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**D E C I S I O N**  
**of 30 June 2004**

**Case Number:** T 0420/02 - 3.3.3

**Application Number:** 96923157.0

**Publication Number:** 0837905

**IPC:** C08L 23/04

**Language of the proceedings:** EN

**Title of invention:**

Use of polyolefin compositions as outer cable-sheathing

**Patentee:**

BOREALIS POLYMERS OY

**Opponents:**

Union Carbide Corporation  
THE DOW CHEMICAL COMPANY  
Basell Polyolefine GmbH

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 54, 83, 84, 87(1), 88, 123(2), 123(3)

**Keyword:**

"Reformatio in peius (no)"  
"Novelty (yes)"  
"Inventive step (yes)"  
"Priority - same invention (yes)"

**Decisions cited:**

G 0010/91, G 0002/98, G 0001/99, T 0450/89, T 0989/93

**Catchword:**

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Case Number: T 0420/02 - 3.3.3

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.3  
of 30 June 2004

**Appellant:**  
(Opponent II)

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**Representative:** -

**Decision under appeal:** Interlocutory decision of the Opposition  
Division of the European Patent Office dated  
5 February 2002 posted 28 February 2002  
concerning maintenance of European patent  
No. 0837905 in amended form.

**Composition of the Board:**

**Chairman:** R. Young  
**Members:** C. Idez  
E. Dufrasne

## Summary of Facts and Submissions

I. The grant of the European patent No. 0 837 905 in the name of Borealis Polymers OY in respect of European patent application No. 96 923 157.0 filed on 3 July 1996 and claiming priority of the SE patent application No. 9502508 filed on 10 July 1995 was announced on 15 September 1999 (Bulletin 1999/37) on the basis of 12 claims.

Independent Claims 1, 11, and 12 read as follows:

- "1. A cable-sheathing composition, characterised in that it consists of a multimodal olefin polymer mixture obtainable by polymerisation of at least one  $\alpha$ -olefin in more than one stage and having a density of 0.915-0.955 g/cm<sup>3</sup> and a melt flow rate of 0.1-3.0 g/10 min, said olefin polymer mixture comprising at least a first and a second olefin polymer, of which the first has a density and a melt flow rate selected from (a) 0.9300-0.975g/cm<sup>3</sup> and 50-2000 g/10 min and (b) 0.88-0.93 g/cm<sup>3</sup> and 0.01-0.8 g/10 min, and that the individual polymers of said olefin polymer mixture are present in an amount of more than 10% by weight each.
  
11. The use of the cable-sheathing composition as claimed in any one of the preceding claims as outer sheath for a power cable.
  
12. The use of the cable-sheathing composition as claimed in any one of claims 1-11 as outer sheath for a communication cable."

Claims 2 to 10 were dependent claims.

II. Three Notices of Opposition were filed against the patent, as follows:

(i) by Union Carbide Corporation (Opponent I), on 12 May 2000,

(ii) by The Dow Chemical Company (Opponent II), on 13 June 2000, and

(iii) by Elenac GmbH (later Basell Polyolefine GmbH) (Opponent III), on 14 June 2000.

The Opponents requested the revocation of the patent as a whole on the grounds of lack of novelty and lack of inventive step (Article 100(a) EPC).

The oppositions were supported *inter alia* by the following documents:

D1: EP-A-0 369 436;

D3: US-A-4 547 551;

D5: US-A-3 914 342;

D6: US-A-4 439 632; and

D7: EP-B-0 517 868;

III. By a decision announced orally on 5 February 2002, and issued in writing on 28 February 2002, the Opposition Division held that the grounds of opposition did not prejudice the maintenance of the patent in amended form.

The decision was based on Claims 1 to 8 submitted as main request by the Patent Proprietor with its letter of 3 December 2001.

Claim 1 of this request read as follows:

"The use of a cable-sheathing composition as outer sheath for a power cable or a communication cable, characterized in that the composition consists of a multimodal olefin polymer mixture obtained by polymerisation of at least one  $\alpha$ -olefin in more than one stage and having a density of 0.915-0.955 g/cm<sup>3</sup> and a melt flow rate of 0.1-3.0 g/10 min, said olefin polymer mixture comprising at least a first olefin polymer having a density of 0.930-0.975 g/cm<sup>3</sup> and a melt flow rate of 50-2000 g/10 min and a second olefin polymer having a density of 0.88-0.93 g/cm<sup>3</sup> and a melt flow rate of 0.01-0.8 g/10 min, said first and second polymers being present in an amount of more than 10% by weight each."

Claims 2 to 8 were dependent claims.

IV. In its decision, the Opposition Division held that the amended claims 1 to 8 of the main request fulfilled the requirements of Rule 57(a), of Article 84, and Article 123 EPC. It held that the subject-matter of Claims 1 to 8 was novel over documents D1, D3, and D7, since none of these documents disclosed the specific

use as defined in Claim 1 (i.e. use as an outer sheath of a power or communication cable).

Concerning inventive step, document D3 was considered as the closest state of the art. The technical problem was seen as the provision of an outer sheathing material for cables having good processability, low shrinkage, high surface finish, high mechanical strength and high environmental stress cracking resistance (ESCR).

According to the decision, D3, however, did not mention the problem of shrinkage and did not pay much attention to the problem of inhomogeneity of the blends. The skilled artisan would not combine the teaching of D3 with that of D1, since D1 was silent on the problem of shrinkage and it did not address the problems of outer cable sheathings.

The further argument put forward by Opponent III, that the combination of D7 with D6 would render the claimed subject-matter obvious was not accepted by the Opposition Division. The Opposition Division considered that D7 did not foreshadow the bimodal compositions as defined in Claim 1 and that it was not concerned with the problem of shrinkage and ESCR. Furthermore, document D6 while being generally concerned with mechanical problems of cable sheathing was silent on the problem of shrinkage and of obtaining a good balance of processability, shrinkage, surface finish, mechanical strength and ESCR.

Thus, the Opposition Division came to the conclusion that the subject-matter of Claims 1 to 8 involved an inventive step.

V. A Notice of Appeal was filed on 26 April 2002 by the Appellant (Opponent II). The prescribed fee was paid on 25 April 2002. In the Statement of Grounds of Appeal filed on 8 July 2002, the Appellant argued essentially as follows:

(i) Concerning novelty:

(i.1) D1 disclosed a multimodal polymer mixture meeting all the requirements set out in Claim 1.

(i.2) D1 further referred to wire and cable applications for linear low density polyethylene (LLDPE) products.

(i.3) There was no indication that the LLDPE products of D1 would not be suitable for wire and cable applications.

(i.4) Thus, D1 taught the use of a multimodal olefin polymer composition within the definition of the mixture defined in Claim 1 in wire and cable applications. The skilled person would have understood that the use of LLDPE in cable and wire application was the use as cable outer sheath.

(i.5) Thus, D1 destroyed the novelty of Claims 1, 3 and 4.



(ii) Concerning inventive step:

(ii.1) D3 taught the use of bimodal compositions in wire coating.

(ii.2) The principal distinguishing feature between D3 and D1 was that the blends of D3 were prepared by post reactor blending.

(ii.3) Thus, starting from D3 the technical problem was merely to use bimodal resin composition prepared by an alternative process as a cable outer sheath.

(ii.4) The person skilled in art would have combined the teachings of D3 and D1, since they both refer to bimodal compositions for use in cable and wire applications, and since D1 clearly mentioned that the multi-stage process offered improved properties in comparison to the post blending process (cf. page 3, lines 31 to 35 and page 6, lines 17 to 18).

(ii.5) Thus, the claimed subject-matter lacked inventive step.

VI. In its letter dated 16 January 2003, the Respondent (Patent Proprietor) argued essentially as follows:

(i) Concerning novelty:

(i.1) Claim 1 was directed to the use of a cable sheathing composition as an outer sheath for power cables or communication cables. The polymer mixture used as the outer sheath was restricted to one obtained

by a multistage process and excluded mixtures made by blending.

(i.2) While D1 disclosed some aspect of Claim 1, it did not disclose the use of a composition according to Claim 1 as an outer sheath for a power cable or a communication cable. The reference in D1 to known applications of LLDPE polymers was not relevant.

(ii) Concerning inventive step:

(ii.1) Although D3 mentioned wire coating, it did not contain a reference to outer sheath of power cables or communication cables.

(ii.2) D3 was essentially directed to the production of films.

(ii.3) D3 referred to polymer mixtures obtained by post blending. These compositions exhibited a lack of homogeneity. Furthermore D3 was totally silent on the shrinkage properties of the compositions disclosed therein.

(ii.4) D1 was not concerned with cable sheathing compositions for use as outer sheath of a power cable or a communication cable.

(ii.5) Furthermore D1 was silent on the problem of shrinkage.

(ii.6) Thus, neither D3 nor the combination of D3 with D1 would render the claimed subject-matter obvious.

VII. In a communication dated 16 February 2004 and annexed to the summons to Oral Proceedings the Board presented its provisional view on the issues of added subject-matter, novelty and inventive step concerning Claims 1 to 8 submitted with the letter of 3 December 2001 of the Respondent. In particular, the Board expressed its provisional opinion that Claim 1 of the the set of claims allowed by the Opposition Division would appear to contravene Article 123(2) EPC.

VIII. With its letter dated 10 May 2004, the common representative of Appellant and Opponent I submitted *inter alia* the following documents:

D13: "Polyethylene Processing Tips", U.S.I, Vol. III, No.2, March 1958, page 229;

D14: R. N. Harward et al "Effect of Blending on the Molecular Weight Distribution of Polymers" Journal of Polymer Science, Part A, Vol.2, page 2977-3007 (1964);

D15: C. Tsenoglou "Viscoelasticity of binary homopolymer blends"; ACS Polymer Preprints, Vol. 28, No.2, 1987, pages 185-186;

D16: Table showing the calculation of the melt flow rates of the polymer blends obtained in the examples of the patent in suit and of D1.

D17: English translation of the Swedish patent application SE 9502508-6 of 10 July 1995;

D18: WO-A-96/18677, and

D20: C. G. Richardson, "The development of a new low shrink jacketing material for optical fiber cables", International Wire & Cable Symposium Proceedings 1986, pages 40 to 42.

The common Representative of Appellant and Opponent I argued essentially as follows:

(i) Added subject-matter:

There was no support in the application as filed for a multimodal composition as defined in Claim 1.

(ii) Insufficiency of disclosure:

(ii.1) The patent in suit did not provide indication as how to determine the melt flow rate of the second component.

(ii.2) Although the patent in suit indicated that the melt flow rate of the second component could be calculated, no details on the calculation were given.

(ii.3) As further shown by documents D13 to D15 there was no single recognized way of calculating the melt flow rate of the second component.

(ii.4) Thus, the skilled person would not know how to determine the melt flow rate of the polymer produced in the second reactor.

(iii) Lack of clarity:

(iii.1) The stipulation of the melt flow rate of the second polymer in Claim 1 did not meet the requirements of Article 84 EPC.

(iii.2) This definition was not clear since no reproducible method for the determination of the melt flow rate of the second polymer was given in the patent in suit.

(iii.3) Thus, the skilled person would not know whether or not he was working within the scope of Claim 1.

(iv) Novelty:

(iv.1) The claims lacked entitlement to the priority date, since there was no support in the priority document for referring to the density and the melt flow rate of the second polymer in association with a multimodal composition.

(iv.2) Thus, D18, which had been published before the filing date of 3 July 1996 of the patent in suit belonged to the prior art.

(iv.3) D18 taught the same compositions as the patent in suit for the same use, i.e. a cable jacket.

(iv.4) Although D18 did not explicitly mention the use for a communication or power cable, any coated cable could be used for power or communication purposes. Thus D18 anticipated the claims on file.

(v) Inventive step:

(v.1) Document D18 disclosed bimodal olefin compositions for use in cable jacketing and having good processability, good ESCR, mechanical properties, and homogeneity.

(v.2) The discovery that such composition would have reduced shrinkage could not render an obvious use patentable.

(v.3) Furthermore since the compositions of D18 had good ESCR, the skilled person would consider these compositions for use on the outside of the cable.

(v.4) Document D5 referred to blends made by the parallel or serial polymerization of two components which were combined while being still in the liquid phase.

(v.5) The melt flow rates and the density of the components of the blends of D5 significantly overlapped with those of the components of the patent in suit.

(v.6) The compositions of D5 exhibited good processability, mechanical properties and ESCR, and were used in cable jacketing.

(v.7) D5 disclosed that these blends exhibited reduced melt viscosity at high shear rate. This was similar to the description of the relaxation behaviour.

(v.8) As shown in D20, there was a link between relaxation behaviour and shrinkage. D20 would suggest using polymers having a short relaxation time such as those disclosed in D5 as in order to reduce the shrinkage.

IX. With its letter dated 19 May 2004, the common Representative of the Appellant and Opponent I filed a further document:

D21: Article dated 9 October 1995 concerning Borstar-Advanced New Generation Polyethylene Technology from Borealis.

It submitted that D21 provided evidence that the skilled person would use the compositions of D18 for cable jacketing purposes.

X. In its letter dated 27 May 2004, Opponent III essentially relied on the arguments presented by the Appellant and the Opponent I.

XI. With its letter dated 28 May 2004, the Respondent submitted a set of Claims 1 to 8 as new main request.

Claim 1 thereof read as follows

"The use of a cable-sheathing composition as outer sheath for a power cable or a communication cable, characterized in that the composition consists of a multimodal olefin polymer mixture obtained by polymerisation of at least one  $\alpha$ -olefin in more than one stage and having a density of 0.915-0.955 g/cm<sup>3</sup> and a melt flow rate of 0.1-3.0 g/10 min, said olefin

polymer mixture comprising at least a first [sic] a second olefin polymer, of which the first olefin polymer has a density of 0.930-0.975 and a melt flow rate of 50-2000 g/10 min and that the individual polymers of said olefin polymer mixture are present in an amount of more than 10% by weight each."

Claims 2 to 8 were dependent claims.

It also argued essentially as follows:

(i) Claim 1 was supported by the combination of Claim 1 as originally filed read in combination with original Claims 13 and 14, and lines 16 to 18 on page 8 of the application.

(ii) Claim 1 was also in conformity with Article 123(3) EPC.

(iii) Since there was no reference in Claim 1 to the melt flow rate and the density of the second polymer, the objections raised by the Appellant in that respect no longer applied.

(iv) The claimed subject-matter enjoyed the priority. Thus, D18 was not a prior art document and should not be allowed in to the proceedings.

(v) The blends of D5 were not obtained according to a two stage polymerization.

(vi) D5 did not refer to the special use as outer sheath for a power cable or communication cable.



(vii) D5 was not concerned with the problem of shrinkage. The shrinkage properties could not be determined from the reduced melt viscosity at high shear.

(viii) Thus, D5 could not suggest the claimed invention.

XII. In its letter dated 25 June 2004, the Representative of the Appellant and Opponent I argued essentially as follows:

(i) The claims of the new main request of the Patent Proprietor were not in accordance with the provisions of decision G 1/99 (OJ EPO 2001, 381) since they had a broader scope than those allowed by the Opposition Division.

(ii) The main request did not meet the requirements of Article 83 EPC, for the following reasons:

(ii.1) The wording "first polymer" did not restrict the polymer to be produced in the first stage of the multistage polymerization.

(ii.2) Thus, its density and melt flow rate could not be measured.

XIII. With its letter dated 25 June 2004, the Respondent filed a new main request and three auxiliary requests.

Claim 1 of the main request read as follows:

"The use of a cable-sheathing composition as outer sheath for a power cable or a communication cable, characterized in that the composition consists of a multimodal olefin polymer mixture obtained by polymerisation of at least one  $\alpha$ -olefin in more than one stage and having a density of 0.915-0.955 g/cm<sup>3</sup> and a melt flow rate of 0.1-3.0 g/10 min, said olefin polymer mixture comprising at least a first olefin polymer and a second olefin polymer, of which the first olefin polymer has a density of 0.930-0.975 and a melt flow rate of 50-2000 g/10 min and that the individual polymers of said olefin polymer mixture are present in an amount of more than 10% by weight each."

The remaining Claims 2 to 8 of the main request were dependent claims.

It also submitted *inter alia* the following new documents

D22: K.B. McAuley et al. "On-Line Inference of Polymer Properties in an Industrial Polyethylene Reactor.", *AIChE. Journal*, Vol.37, No.6. June 1991; 825-835;

D23: B. Hagström "Prediction of melt flow rate (MFR) of bimodal polyethylene's based on MFR of their components."; *The Polymer Processing Society, Extended Abstracts & Final Programme of the Europe/Africa Region Meeting Gothenburg, Sweden, August 19-21, 1997.*

The Respondent argued essentially as follows:

(i) The deletion of the features of the second polymer in Claim 1 of the main request and the second auxiliary request did not result in a broadening of the scope of the claims in comparison to that of the claims allowed by the Opposition Division.

(ii) The polymer mixture was technically determined by the properties of the first polymer and the properties of the final polymer mixture. Thus, the properties of the second polymer were automatically fixed.

(iii) The features of the second polymer in the Claim 1 as maintained by the Opposition Division represented an overdetermination of the claimed matter.

(iv) The admissibility of the features of the second polymer had been objected to by the Board under Article 123(2) EPC, and further objected to by the Opponents under Articles 83 and 84 EPC.

(vi) Thus, the third alternative of the second paragraph of the headnote of the decision G 1/99 applied to the present case. The removal of these feature was therefore allowable.

(vii) The Annex I showed that the skilled person would use the methods disclosed in D22 and D23 for calculating the  $MFR_2$  of mixtures based on components having a large ratio between the  $MFR_2$  thereof.

XIV. With a further letter dated 29 June 2004, the Respondent submitted a new main request and 11 auxiliary requests.

Claims 1 to 8 of the main request corresponded to Claims 1 to 8 of the main request submitted with the letter of 25 June 2004.

XV. Oral proceedings were held on 30 June 2004.

At the oral proceedings, the Parties having agreed that Claim 1 of the set of claims allowed by the Opposition Division contravened Article 123(2) EPC, as submitted by the Board in its communication dated 16 February 2004, the discussion was firstly focussed on the admissibility of the main request submitted by the Respondent with its letter of 29 June 2004 in view of the principles set out in decision G 1/99. Following preliminary considerations of the Board concerning the admissibility of this request in that respect, the Respondent withdrew the requests then on file and submitted a new main request, and eleven auxiliary requests.

Claim 1 of the main request read as follows:

"The use of a cable-sheathing composition as outer sheath for a power cable or a communication cable, characterized in that the composition consists of a bimodal olefin polymer mixture obtained by polymerisation of at least one  $\alpha$ -olefin in more than one stage and having a density of 0.915-0.955 g/cm<sup>3</sup> and a melt flow rate of 0.1-3.0 g/10 min, said olefin polymer mixture comprising at least a first olefin

polymer, having a density of 0.930-0.975 g/cm<sup>3</sup> and a melt flow rate of 50-2000 g/10 min and a second olefin polymer having a density of 0.88-0.93 g/cm<sup>3</sup> and a melt flow rate of 0.01-0.8 g/10 min, and that the individual polymers of said polymer mixture are present in an amount of more than 10% by weight each."

Claims 2 to 8 of the main request corresponded to Claims 2 to 8 of the main request submitted with letter of 29 June 2004.

Following objections under Article 123(2) EPC raised both by the Board and the Opponents concerning Claim 1 of the main request, the Respondent submitted a manuscript amended version thereof.

Claim 1 of the manuscript amended main request reads as follows:

"The use of a cable-sheathing composition as outer sheath for a power cable or a communication cable, characterized in that the composition consists of a bimodal olefin polymer mixture obtained by polymerisation of at least one  $\alpha$ -olefin in two stages and having a density of 0.915-0.955 g/cm<sup>3</sup> and a melt flow rate of 0.1-3.0 g/10 min, said olefin polymer mixture being a mixture of two olefin polymers in which a first olefin polymer has a density of 0.930-0.975 g/cm<sup>3</sup> and a melt flow rate of 50-2000 g/10 min and a second olefin polymer has a density of 0.88-0.93 g/cm<sup>3</sup> and a melt flow rate of 0.01-0.8 g/10 min, and that the individual polymers of said polymer mixture are present in an amount of more than 10% by weight each."

Claims 2 to 8 correspond to the Claims 2 to 8 of the main request submitted with the letter of 29 June 2004.

The submissions made by the Parties in respect of the main request can be summarized as follows:

(i)) Concerning the formal allowability of the main request:

(i.a) By the Respondent:

(i.a.1) Claim 1 was supported by paragraphs [023], [024], and [025] of the patent specification.

(i.a.2) The expressions "first olefin polymer" and "second olefin polymer" had no chronological meaning linked to the stage of polymerization. The wording "first" and "second" were merely labels in order to identify the components of the mixture. This was evident, since paragraph [025] clearly disclosed that the order of the polymerization stage might be reversed.

(i.a.3) In view of the incorporation of the features that the mixture was bimodal and that it was a mixture of two polymers, the scope of Claim 1 was not broader than that of Claim 1 of the set of claims allowed by the Opposition Division.

(i.b) By the Appellant, Opponent I and Opponent III:

(i.b.1) According to Claim 1 as granted, the first polymer should exhibit a density and a melt flow rate selected from (a) 0.930-0.975 g/cm<sup>3</sup> and 50-2000 g/10 min and (b) 0.88-0.93 g/cm<sup>3</sup> and 0.01-0.8 g/10 min.

(i.b.2) It was clear from the decision of the Opposition Division (cf. page 4; second paragraph) that the possibility for the first polymer to have a density of 0.88-0.93 g/cm<sup>3</sup> and a melt flow rate of 0.01-0.8 g/10 min (i.e. alternative (b)) had been deleted from Claim 1 of the set of claims allowed by the Opposition Division.

(i.b.3) While Paragraphs [023] and [024] supported alternative (a), it was evident that paragraph [025] corresponded to alternative (b).

(i.b.4) It thus followed that Claim 1 of the main request which, according to the Patentee, covered both alternatives (a) and (b) had a broader scope than that of Claim 1 of the set of claims allowed by the Opposition Division. Thus, Claim 1 was not allowable under the provisions set out in G 1/99.

(i.b.5) Furthermore it was clear from paragraph [024] that the first polymer was associated with the first polymerization stage and the second polymer was associated with the second polymerization stage. This was however not indicated in Claim 1, so that Claim 1 was not supported by paragraph [024].

(ii) Article 84 and 83 EPC:

(ii.1) The Appellant and the Opponents I and III indicated that they had no objection under Article 84 EPC against the main request.

(ii.2) Concerning the determination of the characteristics of the polymer made in the second stage the Appellant made a declaration according to which the Appellant believed that document D22 was the basis on which the melt flow rate of the polymer in the second stage was calculated for this patent, and, consequently, it withdrew its objections under Article 83 EPC.

(ii.3) In that respect, the Respondent responded that the patent was silent on the calculation method.

(iii) Concerning the validity of the priority:

(iii.a) By the Appellant, Opponent I, and Opponent III:

(iii.a.1) Claim 1 of the main request was not entitled to the priority of document D17.

(iii.a.2) The priority could be acknowledged only if the skilled person could derive the subject-matter of this claim directly and unambiguously from the previous application D17. Reference was made in that respect to the decision G 2/98 (OJ EPO, 2001, 413).

(iii.a.3) The passage from page 6, line 33 to page 7, line 12 of D17, while disclosing the characteristics of a first and a second polymer corresponding to those



indicated for these components in Claim 1 of the main request, did not however refer to a two stage polymerization.

(iii.a.4) It was true that a two stage polymerization process was mentioned in D17 (page 5, line 35 to page 6, line 15), but this was made in combination with very specific process features (e.g. loop reactor/gas-phase reactor), and, in any case not in combination with the specific characteristics in terms of density and melt flow rates for the first and the second polymer specified in the passage from 6, line 33 to page 7, line 12.

(iii.a.5) There was no counterpart in the priority document for the paragraph [025] of the patent in suit which, according to the Respondent, provided a basis for Claim 1 of the main request.

(iii.a.6) Thus, the criteria set out in G 2/98 for claiming priority of the same invention were not met.

(iii.b) By the Respondent:

(iii.b.1) It was clear that the passage page 6, line 33 to page 7, line 12 of D17 should be read in combination with the passage of page 5, lines 13 to 24 (cf. in particular page 7, lines 7 to 10).

(iii.b.2) D17 further disclosed that the bimodal composition should be preferably produced in two polymerization reactors connected in series (page 5, line 35 to page 6, line 1) and that the order of the stages might be reversed (page 6, line 16 to 17).

(iii.b.3) The priority document did not need to be an exact counterpart of the patent. Paragraph [025] of the patent in suit represented an example illustrating the reversal of the polymerization stages. Reversal of the polymerization stages was disclosed in D17 (page 6, lines 16 to 17).

(iii.b.4) Thus, Claim 1 was entitled to claim the priority of D17.

(iv) Novelty:

The Parties indicated that they relied on their written submissions on that issue.

(v) Inventive step:

(v.a) By the Appellant, Opponent I, and Opponent III:

(v.a.1) Document D5 should be considered as the closest state of the art.

(v.a.2) The problem underlying the patent in suit was to provide a polymer composition for cable-sheathing exhibiting good environmental stress cracking resistance (ESCR), reduced shrinkage and good processability (cf. paragraph [0003]).

(v.a.3) There was a broad overlap between the composition of the polymer blends disclosed in D5 and that of the polymer mixtures used according to the patent in suit. These blends might also be prepared in multistage polymerization process.

(v.a.4) The blends disclosed in D5 exhibited improved environmental stress cracking resistance, impact resistance and excellent processability.

(v.a.5) These blends were useful in the fabrication of cable jacketing. The skilled person would understand the term cable jacketing as referring to the outer sheath of the cable. This was further evident from Figure I of document D6.

(v.a.6) Although D5 did not specify the shrinkage properties of the blends, it indicated that the presence of longer molecules connecting spherulites in the structure of the blends tended to reduce stress forces. It was known that the reduction of stress forces would lead to a reduced shrinkage.

(v.a.7) Consequently, D5 disclosed compositions useful for the manufacture of cable outer sheath, which exhibited good ESCR, good processability and reduced shrinkage.

(v.a.8) Thus, inventive step could only be acknowledged provided it would have been shown that the use of the compositions according to the patent suit led to unexpected properties in comparison to the blends of D5.

(v.a.9) The comparison made in Table 1 and Table 2 of the patent in suit between blends according to the patent in suit and References 1 and 2 did not provide such evidence, since the results obtained in terms of ESCR and shrinkage were to be expected in view of D5.

(v.a.10) Furthermore, it had not been shown that good shrinkage and good ESCR properties would be obtained on the entire range of Claim 1.

(v.b) By the Respondent:

(v.b.1) Materials for outer sheath of power or communication cables had to meet severe requirements in terms of surface finish, ESCR, shrinkage and processability. It was the aim of the patent in suit to provide compositions meeting all these requirements.

(v.b.2) None of the compositions disclosed in the examples of D5 fell under the scope of Claim 1 of the main request.

(v.b.3) While the compositions of D5 were generally said to have improved ESCR, the ESCR value disclosed in Example 1 of D5 (cf. Table 1) was much lower (i.e. 288 hours) than those obtained by the compositions according to the patent in suit (2000 hours).

(v.b.4) D5 related neither to the problem of surface finish nor to the problem of shrinkage.

(v.b.5) The relationship made by the Appellant between the presence of longer molecules in the internal structure of the blend of D5 and a reduced shrinkage was not correct. On the contrary, the long molecules present in the internal structure of the blends of D5 would be stretched during extrusion and would lead to an increased shrinkage of the extruded sheath when they returned to coils.

XVI. The Appellant, Opponent I and Opponent III requested that the decision under appeal be set aside and that the European patent No. 837905 be revoked.

The Respondent requested that the appeal be dismissed and that the patent be maintained on the basis of the main request filed at the oral proceedings consisting of a manuscript amended Claim 1 and Claims 2 to 8 of the main request submitted with the letter dated June 29, 2004 or, in the alternative, on the basis of the 1<sup>st</sup> to 11<sup>th</sup> auxiliary requests submitted at the oral proceedings.

## **Reasons for the Decision**

1. The appeal is admissible.

### *Main request*

2. *Article 123(2) EPC:*

2.1 It is noted by the Board that an objection under Article 100(c) EPC has neither been raised against the granted patent by the Opponents, nor dealt with in the appealed decision.

2.2 This has as a consequence that the assessment of the allowability of Claim 1 under Article 123(2) EPC must be limited to that of the amendments made during the opposition and/or opposition appeal proceedings (G 10/91 OJ EPO, 1993, 420).

2.3 In that respect Claim 1 differs from granted Claims 11 and 12 read in combination with granted Claim 1 to which they refer

(a) in that the composition consists of a bimodal olefin polymer mixture obtained by polymerisation of at least one  $\alpha$ -olefin in two stages,

(b) in that the olefin mixture is a mixture of two olefin polymers,

(c) in that the density and the melt flow rate of the first olefin polymer are 0.930-0.975 g/cm<sup>3</sup> and 50-2000 g/10 min, respectively; and

(d) in that the density and the melt flow rate of the second olefin polymer are 0.88-0.93 g/cm<sup>3</sup> and 0.01-0.8g/10 min, respectively.

2.4 While features (a) and (b) are supported by lines 12 to 21 on page 7 of the published application (i.e. WO-A-97/03124), features (c) and (d) find their support in lines 2 to 7, and 22 to 32 of page 7 thereof.

2.5 Claims 2 to 8 result from the reformulation into use claims of granted Claims 3, and 5 to 10.

2.6 Thus, no objection under Article 123(2) EPC arises in respect of Claims 1 to 8 of the main request.

3. *Article 123(3) EPC*

The amendments carried out in Claim 1 further specify the olefin polymer mixture used as cable sheathing composition. They cannot therefore extend the scope of protection with respect to granted independent Claims 11 and 12, so that Article 123(3) EPC is also complied with.

4. *Reformatio in peius*

4.1 The Appellant has argued that the scope of Claim 1 of the main request is broader than the scope of Claim 1 of the set of claims on the basis of which the Opposition Division decided to maintain the patent in amended form, and that, consequently, it would be put in a worse position than if it had not appealed.

4.2 In that respect, it has submitted that Claim 1 as interpreted in the light of the description of the patent in suit, i.e. paragraph [025] now covered the possibility for the first olefin polymer to have a density of 0.88-0.93 g/cm<sup>3</sup> and a melt flow rate of 0.01-0.8 g/10 min. In its opinion this alternative which was covered by Claim 1 as granted in view of the alternative (b) in that claim, has been deleted from Claim 1 as maintained by the Opposition Division as can be deduced from the first paragraph of page 4 of the decision of the Opposition Division.

4.3 In the Board's view these arguments cannot be accepted for the following reasons:

- 4.3.1 As submitted in the communication of the Board annexed to the Summons to Oral Proceedings, and as agreed by all the Parties at the oral proceedings of 30 June 2004, Claim 1 of the set of claims allowed by the Opposition Division was considered as contravening Article 123(2) EPC as a direct consequence of an inadmissible amendment held allowable by the Opposition Division (i.e. the combination of the features that the composition is multimodal with the characteristics in terms of density and melt flow rate of the first and second olefin polymers).
- 4.3.2 Claim 1 like Claim 1 of the set of claims allowed by the Opposition Division refers to a mixture of a first olefin polymer having a density of 0.930-0.975 g/cm<sup>3</sup> and a melt flow rate of 50-2000 g/10 min, and a second olefin polymer having a density of 0.88-0.93 g/cm<sup>3</sup> and a melt flow rate of 0.01-0.8 g/10 min.
- 4.3.3 While, as stated in Article 69(1) EPC, the description shall be used to interpret the respective Claims 1 in order to determine their respective scope of protection, checking whether the scope of protection given by Claim 1 is broader than that given by Claim 1 allowed by the Opposition Division, however, presupposes that the description is interpreted in the same manner for the respective claims.
- 4.3.4 In that respect, it is evident in view of paragraphs [0019] and [0025] (referred to by the Appellant) of the patent in suit, which unambiguously mention that the polymerization stages might be reversed, that the so called first polymer might have the properties of the so called second polymer. This implies that the terms



"first" and "second" must be regarded as mere labels used for distinguishing the components of the polymer mixture and that no limitation based on a chronological interpretation of these terms can be inferred from their use in Claim 1 of both the main request and the set of claims allowed by the Opposition Division.

4.3.5 In this connection, it is further evident that granted Claim 1 merely required that **one** polymer having either the characteristics (a) or the characteristics (b) (cf. Section XV (i.b.1) above) should be present in the multimodal olefin composition, so that the amendment carried out in Claim 1 allowed by the Opposition Division, aimed to restrict the scope of this claim in comparison to that of granted Claim 1 **only** by requiring that at least **two** olefin polymers having specific properties in terms of density and melt flow rates and labelled as first and second polymer should be present in the multimodal olefin composition, but, in no case and contrary to the statement in the second paragraph of page 4 of the decision the Opposition Division, by excluding the possibility for the "first" polymer of having the characteristics (b) set out in granted Claim 1.

4.3.6 Since, furthermore, Claim 1 of the main request differs from Claim 1 allowed by the Opposition Division, in that the composition has been restricted to a bimodal olefin polymer mixture of two olefin polymers obtained by polymerisation of at least one  $\alpha$ -olefin in two stages, this inevitably results in a limitation of scope vis-à-vis that of Claim 1 allowed by the Opposition Division.

4.3.7 Consequently, the removal of the inadmissible amendment introduced during the opposition procedure has been compensated by introducing features which limit the scope of the patent as maintained. It thus follows that Claim 1 is in accordance with the provisions set out in decision G 1/99 (cf. Order, first alternative).

5. *Article 84 EPC*

5.1 No objections under Article 84 EPC have been raised by the Appellant and Opponents against Claims 1 to 8 of the main request.

5.2 The Board is also satisfied that the requirements of Article 84 EPC are met by all the Claims 1 to 8.

6. *Article 83 EPC*

6.1 In the written appeal procedure, the Appellant has challenged the sufficiency of disclosure of the patent in suit on the grounds that it does not provide sufficient information as how to calculate the melt flow rate of the polymer prepared in the second stage of the polymerization, which, in view of the amendments made in the Claim 1, is now an essential feature of the invention. In that respect, it further submitted documents D13, D14 and D15 in order to show that different calculations might be used and that they would lead to different results in that respect (cf. D16).

6.2 In response to this allegation, the Respondent has submitted with its letter dated 25 June 2004 documents, D22 and D23 in order to show that the skilled person

would know which calculation method should be used in order to calculate the melt flow rate of the polymer prepared in the second step of the polymerization process.

- 6.3 Since, during the oral proceedings, the Appellant has made a declaration according to which it believes that document D22 is the basis on which the melt flow rate of the polymer in the second stage is calculated for the patent in suit, and since it has withdrawn its objections under Article 83 EPC on that respect, the Board sees no reason to doubt, in the absence of any evidence of the contrary, that the skilled person would know which method should be used for the calculation of the melt flow rate of the polymer in the second stage (e.g. the method disclosed in D22), or, therefore, further to pursue this objection on its own motion in the framework of Article 102(3) EPC.
- 6.4 Since an objection under Article 100(b) EPC has neither been raised against the granted patent by the Opponents, nor dealt with in the appealed decision, the requirements of Article 83 EPC must therefore be regarded as met.

## 7. *Novelty*

- 7.1 In the course of the appeal procedure lack of novelty of the subject-matter of the claims then on file has been alleged by the Appellant only in view of documents D1 and D18 (cf. Statement of Grounds of Appeal filed on 10 July 2002 and letter dated 10 May 2004).

- 7.2 D1 generally relates to a process for the in situ blending of ethylene polymers, said process comprising continuously contacting, under polymerization conditions, a mixture of ethylene and at least one alpha-olefin having at least 3 carbon atoms with a catalyst in at least two fluidized bed reactors connected in series (page 3, lines 39 to 42).
- 7.3 According to D1, the polymerization conditions are such that an ethylene copolymer having a high flow rate in the range from 0.1 to 1000 g/10 min is formed in at least one reactor and an ethylene copolymer having a low melt flow rate in the range from 0.001 to 1.0 g/10 min is formed in at least one other reactor, each copolymer having a density of 0.860 to 0.965 gram/cm<sup>3</sup> and a melt flow ratio in the range from 20 to 70 (Claim 1).
- 7.4 It thus appears that document D1 requires neither that the final composition should exhibit a specific melt index and a specific density, nor that the copolymers obtained in the different stages of the process should exhibit different densities.
- 7.5 While it is true that document D1 discloses in specific examples (page 6, lines 47 to 58; Examples 2 and 3) compositions which would meet all the requirements set out in Claim 1 in terms of melt flow rates, densities, and amount of polymers, it is however evident that D1 does not mention the use of these specific compositions as outer sheath for a power cable or a communication cable.

7.6 This conclusion cannot be altered by the statement in D1 (cf. page 3, lines 3 to 7), that linear low density polyethylene (LLDPE) might be used, *inter alia*, in wire and cable applications, since this does not imply that the compositions of D1 would be inevitably be used in wire or cable applications, let alone as outer sheath for a power or a communication cable. On the contrary, this passage, in the Board's view, is to be considered as a mere listing of applications previously known in the art for LLDPE compositions. The fact that document D1 is not concerned at all with wire or cable applications is further confirmed by lines 15 to 37 on page 3 of D1, which clearly disclose that the aim of D1 is to provide ethylene copolymers compositions able to overcome problems arising in the manufacture of films of LLDPE compositions.

7.7 Consequently, D1 does not contain a clear and unmistakable disclosure of the subject-matter of Claim 1. It cannot deprive the subject-matter of this claim of novelty (cf. also decision T 450/89 of 15 October 1991, not published in OJ EPO; Reasons, point 3.11).

7.8 Document D18 is an international application under the PCT which has been published on the 20 June 1996, i.e. before the filing date of the patent in suit (3 July 1996) but after the claimed priority date thereof (10 July 1995). It would thus belong to the prior art under Article 54(1) and (2) EPC if the patent in suit is not entitled to the priority of document D17, or to the prior art according to Article 54(3) and (4) EPC if the priority is valid and if the requirements of Article 158(2) EPC are met.

7.8.1 As stated in the decision G 2/98, the requirement for claiming priority of "the same invention", referred to in Article 87(1) EPC, means that priority of a previous application in respect of a claim in a European patent application in accordance with Article 88 EPC is to be acknowledged only if the skilled person can derive the subject-matter of the claim directly and unambiguously, using common general knowledge, from the previous application as a whole.

7.8.2 In this context, it is clear that all the features of Claim 1 can be found in document D17 in view of independent Claims 12 and 13 in combination with Claim 1 to which they refer, and of the following passages of the description:

page 6, line 33 to page 7, line 14;

page 5, lines 13 to 23; and

page 5, line 32 to page 6, line 17.

7.8.3 While it is generally not permissible to combine separate items belonging to different embodiments described in one document simply because they are disclosed in that one document unless such combination has been suggested there, it is evident in the present case that such a combination is suggested to the skilled person, since these passages are linked to each other by the preferred embodiment relating to a mixture of two polymers as a cable sheathing composition.

7.8.4 The argument of the Appellant, Opponent I and Opponent III, that D17 contained no counterpart to paragraph [025] in the patent in suit (Section XV.(iii.a.5), above) is irrelevant since this paragraph merely

- reiterates in the form of an illustration the consequence of the rule of interchangeability of the labels developed in paragraphs [019], [023] and [024].
- 7.8.5 The further argument of the Appellant, Opponent I and Opponent III that the passage in D17 at page 5, line 35 to page 6, line 15 required a combination with very specific process features (Section XV.(iii.a.4), above) cannot succeed since it is clear from the introductory phrase "it is most preferable that" that the features referred to are a sub-embodiment of the preferred bimodal polymer mixture with which the whole paragraph is generally confronted and not limiting on it.
- 7.8.6 The Board comes therefore to the conclusion that the subject-matter of Claim 1 of the main request can be derived clearly and unambiguously from D17 as a whole.
- 7.8.7 The same is true for the subject-matter of Claims 2 to 8 which are clearly based on Claims 2, 5, 6, 7, 8, 10, and 11 of D17 respectively.
- 7.8.8 It thus follows that Claims 1 to 8 are entitled to claim the priority of document D17.
- 7.8.9 Since, as appears from the European Patent Register, the national fees mentioned in Article 158(2) EPC have been paid on 1 July 1997, document D18 belongs to the state of the art according to Article 54(3) and (4) EPC.
- 7.9 D18 relates to a polyethylene composition, which contains 85-99 percent by weight of a component (A) having a bimodal molecular weight distribution and a component (B) having a unimodal molecular weight

distribution. Component (B) is a linear ethylene polymer having molecular weight between 150,000-600,000, a molecular weight distribution between 3.5-9.5, a melt index  $MFR_{21}$  between 0.5-10 and a density controlled within the range of 910-960 g/cm<sup>3</sup>, and the amount of component (B) calculated from the end product is between 1-15 percent by weight (page 3, lines 16 to 22).

7.10 The bimodal component of the polyethylene composition has a density of 940-955 g/cm<sup>3</sup> and a melt flow rate of 0.03-0.6 g/10 min. It is formed of a low molecular weight fraction having preferably a molecular weight of 5000-50,000, a molecular weight distribution  $M_w/M_n$  of 2.5-9 and melt flow rate between 10-1000 g/10 min and a density between 950-980 g/cm<sup>3</sup>. Most preferably this component has relatively high density, preferably 950-980 g/cm<sup>3</sup> and high melt flow rate  $MFR_{21}$ , preferably 150-500. The proportion of this fraction from the whole bimodal component is preferably 40-60%. The another fraction of the bimodal component comprises a fraction having a calculated molecular weight  $M_w$  of 300,000-900,000 and a molecular weight distribution of 4.5-12. The proportion of this fraction of the whole bimodal component is preferably 60-40% (page 3, line 24 to page 4, line 8).

7.11 The bimodal component is prepared preferably by a two-step process, in which in the first polymerization step the low molecular weight fraction is formed and in the second step polymerization is continued in another reactor to prepare the bimodal product. It is also possible to form the high molecular weight component in the first reactor and the low molecular weight



- component in the second reactor (page 4, lines 13 to 17).
- 7.12 The other main component in the polyethylene composition is a linear ethylene polymer having a unimodal molecular weight distribution and having a molecular weight preferably between 150,000-600,000, a molecular weight distribution between 3.5-9.5 and a melt flow rate  $MFR_{21}$ , between 0.5-10. The density of the component is controlled so that it is between 910-960  $g/cm^3$  (page 4, lines 24 to 28).
- 7.13 It is therefore evident that the compositions disclosed in D18 are mixtures of at least three olefin polymers. It is further clear that D18 does not disclose the use of these compositions as outer sheath for a power cable or a communication cable, since it merely mentions that the compositions are suitable for manufacturing cable isolation materials (page 1, lines 5 to 8).
- 7.14 It thus follows, that at least for these reasons D18 cannot destroy the novelty of the subject-matter of Claims 1 to 8 of the main request.
- 7.15 Consequently, the subject-matter of Claims 1 to 8 must be regarded as novel over the cited prior art (Article 54 EPC).

*The patent in suit, the technical problem*

8. The patent in suit is concerned with the use of polyolefin based cable sheathing compositions for the manufacture of outer sheath for a power cable or a

- communication cable. Such cable sheathing compositions, are known, in particular, from documents D3 and D5.
- 8.1 Document D3 relates to a ethylene polymer blend, the polymer component of which consists essentially of (a) 40-70 parts by weight of a high molecular weight ethylene polymer having a high load melt index (HLMI) in the range of 0.1 to 1.5 g/10 min and a density in the range of 0.930 to 0.940 g/cm<sup>3</sup>, and having a heterogeneity index of <10, and (b) 60-30 parts by weight of a low molecular weight ethylene polymer having a melt index (MI) in the range of 45-300 g/10 min and a density of above 0.950 g/cm<sup>3</sup> and having a heterogeneity index of <6. The polymer blend used exhibits a melt flow rate of 0.01 to 0.6 g/10 min and a density of 0.940 to 0.965 g/cm<sup>3</sup> (Claim 1; Table I).
- 8.2 The blends are prepared by dry blending, melt blending or dry blending followed by melt blending (column 3, lines 62 to 68).
- 8.3 Although being essentially focussed on the manufacture of films, document D3 further mentions that the polymer blends might also be useful in wire coating (column 2, lines 32 to 40).
- 8.4 As indicated in D3, the blends have a good balance of stiffness and impact strength and high ESCR (column 2, lines 29 to 31) and exhibit desirable processing properties when extruded into a polyolefin film (column 2, lines 32 to 37).

- 8.5 Document D5 relates to high density ethylene polymer blends having improved impact strength and ESCR and to a Ziegler polymerization process for the preparation thereof (column 1, lines 12 to 17). In addition to improved ESCR and impact strength, these blends have excellent processability such as reduced melt viscosity at high shear. These blends are useful in the fabrication of cable jacketing (column 3, lines 7 to 11).
- 8.6 Preferred high density ethylene polymer blends according to D5 comprise at least 60 weight percent of an intermediate molecular weight ethylene polymer and from 5 to 40 weight percent of a high molecular weight, non-elastomeric ethylene/ $\alpha$ -olefin copolymer. Preferably, the blend has a melt flow rate in the range of from about 0.1 to 30 g/10 min and a density of at least 0.930 g/cm<sup>3</sup>, most preferably a density of 0.946 g/cm<sup>3</sup> to 0.964 g/cm<sup>3</sup> and a melt flow rate in the range of 1.0 to 10 g/10 min (column 3, lines 17 to 34).
- 8.7 The intermediate molecular weight ethylene polymer is an homopolymer of ethylene, or an ethylene/ $\alpha$ -olefin copolymer containing a predominant amount of polymerized ethylene and a minor amount (e.g. up to about 13 wt.%) of one or more polymerized  $\alpha$ -olefin, and mixtures thereof. Such intermediate molecular weight polymer preferably has a density in the range of from 0.945 to 0.970 g/cm<sup>3</sup> and melt flow rate in the range of 0.5 to about 500 g/10 min, especially from 0.955 to 0.970 g/cm<sup>3</sup> and from 1 to 400 g/10 min, respectively (column 3, lines 36 to 50).

- 8.8 The high molecular weight, non-elastomeric ethylene/ $\alpha$ -olefin copolymer is a thermoplastic copolymer of ethylene and one or more  $\alpha$ -olefins and mixtures of such copolymers which copolymers have a crystallinity of at least 5 percent. Preferably, the copolymer has a melt flow rate in the range of from 0.0001 to 6 g/10 min, especially from 0.003 to 1 g/10 min, and a density in the range of from 0.870 to 0.955 g/cm<sup>3</sup>, especially from 0.880 to 0.945 g/cm<sup>3</sup> (column 3, line 51 to column 4, line 1).
- 8.9 According to D5 it is critical that the melt flow rate of the intermediate molecular weight polymer be at least 5 times the melt flow rate of the high molecular weight copolymer, preferably at least 10 times (column 4, lines 19 to 22).
- 8.10 The preparation of the blends is carried out by the steps of (1) polymerizing ethylene or mixture of ethylene and  $\alpha$ -olefin comonomer in a primary polymerization zone in a solvent in the presence of a Ziegler catalyst at solution polymerization temperature under conditions such that the intermediate molecular weight polymer is provided, (2) polymerizing a monomer mixture of ethylene and  $\alpha$ -olefin in an auxiliary polymerization zone in the presence of Ziegler catalyst at solution polymerization temperature under conditions such that the high molecular weight copolymer is provided and (3) combining the polymerization products from the aforementioned polymerization zone while said products are still in the liquid state. The foregoing process can be carried out in a batchwise or continuous manner, although a continuous manner is preferred. It is further to be noted that steps (1) and (2) can be

carried out simultaneously in a parallel operation wherein polymerization is effected in two reactors operating as the primary and auxiliary polymerization zones or steps (1) and (2) can be carried out in series or sequence in forward or reverse order wherein the polymerization product of one zone is passed to a second zone by polymerizing monomer in one reactor under one set of conditions and withdrawing the polymerization mixture to a second reactor and polymerizing monomer in second zone under a separate set of conditions, during which time the polymer is maintained in solution (column 4, line 50 to column 5, line 10).

- 8.11 The object of the patent in suit, as mentioned in paragraphs [0002], [0003], and [0006], is to provide a cable sheathing composition as an outer sheath for a power cable or a communication cable, having in combination a good processability, a high surface finish, high mechanical strength, low shrinkage and higher ESCR.
- 8.12 Whilst both documents D3 and D5 disclose compositions which can be used in cable sheathing applications and which exhibit good ESCR, impact strength and processability, neither of them deals with the problem of improving the surface finish and the problem of reducing the shrinkage of these compositions.
- 8.13 The closest state of the art should normally be represented by a document which deals with the same problem. However, in the absence of such a document, the starting point for evaluating inventive step should be searched for in a document relating to a similar

technical problem, or at least to the same or a closely related technical field as the patent in suit (cf. T 989/93 of 16 April 1997, not published in OJ EPO; Reasons, point 12).

8.14 While D3 has been considered as the closest state of the art in the decision under appeal, the Appellant, at the oral proceedings, has used D5 as starting point for the assessment of inventive step.

8.15 Although, in view of the considerations in paragraphs 8.12 and 8.13, D3 and D5 could be both regarded as meeting the requirements set out in decision T 989/93 to be used as a starting point for the assessment of inventive step, the compositions disclosed in D5 come closer to those used according to the patent in suit than those disclosed in D3, in terms of density and melt flow rate of the blend and of the olefin polymer components thereof and in view of the preparation method of the blends, so that document D5 represents, in the Board's view, a more appropriate starting point than document D3.

8.16 Thus, starting from D5, the technical problem may be seen in the provision of a cable sheathing composition as an outer sheath for a power cable or a communication cable, having in combination a good processability, a high surface finish, high mechanical strength, low shrinkage and high ESCR.

8.17 The solution proposed according to Claim 1 of the patent in suit is to use a bimodal mixture of two olefin polymers obtained in a two stage polymerisation and having the specific densities and the melt flow rates set out in Claim 1.

8.18 In view of Examples 1, 2 and 3 of the patent in suit, the Board is satisfied that this claimed problem is effectively solved by the claimed measures.

9. *Inventive step*

9.1 It remains to be decided whether the claimed subject-matter was obvious to a person skilled in the art having regard to the relevant prior art.

9.2 While it is true, as submitted by the Appellant, that there is an overlap between the compositions disclosed in D5 and those according to the patent in suit in terms of density and melt flow rate of the blends and components thereof, it is noted by the Board that, as submitted by the Respondent, none of the compositions of the Examples of D5 meet the requirements set out in Claim 1 for the olefin polymer mixture.

9.3 In this context, while the compositions exemplified in D5 exhibit a good processability in view of their low melt viscosity under shear (cf. Examples 1, 2, and 3), it is noted by the Board that the only value of the ESCR of the blends disclosed in D5 (cf. Example 1) is much lower (288 hours) than that obtained by the compositions exemplified in the patent in suit (i.e. 2000 hours; cf. Examples 1, 2, 3 and 4), and that no information is available in D5 concerning the surface

finish and the shrinkage of extruded articles made from the compositions disclosed therein.

- 9.4 This latter point has been challenged by the Appellant who has argued that it is implicit that the blends of D5 would have a low shrinkage in view of the presence of longer molecules connecting spherulites in their internal structure.
- 9.4.1 In that respect, the Board firstly notes that D5 itself makes no correlation between shrinkage and the presence of these longer molecules, but that it only believes that their presence causes the good impact strength and the good ESCR of the composition (cf. column 2, line 59 to column 3, line 6).
- 9.4.2 Secondly, the allegation of the Appellant that the presence of these longer molecules would lead to reduced shrinkage due to lower stress forces, has been contested by the Respondent, who has submitted that, on the contrary, these longer molecules, having been stretched during extrusion, would lead to an increased shrinkage of the extruded sheath when they returned to coils.
- 9.4.3 Since the Parties have made contrary submissions, and since the Board is unable to establish this fact on its own motion, the Board can only consider that no conclusive indication can be deduced from D5 concerning either a positive or a negative influence of the presence of these longer chains on the shrinkage of extruded articles.



9.5 The lack of information in D5 concerning the shrinkage and surface finish properties of the blends disclosed therein cannot be compensated by the further argument of the Appellant, that the compositions of Comparative Examples Reference 1 and Reference 2 of the patent in suit should be considered as representative of the properties of the compositions of D5 in terms of surface finish, shrinkage, as well as processability and mechanical properties,

(i) firstly, since this argument would be based on knowledge which has been derived from the patent in suit (hindsight) and which is not derivable from the general disclosure of D5 or its actual examples;

(ii) secondly, since the composition of Reference 1 does not fall under the scope of D5, because this composition is a unimodal composition (cf. paragraph [034]); and, thirdly,

(iii) since the composition of Reference 2 does not either fall under the scope of D5, since it neither comprises an ethylene copolymer as required by D5, nor meets the requirements set out in D5 (cf. paragraph 8.10 above) in terms of ratio of the melt flow rates of the two olefin polymer components (cf. paragraph [0048]).

9.6 It thus follows from the above, that no indication can be found in document D5 concerning the reduction of shrinkage and the obtaining of good surface finish in combination with a further improvement of the ESCR and the maintenance of a good processability.

- 9.7 Consequently, even if one would consider that the expression "cable jacketing" used in D5 would refer to the manufacture of the outer sheath of a cable, D5 itself cannot provide a hint to the solution of the technical problem.
- 9.8 In the course of the appeal procedure, the Appellant has further relied on documents D1, D3, D18, D20, and D21 in support of its objection of lack of inventive step.
- 9.9 As indicated above in paragraph 8.4, document D3 is more focussed on the production of films. Even if one would consider that D3 is also concerned with the manufacture of the outer sheath of cable, since it mentions the use of the blends in wire coating application, it is evident, on the one hand, that D3 is not interested at all with the problem of good surface finish, since it accepts that the blends have a high content of fish eyes (cf. column 24, lines 18 to 22), and, on the other hand, that D3 is totally silent on the problem of shrinkage reduction.
- 9.10 Thus, at least for these reasons, D3 cannot offer to the skilled person a hint to the solution of the technical problem.
- 9.11 In the Board's view, the skilled person would have no hint to search for a solution to the technical problem in D1, since D1, as indicated above in paragraph 7.6 above, is not concerned with the manufacture of outer sheath for power or communication cables.

- 9.12 Furthermore, even if the skilled person would have considered D1, this document would have been of no help for solving the technical problem, since it contains no indication on the shrinkage and on the ESCR of the compositions disclosed therein.
- 9.13 D18 and D21 cannot be taken into consideration, since they have been published after the priority date of the patent in suit. Document D20 is even less relevant than documents D5, D3 and D1, since, although dealing with the problem of shrinkage in cable jacketing material, it merely refers to a polyethylene compound without giving any information on its composition, and since it is concerned neither with the problem of ESCR nor with the problem of surface finish of cable sheathing compositions.
- 9.14 Consequently, the subject-matter of Claim 1, and by the same token that of dependent Claims 2 to 8 involves an inventive step (Article 56 EPC).
- 9.15 It thus follows that the main request of the Respondent is allowable.

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the first instance, with the order to maintain the patent on the basis of the main request filed at the oral proceedings consisting of a manuscript amended Claim 1 and Claims 2 to 8 of the main request as submitted with the letter dated June 29, 2004.

The Registrar:

The Chairman:

E. Görgmaier

R. Young