did employ the same catalyst, it did not lead to the same composition; further, D1 did not disclose the molecular weight distribution, enthalpy of fusion or content of regioinversion (characteristics (B)(a)-(c));

(xi) the only examples of D1 corresponding to the teaching thereof (examples 3 and 6) employed contents of polymeric components outside the claimed range of the patent in suit;

(xii) the examples in Table 2 of the patent showed that the narrow restriction of the product constitution and parameters was necessary to obtain the - unexpected - elastoplastic properties;

(xiii) D1 contained no incentive to make the restriction defined by the claims and the examples of the patent in suit showed that all parameters were critical;

(xiv) the nature of the polypropylene employed in the examples of D1 was not known; the polypropylene defined in the claim of the patent in suit was itself not novel but represented a selection from known polypropylenes.

(c) Inventive step:

All parties agreed that D10 represented the closest prior art.

The Appellants submitted that:

(i) Relevant examples of D10 were stocks 12-18 of Table II which demonstrated proportions of polypropylene and EPDM within the scope of the claims of the patent in suit; the monomer composition of the EPDM fell within the scope of claim 1(B) (footnote to the Table in D10 relating to Stocks 2-11 and col. 8, lines 3 and 4 of D10);

(ii) the level of crystallinity of the EPDM (expressed by enthalpy of fusion) was not a distinguishing feature since D10 related to copolymer rubbers of low crystallinity which corresponded to "less than 20 J/g"; in any case, no effect had been demonstrated for this characteristic;

(iii) the molecular weight distribution (MWD) defined in the claims of the patent in suit did not provide any distinction over that disclosed in D10. The definition of "polydispersity", given in D10 (weight average molecular weight divided by number average molecular weight) was identical to the definition of MWD given by the Respondent during the pre-grant proceedings. All methods for determining MWD led to the same result, within experimental error. The patent did not disclose certain information regarding the GPC method (nature of the GPC column, calibrant and detector), meaning that the disclosure of this feature was incomplete so it could not be relied upon as a distinction. The claims were in any case not limited to any particular method for determining the MWD;

(iv) characteristic (B)(c) - the level of regioinversions of the EPDM - represented the sole difference of the subject-matter claimed in the patent in suit over D10;

(v) paragraph [0047] of the patent set out the level of certain physical properties (tensile strength and tension set). However the values reported in the patent in suit were poorer than the results reported in D10. Thus it was not shown that the level of regioinversions gave rise to any technical effect, meaning that the problem as defined in the patent in suit (see section IV above) had to be reformulated as being to provide alternative compositions;

(vi) D10 taught the need to have rubbers of low MWD and low crystallinity. This corresponded to the properties of rubbers prepared by metallocenes;

(vii) the solution claimed was obvious in the light of D15, page 270 teaching that metallocene prepared elastomers served as a "drop in" for conventional EPDMs; similar arguments were advanced in respect of D16 which taught that the metallocene-prepared EPDM could be vulcanised;

(viii) a further possible formulation of the technical problem was to provide compositions which were obtained in a better yield; Ziegler-Natta catalysts provided a low yield. Metallocenes provided a higher yield and, as shown by the evidence, allowed the required properties to be retained. Hence it would have been obvious to solve the technical problem of increasing the yield by employing metallocene instead of Ziegler-Natta catalysts to prepare the EPDM component.

The Respondent submitted:

(ix) Although there was broad overlap, none of the compositions of D10 fell within the scope of the claims of the patent in suit;

(x) the argument, presented in the written submissions, that the physical properties reported in the examples of D10 were determined according to different standards to those employed in the patent in suit, and hence not comparable therewith was emphasised;

(xi) D10 did not disclose the enthalpy of fusion, or the content of regioinversions of component (B);

(xii) regarding the molecular weight distribution, it was submitted that D10 referred to "polydispersity" which implied a rheological method. The examples of the patent in suit employed GPC. The results of the two methods were not comparable. It was emphasised that the patent provided a complete disclosure of the GPC measurement employed;

(xiii) D15 did not contain any hint as to the problem underlying the invention. The reference in D15 to "drop in" was too generic and neglected compatibility issues;

(xiv) regarding the yield, the passages relied upon by the Appellants provided no evidence that the metallocene catalysts provided an improvement in yield as compared to Ziegler-Natta catalysts;

(xv) D16 related to non-vulcanised compositions; there was no hint to use the EPDMs of D16 in heterophasic compositions in order to solve the technical problem of the patent in suit.

(d) With regard to Article 83 EPC the Appellants submitted:

(i) This objection was linked to the anticipation of the subject-matter by D1, the question being whether characteristics (B)(a)-(c) were disclosed therein;

(ii) according to paragraph [0037] of the patent the compositions were prepared by the process of D1. The question was whether following the procedure of D1 automatically yielded characteristics (B)(a)-(c). If the Respondent/Patentee would admit this to be the case, then sufficient disclosure would be conceded, but this would have consequences for novelty;

(iii) the teaching of the patent did not make available without undue burden the compositions claimed. The examples disclosed a limited range of catalysts and temperatures but there was no information regarding how essential these were. Certain molecular weight distributions and melting enthalpies were exemplified, but claim 1 was not limited to these values.

The Respondent submitted:

(iv) paragraphs [0028]-[0030] of the patent disclosed that the polymer could be prepared by metallocene catalysts and gave examples of suitable catalysts; there was no evidence that the characteristics claimed were not obtained.

(e) Late filed evidence:

(i) Appellant I submitted that in the absence of any submission by the Respondent/Patentee, it had attempted to anticipate and predict the arguments that would be advanced and the position of the Board; the examples submitted on 4 and 11 March 2005 (see section VIII above) represented the results of these considerations;

(ii) following an observation by the Board it transpired in the discussion that only one of the compositions (V5600) employed an elastomeric copolymer of the required monomer constitution, enthalpy of fusion and MWD. However the level of regioinversions of this composition was above that required by the claims of the patent in suit. The Appellants submitted that due to the close proximity of the compositions of the other examples to the amounts of monomers required by the claims, it would be apparent that this data was nevertheless relevant.

XI. The final requests of the Parties were:
Appellants (Opponents):
that the decision be set aside and that the European Patent No. 770 106 be revoked.
Respondent (Patentee):
that the Appeals be dismissed.

Reasons for the Decision

1. The Appeals are admissible.

2. *Article 123(2)EPC*

2.1 The claims of the patent in suit differ from those of the application as originally filed in the inclusion of characteristic (B)(c) of claim 1.

2.2 This characteristic was originally disclosed in claim 13, which claim was dependent on claim 1 and is also to be found at page 3 of the application as filed as a preferred feature of component (B), directly after the recitation of the subject-matter of original claim 1.

Accordingly the content of regioinversions applied to the subject-matter of the application in its broadest scope as a preferred feature of component (B).

2.3 The Appellants objected that this amendment resulted in a change to the information imparted by the examples of the application and those of the granted patent.

It is true that in the application as filed it was not explicitly stated that the "compositions of the present invention" (paragraph [0047]) exhibited characteristic (B)(c) whereas in the granted patent, due to the amendment to the claim, this same wording implied that the examples did exhibit said feature. This however is a matter of support of the examples by the description, which, being governed by Article 84 EPC, is not a ground of opposition.

2.4 It is thus concluded that the modification of claim 1 of the application as filed by including therein the restriction contained in original claim 13 does not result in an extension of the subject-matter of the claims beyond the content of the application as filed and hence that this amendment meets the requirements of Article 123(2) EPC.

3. *Article 100(b) EPC*

3.1 The arguments of the Appellants that the method of D1 automatically yielded compositions falling within the scope of the patent in suit, or, in the alternative, that there would be a deficit in the disclosure since there was no indication in the patent how to modify the teaching of D1 in order to obtain the claimed product properties are not supported by any evidence.

According to the pertinent Case Law (see Case Law of the Boards of Appeal of the European Patent Office, 4th Edition, Section II.A.7) the burden of proof is upon an opponent to show that a skilled reader of a patent, using the common general knowledge, would be unable to carry out the invention. No such supporting evidence has been advanced in this case.

3.2 Therefore the Appellants have failed to discharge the burden of proving that the skilled reader would be unable to carry out the claimed invention based on the information contained in the patent in suit or, in the alternative, would not be in a position to effect any necessary modifications to the teachings of D1 so as to arrive at subject-matter falling within the terms of the claims of the patent in suit.

Accordingly, this objection can be seen as no more than unsupported speculation, or as an unproven assertion with the consequence that it must be dismissed.

4. *Admissibility of the late filed evidence*

4.1 Reasons for the late filing.

The justification put forward at the oral proceedings for the late submission of the evidence (see section X(e) above) is not found convincing by the Board.

4.1.1 Firstly, some two years elapsed between filing of the Appeals and the oral proceedings. At any point in this period, the Appellants were at liberty to submit any further arguments or evidence.

4.1.2 Secondly, there was no justification for the extremely late point in the proceedings at which the evidence was submitted: No circumstances had arisen in the period immediately preceding the date set for oral proceedings which would have necessitated presenting further evidence within days of the latest date indicated by the Board in the summons, i.e. one month prior to the oral proceedings.

4.1.3 The fact that the Respondent failed - unintentionally (see section IX above) - to file any statement prior to the issue of the Summons cannot itself give rise to a requirement that the Respondent deal with unexpected new evidence filed at a late stage of the proceedings.

4.1.4 It is therefore concluded that, on the face of it, there was no procedural justification for the late filing of the evidence.

4.2 As noted above, the data was filed after the time limit pursuant to Article 108 EPC, and at a very late stage of the proceedings. Decision T 1002/92 (OJ EPO 1995, 605) held in 3.4 of the reasons, in application of the principles established in the opinion delivered in decision G 10/91 (OJ EPO 1993, 420) under Article 114(1) EPC, that, exceptionally, such late filed evidence might be admitted at the Appeal stage, if such new material was *prima facie* highly relevant [such that] it was highly likely to prejudice maintenance of the European Patent.

4.2.1 According to the accompanying letter the evidence, which was a report on a series of experiments comparing the relevant properties of four polyolefin compositions, was intended to show that the level of regioinversions i.e. characteristic (B)(c) had only a minor influence on the properties of compositions falling within the terms of the claims of the patent in suit.

4.2.2 In order to establish whether the examples filed are relevant, it is necessary as a first step to ascertain whether the characteristics of the materials employed as components (A) and (B), and proportions thereof employed in fact fall within the terms of claim 1 of the patent in suit.

4.2.3 The examples submitted by Appellant I contain as component (A) a crystalline isotactic propylene homopolymer having a MWD determined by GPC of 4.8, and an isotacticity index of 94. The four copolymers employed as component (B) contain a polyene (ethylidene norbornene - "ENB"). Claim 1 of the patent in suit specifies that component (B) contains 40-70 wt% of units derived from ethylene and 30-60 wt% of units derived from an α-olefin and optionally minor proportions of units derived from a polyene. Claim 9 of the patent in suit defines these "minor proportions" of polyene as 0.1-10 % by weight of component (B). ENB is such a polyene. The compositions corresponding to component (B) tested by the Appellant are designated V7000, V7001, V5600, V5601 respectively and have the constitution and properties, including content of regioinversions, as shown in the following table (corresponding to "Table 1" submitted by the Appellant):

Composition	V7000	V7001	V5600	V5601
Wt% Propylene	24.47	24.64	31.70	28.82
Wt% Ethylene	71.87	71.82	64.30	67.64
Wt% ENB	3.66	3.54	4.00	3.54
M_w/M_n by GPC	2.2	2.7	3.1	2.9
Enthalpy of Fusion (J/g)	18-20	18-20	4	4
Visc. index (Mooney)	2.3/59	2.3/60	2.8/72	2.8/72
% Content of regioinversions	5.39	0.86	8.05	1.44

4.2.4 It is conspicuous to the Board that none of these four compositions falls within the terms of claim 1 of the patent in suit.

Composition V7000 has 71.87 wt% ethylene which is above the maximum of 70 wt% permitted by claim 1, 24.47 wt% propylene which is below the permitted minimum of 30 wt% and a content of regioinversions of 5.39% which is above the permitted maximum of lower than 5%. Composition V7001 has a content of regioinversions of 0.86% which is within the amount permitted, but has too much ethylene (71.82 wt%) and too little propylene

(24.64 wt%). Example V5600 has contents of ethylene and propylene (64.30 wt% and 31.70 wt% respectively) within the terms of claim 1 of the patent in suit, but the content of regioinversions of 8.05% is too high. Composition V5601 has the permitted content of regioinversions (1.44%) and ethylene (67.64 wt%) but the content of propylene of 28.82 wt% is below the minimum permitted. Accordingly, none the four examples submitted by the Appellant contain a component (B) falling within the scope of claim 1 of the patent in suit.

4.2.5 At the oral proceedings, the Appellant submitted that, taking account of the fact that, according to claim 9, the additional presence of a polyene at a level of 0.1 to 10 wt% is possible as a preferable feature, the percentages of the propylene and ethylene in the definition of component B of claim 1 should be understood as being based, not on the total composition, but rather on the combination of ethylene and propylene alone. However this does not alter the situation or the conclusions reached since:

(i) The presentation of the percentages of the components in Table 1 provided by the Appellant is clearly based on the total composition and not on the ethylene and propylene alone, thus indicating that this was the interpretation of claim 1 of the patent in suit favoured by the Appellant when filing the evidence referred to.

(ii) Even if the different interpretation of the claims proposed by the Appellant at the oral proceedings were to be adopted, the conclusions remain the same since the examples submitted still do not fall within the terms of claim 1, or of claim 9. This is in particular the case with composition V5601 which, according to this different basis of calculation still exhibits a content of propylene (29.9 wt%) which is below the minimum permitted by claim 1, and composition V7001 which, on this basis of calculation would exhibit a content of propylene below (25.5 wt%) and a content of ethylene above (74.4 wt%) the respective limits permitted by claim 1 of the patent in suit.

4.2.6 Accordingly, it is apparent that - regardless of the manner in which the proportions of the component monomers is calculated - none of the examples submitted by Appellant I corresponds to the subject-matter as defined in the claim 1 of the patent in suit.

For this reason alone, the examples are evidently not effective for the intended purpose of demonstrating the influence of characteristic (B)(c) of claim 1 of the patent in suit (sections VIII and 4.2.1 above). In other words, they are not *prima facie* relevant to the issues under consideration.

4.2.7 The argument, advanced by the Appellant at the oral proceedings, that this evidence should nevertheless be taken into account since the compositions presented were very close to the claimed subject-matter cannot overcome this deficiency. This approach introduces a further step of consideration and evaluation, i.e. after a *prima facie* study reveals that none of the examples falls within the scope of the claims of the patent in suit, to continue the study of the data to find whether it could nevertheless in some other sense be considered relevant. The necessity of this further step demonstrates that the relevance - if any - of this data would not be *prima facie* apparent.

4.3 In summary, due to the facts that the evidence filed with the letter of 4 March 2005 was submitted at a late stage without convincing justification and because it is not *prima facie* relevant to the decision to be taken, the Board, pursuant to Article 114(2) EPC, and following the decision T 1002/92 in application of the principles established in decision G 10/91 (*supra)* exercised its discretion to disregard this and, hence not admit it to the procedure.

5. *The Patent in suit - Novelty*

Lack of novelty of the subject-matter of the patent in suit was alleged in view of the disclosures of D1 and D6.

5.1 According to the patent in suit there is provided a polyolefin composition comprising a crystalline propylene polymer phase and a substantially amorphous elastomeric ethylene copolymer phase. A proposed field of use of the compositions is in seal gaskets (paragraph [0003]).

5.1.1 Specifically according to claim 1, such a polyolefin composition comprises (A) 20-50 parts by weight of a crystalline propylene polymer having an isotacticity index greater than 80 and a MWD greater than 3.5. This component (A) contains 0.5-15 mol% of ethylene or another α-olefin having 4-10 carbon atoms. The composition further comprises (B) 50-80 parts by weight of an elastomeric ethylene copolymer having a monomer content of 40-70 wt% units derived from ethylene and 30-60 wt% units derived from an α-olefin. The elastomeric ethylene copolymer component (B) has the following characteristics:

(a) MWD lower than 3.5
(b) a crystallinity content (expressed as enthalpy of fusion) lower than 20 J/g and
(c) content of 2-1 regioinversions in the α-olefin units lower than 5%.

5.1.2 The compositions may be prepared by a three stage sequential process (paragraphs [0031], [0032], [0037], [0038]) involving:

- a first stage in which the propylene (component (A)) is prepared employing a Ziegler-Natta type catalyst;

- a second stage of deactivating the Ziegler-Natta catalyst, followed by contacting with a metallocene catalyst system;

- a third stage in which in the presence of the product of the second stage the EPDM (component (B)) is prepared by means of a metallocene catalyst (paragraph [0028]).

Alternatively, the two components (A) and (B) can be prepared separately and combined by physical mixing whereby the sequential polymerization method yields products with superior elastomeric properties (paragraph [0031]).

5.1.3 The aim of the invention according to the patent, as set out in the description (paragraphs [0001] [0003] and [0005]), is to provide polyolefin compositions capable of giving, after dynamic vulcanisation, thermoplastic elastomeric compositions having improved elastomeric properties and a better balance of elasto-mechanical properties, and which can be processed on conventional thermoplastics processing equipment. Further, the compositions are stated to have beneficial properties when impregnated with an oil extender, as the tendency to exude this (blooming) is lower than prior art compositions (paragraph [0047]).

5.2 Analysis with respect to D1:

D1 is prior art pursuant to Article 54(3) EPC, and is cited in the patent in suit (paragraph [0037]) as disclosing the preferred multistage sequential process for preparing the claimed compositions.

5.2.1 According to page 4, line 25 to page 5, line 6 and in particular page 15, line 6 to page 16, line 12 of D1 there is provided a multistage process for producing heterophasic high impact polypropylene (page 15, line 1), said process having:

- a first stage of polymerization in which propylene and possibly ethylene and/or one or more olefins $CH_2=CHR^{II}$ (R^{II} being a hydrocarbon radical with 2-10 carbon atoms), are polymerised employing a catalyst of the Ziegler-Natta type;

- a second "treatment" stage in which the catalyst is deactivated, and a metallocene catalyst composition introduced;

- a third stage (denoted "a second stage of polymerisation" in D1) in which one or more olefins CH_2=CHR (R being hydrogen, or an alkyl, cycloalkyl or aryl radical with 1-10 carbon atoms) are (co)polymerised in the presence of the product of the "treatment stage" to obtain a substantially amorphous polyolefin (co)polymer.

5.2.2 The polymer obtained in the first stage of D1 makes up between 10 and 90, preferably, 20 to 80 wt % of the total composition (page 6, lines 7-10, claims 21 and 22). The proportions of monomers employed to prepare the copolymer of the first stage in D1, as defined at page 15, line 23 and in claim 23 thereof is greater than 80 wt % propylene units, less than 20 wt % other olefin units. In the case that the other monomer is ethylene, which is the only other olefin explicitly referred to in D1 (page 15, line 10), this would correspond to proportions of more than 72.7 mol% propylene and less than 27.3 mol% ethylene.
The amorphous copolymers of the second stage of polymerisation in D1 are present in amounts of between 20 and 80, preferably 35 to 65 wt % of the total amount of polymer produced (claim 23, page 16, line 10, page 17, lines 20-23). The second stage copolymers can contain from 30-70 wt% ethylene (D1, page 16, lines 23 and 27). Of the examples in D1, only two are according to the process therein disclosed, namely examples 3 and 6, shown in Tables 1 and 2 on pages 25 and 26 of D1.

These examples employ contents of the elastomer of the second stage (indicated in the document as "EPR") of 40.2 and 35 wt % (equivalent to parts by weight) respectively. D1 does not disclose the proportions of monomers present in the "EPR" copolymers. Likewise, the MWD, crystallinity content and content of regioinversions of the elastomeric copolymers of the second polymerisation stage of D1 (cf. characteristics (B)(a)-(c) according to claim 1 of the patent in suit) are not reported.

5.2.3 The relationship between the various parameters (proportions of components, properties thereof) in D1 and claim 1 of the patent in suit is summarised in the following table:

	Parameter	D1 (general disclosure)	D1 Examples	Patent in suit
	Component (A):			
(i)	Parts by weight	10-90, preferred 20-80	59.8, 65	20-50
(ii)	Mol-% olefin (Et)	<27.3	0, 0	0.5-15
(iii)	MWD	------*	------*	>3.5
	Component (B):			
(i)	Parts by weight	20-80, preferred 35-65	40.2, 35	50-80
(iv)	Wt-% Et	30-70	------*	40-70
(iv)	Wt-% a-olefin	30-70	------*	30-60
(v)	MWD (a)	------*	------*	<3.5
(vi)	ΔHf (b)	------*	------*	<20 J/g
(vii)	Regioinversions (c)	------*	------*	< 5%

* not stated

5.2.4 Study of the table reveals the following (the feature references in Roman numerals refer to the correspondingly numbered rows of the table):

(a) There are a total of 7 independent parameters defined in claim 1 of the patent in suit. In the case of 3 of these, namely:

- the proportions of component (A) to component (B) (feature (i));

- the α-olefin content in component (A) (feature ii));

- the proportions of ethylene and α-olefin in component (B) (feature (iv))

the definition according to claim 1 of the patent in suit is narrower than the disclosure of D1.
In the case of the remaining 4, namely,

- the MWD of component (A) (feature (iii));

- the MWD of component (B) (feature (v), corresponding to characteristic (B)(a) of claim 1);

- the crystallinity content of component (B) (feature (vi), corresponding to characteristic (B)(b) of claim 1);

- the content of 2-1 regioinversions of the α-olefin units of component (B) (feature (vii), corresponding to characteristic (B)(c) of claim 1), D1 is silent.

5.2.5 The Appellants have argued that the claimed subject-matter should be viewed as a selection from the teaching of D1 but that this selection would not be novel (Section X.b.vi above).

The situation in the present case, in which certain characteristics of the claims of the patent in suit are defined by ranges restricted compared to the teachings of the prior art while the prior art is silent with regard to other characteristics defined in the claims, corresponds to the situation underlying decision T 786/00 (19 December 2001, not published in the OJ EPO). That decision discussed the approach to evaluating novelty in the case of overlapping ranges of numerical parameters as developed in decision T 666/89 (OJ EPO, 1993, 495), namely, to determine what is "hidden" as opposed to what has been made available by considering whether or not a person skilled in the art would, in the light of all the technical facts available, seriously contemplate applying the teaching of the prior art document in the range of overlap. In 3.8.3 of the reasons of T 786/00, it was concluded that application of the approach of T 666/89 was not possible in a case where the prior art was totally silent on certain features. Under such conditions the prior art did not provide a disclosure of a range from which to make a selection. This is the situation in the present case since D1, as noted, is silent on the characteristics (B)(a)-(c) both in the examples and in the more general presentation of that disclosure, and hence can neither explicitly or even implicitly provide a basis from which any "selection" in respect of these characteristics could be made. Accordingly, in the present case, it is not appropriate to speak of a "selection" from the disclosure of D1 and hence the case law developed with respect to selections is not applicable.

Accordingly, and since claim 1 contains features which are not disclosed in D1, it is concluded that the subject-matter of this claim, and therefore of the other independent and dependent claims of the patent in suit is not anticipated by the disclosure thereof.

5.2.6 Even if, in favour of the Appellants, one were to consider the subject-matter of claim 1 of the patent in suit and in particular the characteristics (B)(a)-(c) to represent a selection from the disclosure of D1, the conclusions on novelty would remain unaltered since examination of the evidence of the patent in suit demonstrates the "selection" to be purposive:

(a) Example 1 of the patent in suit shows the preparation of "Composition 1", according to the claims by the sequential method. This composition is employed in example 3.

(b) Comparative examples 7 and 8 of the patent in suit employ variations of this, the details of which are given in the following table:

	Example 3	Example 7 (comparison)	Example 8 (comparison)
Component A: wt-%	33.6	33	35
Wt-% α-olefin	homopolymer	3.2	homopolymer
Int. Viscosity	1.59	1.4	1.65
Component B: wt-%	66.4	67	65
Wt-% C_2	67.8	***26***	65
MWD	2.7	***10***	***8***
ΔHf (J/g)	15	10	***35***
% Xylene soluble	68.8	63	50
Ult. Tensile Strength (MPa)	6.4	4.7	3.35
Elongation at break (%)	620	800	230
Tension set @ 23° (%)	10	18	18
Tension set @ 100°(%)	16	44	36
Comp. set @ 100° (%)	57	66	63
Comp. set free (%)	34	48	50
Hardness	58	56	65
Blooming	low	high	high

Numerals in ***bold italics*** indicate values falling outside the scope of the claims of the patent in suit.

It is noted that comparative example 7 employs a copolymer as component (A) whereas example 3 and comparative example 8 employ homopolymers. However both these possibilities are within the scope of the claims of the patent in suit and hence all the examples listed in the above table represent valid data for the purpose of assessing the technical effect of the claimed subject-matter.

(c) The above table shows the following:

If either the content of ethylene in the EPDM and the MWD thereof (characteristic (B)(a)), (comparative example 7) or the MWD and the level of crystallinity (characteristics (B)(a) and (B)(b)), (comparative example 8) is not in the range required by the claims, the resulting composition exhibits, compared to a composition according to the claims (example 3):

- lower ultimate tensile strength;

- increased tension set and compression set under all conditions measured;

- increased blooming.

The effects shown for the MWD and crystallinity content of component (B), i.e. characteristics (B)(a) and (b) of claim 1 correspond to "improved elastomeric properties and a better balance of elastomechanical properties." This demonstrates that the selection of these parameters is purposive. Thus even if, in contrast to the conclusions reached under 5.2.5, one were to consider the subject-matter of the claims of the patent in suit to represent a selection from the disclosure of D1, the conclusions on novelty would remain unchanged. As established by the foregoing analysis such selection would be purposive and not arbitrary and hence would satisfy the requirements for novelty (T 279/89, 3 July 1991, not published in the OJ EPO).

5.2.7 The Appellants also argued that since D1 disclosed in the examples at page 20 the same catalysts as employed in the patent in suit under substantially the same conditions, all features of the claims would automatically be met by the disclosure of D1 (Section X.b.iii above). This approach fails firstly because there is no evidence that this is in fact the case. Further, as noted above, neither of the two examples of D1 which are carried out according to the teaching of that document employs proportions of components (A) and (B) within the ranges permitted by claim 1 of the patent in suit. Hence, even if the position of the Appellants regarding the properties of the two components were to be correct, which as noted has not been established, the different proportions of the two components present in the examples of D1 means that these cannot provide an anticipation of the subject-matter of claim 1 of the patent in suit.

5.2.8 Accordingly it is concluded that the subject-matter claimed is novel over D1.

5.3 *With regard to the objections raised on the basis of D6:*

This document relates according to claim 1 thereof to thermoplastic olefinic polymer compositions having good low temperature impact performance and comprising a thermoplastic selected from thermoplastic polyurethanes, polyvinyl chlorides, styrenics, engineering thermoplastics and polyolefins and a substantially linear ethylene/α-olefin copolymer. A preferable thermoplastic is polypropylene as defined in claim 11 and shown in the examples of D6. The content of the copolymer is, in the most general case, 1-99 weight %, preferably 10 to 50 weight % (page 8, lines 33, 34). The examples employ this component in amounts ranging from 7.5 to 40 weight %. This falls outside the scope of the claims of the patent in suit which require that the ethylene/α-olefin copolymer be present in amounts of 50-80 parts by weight. Thus solely on consideration of the proportions of components present, D6 does not anticipate the subject-matter of claim 1 of the patent in suit.

In any case, it has not been shown that the ethylene/α-olefin copolymers of D6 fall within the terms of component (B) of the patent in suit. The substantially linear ethylene/α-olefin copolymers are defined in D6 on page 7, lines 23-32 by reference to two applications identified by their serial numbers. At page 13, starting from line 7 of D6 it is taught that this component can be prepared employing a constrained geometry catalyst and refers generally to monocyclopentadienyl transition metal catalysts cited in a further US patent publication. Regarding the actual preparation of the copolymers, D6 mentions at page 13, line 28 to page 14, line 8 the reaction conditions to be employed but does not discuss the catalysts in further detail. The examples do not show the preparation of the copolymer or disclose the level of crystallinity or content of regioinversions thereof.

The objection of lack of novelty made by Appellant II is based on an experiment - the details of which have not been placed on file (see sections VI.b and IX.b above) - in which polymers were stated to have been prepared employing a catalyst disclosed in one of the documents referred to at page 7 of D6. The reasoning leading to the selection of the catalyst employed is not explained. D6 itself does not contain any indication that such a specific catalyst was used in preparing the compositions thereof, or any other statement that would direct the reader to the catalyst employed by Appellant II. Accordingly it cannot be concluded that what the Appellant did was in fact a repetition of the teaching of D6.

It is further noted that Appellant II has provided no details as to the nature of the polymers that were made, for example proportions of monomer contained. It has merely been reported in very general terms one property thereof, namely that the polymers prepared had a level of regioinversions in the range required by claim 1 of the patent in suit, without however stating what the level of regioinversions was.

Accordingly it has not been established that the compositions disclosed in D6 employed ethylene/α-olefin copolymers as required by claim 1 of the patent in suit. It has also not been shown that the polypropylene employed in D6 corresponds to that required by claim 1 of the patent in suit.

Thus it has not been demonstrated that D6 discloses components (A) and (B) in the proportions required by claim 1 of the patent in suit, or that the properties of components (A) or (B) in D6 are as required by the claims of the patent in suit.

Accordingly, the Appellants have not established that the disclosure of D6 anticipates the subject-matter of claim 1 of the patent in suit.

5.4 It is therefore concluded that the subject-matter claimed in the patent in suit is novel.

6. *The patent in suit, inventive step:*

6.1 *The closest prior art, the objective technical problem*: Like the patent in suit, D10 is also concerned with the provision of gaskets (col. 6, line 43) and also emphasises that the blends are processable as thermoplastics (col. 1, lines 50-54). Accordingly the Board can concur with the view of all parties that D10 represents the closest prior art for the assessment of inventive step.

6.1.1 Analysis of D10:

D10 discloses blends of polyolefin resin and fully cured monoolefin copolymer rubber (col. 1, lines 50ff). D10 employs 25-95 wt% of the polyolefin resin and 75-5 wt% of the copolymer rubber (col. 1, lines 64-65). The general description of D10 does not specify the proportions of monomers to be employed for the preparation of the copolymer rubber (corresponding to component (B) of the patent in suit), beyond stating that a "lesser quantity" of non-conjugated diene is envisaged in the cases where this component is employed (col. 5, line 18). The manner of preparing the copolymer rubber is not disclosed in D10, however it has been submitted by the Respondent, and not disputed by the Appellants, that D10 predates metallocene catalysts and hence another method would have been employed.

The copolymer rubber is stated to have a MWD (referred to as "polydispersity") of less than about 3.5 (col. 3, line 45). The level of crystallinity of the rubber component is defined in qualitative terms as "essentially non-crystalline" (col. 5, line 8).

The compositions are prepared by intimate mixing (col. 3, line 10) and cured by mastication at vulcanization temperatures (col. 2, lines 64-66, col. 3, lines 11-13) which process conditions correspond to the definition of "dynamic vulcanization" given in paragraph [0042] of the patent in suit.

Examples 12-18 in Table II of D10 disclose compositions having:

EPDM rubber:	65 pbw
Polypropylene:	35 pbw

According to the footnote to the Table and the statement at lines 2-4 of col. 8, the EPDM is "believed to be" 55/40.6/4.4 wt% Et/Pr/diene. The enthalpy of fusion of this component is not disclosed.

6.1.2 The following features of the present claims are therefore not disclosed in D10:
Regarding the crystalline polyolefin (corresponding to component (A) of the patent in suit):

- isotacticity index;

- monomer composition;

- molecular weight distribution.

Regarding the copolymer rubber (corresponding to component (B)):

- crystallinity content (enthalpy of fusion - corresponding to characteristic (B)(b));

- the content of regioinversions (corresponding to characteristic (B)(c)).

6.1.3 Regarding the features of crystallinity content and molecular weight distribution of the copolymer rubber, there was disagreement between the parties as to the relationship between the relevant disclosures in D10 and the definition according to claim 1 of the patent in suit, and whether these in fact corresponded to each other.

(a) Concerning the molecular weight distribution, it was argued by the Respondent that the MWD as disclosed in D10 was not the same as that defined in the patent in suit and hence no comparison could be made based on this feature. The method employed in the examples of the patent in suit is gel permeation chromatography (GPC), although the claims are not restricted to this method.

With regard to the discussion of GPC determination, the patent in suit defines the apparatus, solvent and temperature employed. The standards used are not disclosed. Since GPC is a relative method - the MWD being inferred by comparing the elution pattern of the sample under investigation with that of standards the MWD of which is known from other measurements - the values reported can only be interpreted for the purposes of comparison with a MWD reported elsewhere if the standards employed are known.

As the patent in suit does not indicate the standards employed, comparison between the values reported and those in D10 is not possible, any differences in methodology between the patent in suit and D10 notwithstanding. Therefore for this reason alone, it cannot be established whether this characteristic (B)(a) represents a distinguishing feature over the disclosure of D10.

(b) The crystallinity content of the rubber is defined in D10 in qualitative terms as "essentially non-crystalline" (col. 5, line 8). In contrast the patent in suit employs a quantitative definition, namely that the enthalpy of fusion is below 20 J/g. The Appellants failed to provide any evidence to support the argument (see section X.c.ii above) that the qualitative definition of crystallinity in D10 corresponded to the quantitative definition in claim 1 of the patent in suit. Accordingly the Board cannot conclude that these two formulations are synonymous, or that the qualitative indication provided in D10 would inevitably and necessarily be understood by the skilled person as equivalent to the quantitative limitation of claim 1 of the patent in suit.

It is therefore concluded that the quantitatively defined level of crystallinity (characteristic (B)(b)) in claim 1 of the patent in suit provides a distinguishing feature over the disclosure of D10.

6.1.4 Regarding the other physical properties reported both in D10 and the patent in suit, namely tensile strength, elongation at break, tension set and hardness it is apparent firstly that for all of these except the hardness (Shore A), different measurement standards were employed (ASTM D412 in the patent and ASTM D-1708-66 in D10). A further uncertainty arises from the nomenclature used which while similar is not identical. The patent in suit refers to "ultimate tensile strength" and "elongation at break" whereas D10 employs the terms "tensile strength" and "ultimate elongation". It is thus not even certain that the same properties are being measured, regardless of any difference in measurement protocols employed. In view of these differences, no direct comparisons are possible between the values reported *inter alia* for tensile strength and elongation at break in D10 and the patent in suit. The Appellants have not proved that, despite the differing terminology and different standards employed, the results reported in the citation and the patent in suit would in fact be comparable.

Hence the argument of the Appellants (see sections VI.c and X.c.v above) that the properties reported for the compositions of D10, in particular ultimate tensile stress and tension set were superior to those reported for the patent in suit is not supported by the facts.

6.2 The objective technical problem to be solved by the patent in suit in respect to D10:

Based on the analysis in the foregoing sections 5.2.6 and 6.1, the objective technical problem to be solved in relation to the closest prior art D10 can be formulated as to provide vulcanizable compositions exhibiting improved elastomeric properties and a better balance of elastomechanical properties.

6.3 The solution

This problem was solved according to the patent in suit by replacing the olefin elastomer of D10 by one having a specified level of crystallinity (expressed as enthalpy of fusion - characteristic (B)(b)) and a defined level of regioinversions (characteristic (B)(c)). As evidenced by D3 (in particular page 9, lines 8-15), D15 (in particular page 260, lines 18,19 and the passage bridging pages 266 and 268) and D16 (page 4), in effect this amounts to replacement of the olefin rubber of D10 by one prepared by means of a metallocene process.

6.3.1 It is true, as argued by the Appellants (see sections X.c.ii and X.c.v above), that there is no evidence linking the particular distinguishing features of the olefin elastomer compared with D10 to the technical effects noted. In particular, there is no evidence that the content of regioinversions alone makes any direct contribution. However, this feature serves in effect as a "marker" or "flag" indicating the manner in which the polymer was prepared, which method (metallocene catalysis) gives rise to a specific property profile of the EPDM, one part of which is the content of regioinversions.

6.3.2 The Appellants have provided no evidence to suggest that the effects reported in the patent in suit are not obtained, or that employing the EPDM of D10 would lead to the same property profile, i.e. that the claimed subject-matter does not provide a solution to the above formulated objective technical problem in relation to D10.

6.3.3 There is no requirement in the EPC or the case law that in assessing inventive step in a case where there exists a plurality of differences in terms of the product properties or parameters it is necessary to investigate and elucidate precisely which individual parameter or subset of the distinguishing parameters is responsible for observed effects. It is only necessary that it be credibly demonstrated - as it has in the present case - that the "package" gives rise to a technical effect.

6.4 Obviousness of the solution.

6.4.1 The prior art contains no teaching linking the content of regioinversions and specific level of crystallinity of polyolefin rubbers to the elastomeric and elastomechanical properties of heterophasic polypropylene (co)polymer systems in which said rubbers are present.

Accordingly there was no suggestion in the prior art to employ olefin rubbers having these characteristics in order to solve the objective technical problem underlying the patent in suit.

6.4.2 The result upon considering the solution as the mere replacement of the known olefins by those prepared by a metallocene system is no different:

D10 teaches that in order to provide useful gasket compositions an EPDM should be employed which exhibits a low molecular weight distribution and low crystallinity (D10, col. 3, lines 43-47 and col. 5, line 8). As shown by D3, D15 and D16, the skilled person at the priority date of the patent in suit would be aware that this profile corresponds to the properties of EPDMs obtained by the use of a metallocene catalyst. While these documents would suggest that there would be no particular obstacle to effecting such replacement, by the same token the teaching is that these would lead to equivalent properties to those of the EPDMs employed in D10. In particular, D3 at page 9 lines 53 and 54, D15 at page 270, lines 17-20 and D16, page 5 lines 9 and 10 teach that such EPDMs can be employed "in all the typical applications of alpha-olefin elastomers" (D3), as "drop ins" for existing EPDMs (D15), or "display elastic properties comparable to those of vulcanized rubbers" (D16). Consequently, these teachings would not provide any indications as to the excess of effects reported in the patent in suit and hence a composition comprising such an EPDM and encompassing these effects would not be rendered obvious by these teachings.

6.5 The Appellants further argued that it would have been obvious to employ EPDMs prepared by a metallocene route if the skilled person were interested in obtaining products with/in better "yield". However D15 indicates on page 260 lines 15-16 that the metallocene catalysts have "activities comparable to" conventional Ziegler-Natta catalysts. Accordingly the evidence of the prior art is that there would be no benefit in terms of "yield" on replacing conventional Ziegler-Natta catalysts by metallocenes.

6.6 Accordingly it is concluded that the solution to the technical problem does not arise in an obvious way from what all the parties concurred is the closest state of the art, represented by D10, or a combination thereof with D3, D15 or D16.

Order

For these reasons it is decided that:

The appeals are dismissed.

The Registrar: The Chairman:

E. Görgmaier R. J. Young