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Datasheet for the decision of 20 May 2008

Case Number: T 0379/05 - 3.3.09

Application Number: 93119235.5

Publication Number: 0600425

IPC: B32B 27/32

Language of the proceedings: EN

Title of invention:
Heat shrinkable films containing single site catalyzed copolymers having long chain branching

Patentee:
Cryovac, Inc.

Opponents:
OI: Behnisch, Werner, Dr.
OII: THE DOW CHEMICAL COMPANY
OIII: Pechiney Plastic Packaging, Inc

Relevant legal provisions:
RPBA Art. 12(2), 13(1)
Relevant legal provisions (EPC 1973):
Art. 54, 56, 83, 84, 123(2)

Keyword:
"Main Request: admissibility - no"
"Auxiliary Request 1: requirements of Article 123(2) - fulfilled;
requirements of Article 84 - fulfilled;
requirements of Article 83 - fulfilled;
novelty - yes;
inventive step - yes"

D E C I S I O N
of the Technical Board of Appeal 3.3.09
of 20 May 2008

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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 3 January 2005 revoking European patent No. 0600425 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: P. Kitzmantel
Members: N. Perakis
W. Sekretaruk

Summary of Facts and Submissions

I. Mention of the grant of European patent No 0 600 425 in respect of European patent application No 93119235.5 in the name of Cryovac Inc, which had been filed in the name of W.R. Grace & Co. on 29 November 1993 claiming an US priority of 20 September 1993 (US 124179), was announced on 8 March 2000 (Bulletin 2000/10). The patent, entitled "Heat shrinkable films containing single site catalyzed copolymers having long chain branching", was granted with sixty-three claims. Independent product Claims 1, 6, 10, 16, 25, 27, 28, 32 and 37 read as follows:

"1. A heat-shrinkable, impact-resistant multilayer film suitable for packaging comprising a homogeneous single site catalyzed copolymer of ethylene and an alpha-olefin having from three to ten carbon atoms, said single site catalyzed copolymer having long chain branching and a density of from about 0.86 g/cc to about 0.95 g/cc."

"6. A heat-shrinkable, impact-resistant multilayer film comprising at least one inner core layer comprising a homogeneous single site catalyzed copolymer of ethylene and an alpha-olefin having from four to ten carbon atoms and having long chain branching, said copolymer having a density of from about 0.89 g/cc to about 0.91 g/cc."

"10. A heat-shrinkable, impact-resistant multilayer film comprising at least two core layers, each of said core layers comprising a homogeneous single site catalyzed copolymer of ethylene and an alpha-olefin having from four to ten carbon atoms and having long chain branching, said copolymer having a density of from about 0.89 g/cc to about 0.91 g/cc."

"16. A heat-shrinkable, impact-resistant multilayer film having the general structure:
seal/core/barrier/core/abuse
wherein each of the core layers comprises the same homogeneous long chain branched single-site catalyzed copolymer of ethylene and an alpha-olefin having from four to ten carbon atoms, said copolymer having a density of from about 0.89 g/cc to about 0.91 g/cc."

"25. A heat-shrinkable, impact-resistant multilayer film comprising:
a) a seal layer;
b) a first core layer comprising a homogeneous, long chain branched ethylene alpha-olefin copolymer having a density of from 0.89 g/cc to about 0.91 g/cc;
c) a barrier layer;
d) a second core layer comprising a homogeneous, long chain branched ethylene alpha-olefin copolymer having a density of from 0.89 g/cc to about 0.91 g/cc; and

e) an abuse layer;
wherein the homogeneous, branched ethylene alpha-olefin of the first core layer differs from that of the second core layer."

"27. A heat-shrinkable, impact-resistant multilayer film comprising:
a) a sealing layer comprising a homogeneous, single site catalyzed copolymer of ethylene and an alpha-olefin with four to ten carbon atoms, said copolymer having long chain branching and a density of from about 0.89 g/cc to about 0.91 g/cc.
b) a barrier layer; and
c) an abuse layer comprising a homogeneous single site catalyzed copolymer of ethylene and alpha-olefin with four to ten carbon atoms, said copolymer having long chain branching and a density of from 0.89 g/cc to about 0.91 g/cc."

"28. A heat-shrinkable, impact-resistant multilayer film, having the general structure:
seal/core/barrier/core/abuse
wherein each of the two core layers comprises the same homogeneous copolymer of ethylene and octene having an I_{10}/I_2 greater than or equal to 5.63 and a Mw/Mn less than or equal to (I_{10}/I_2)-4.63, said copolymer having a density of from about 0.89 g/cc to about 0.91 g/cc."

"32. A heat-shrinkable, impact-resistant multilayer film comprising:
a) a sealing layer;
b) a first core layer comprising homogeneous ethylene octene copolymer having an I_{10}/I_2 greater than or equal to 5.63 and a Mw/Mn less than or equal to (I_{10}/I_2)-4.63 and having a density of from 0.89 g/cc to about 0.91 g/cc.
c) a barrier layer;
d) a second core layer comprising a homogeneous ethylene octene copolymer having an I_{10}/I_2 greater than or equal to 5.63 and a Mw/Mn less than or equal to (I_{10}/I_2)-4.63 and having a density of from 0.89 g/cc to about 0.91 g/cc; and
e) an abuse layer."

"37. A heat-shrinkable, impact-resistant multilayer film having the general structure:
seal/core/abuse
wherein the core layer comprises a homogeneous long chain branched single site catalyzed copolymer of ethylene and an alpha-olefin having from four to ten carbon atoms, said copolymer having a density of from about 0.89 g/cc to about 0.91 g/cc."

Claims 2-5, 7-9, 11-15, 17-24, 26, 29-31, 33-36, 38-63 were dependent, directly or indirectly, on one of the independent Claims.

II. A first Notice of Opposition was filed against the patent by Dr Werner Behnisch on 20 November 2000. Opponent I requested the revocation of the patent in its entirety, relying on Article 100(a) EPC (lack of novelty and lack of inventive step of the claimed subject-matter).

III. A second Notice of Opposition was filed against the patent by The Dow Chemical Company on 8 December 2000. Opponent II requested the revocation of the patent in its entirety, relying on Article 100(a) EPC (lack of novelty and lack of inventive step of the claimed subject-matter).

IV. A third Notice of Opposition was filed against the patent by Pechiney Plastic Packaging Inc. on 8 December 2000. Opponent III requested the revocation of the patent in its entirety, relying on Article 100(a) EPC (lack of novelty and lack of inventive step of the claimed subject-matter), 100(b) EPC (the opposed patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art) and 100(c) EPC (the subject-matter of the opposed patent extended beyond the content of the application as filed).

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

D1 : WO-A-94/09060
D2 : WO-A-93/08221
D5 : US-A-4 820 557
D6 : US-A-4 837 084
D12: WO-A-94/25523
D15: Plastic Focus, 13 September 1993, 25(18)
D17: B.A.Story *et al*, "The New Family of Polyolefins from Insite* Technology", MetCon'93, Houston, 1993, 26-28 May, pp 113-123
D20: WO-A-95/00333
D23: G.D.Schwank, "Selected Applications for Constrained Geometry Catalyst Technology(CGCT) Polymers", SPO'92, 23 September 1992, pp 1-22
D24: K.W.Swogger, "The Material Properties of Polymers Made From Constrained Geometry Catalysts", 22 September 1992
D25: "Dow Claims Big Advantage in New Polyolefin Catalysts", Chemical Marketing Reporter, 5 October 1992, pp 3, 20

VI. By its decision announced orally at the oral proceedings of 8 December 2004 and issued in writing on 3 January 2005 the Opposition Division revoked the patent.

VII. The Opposition Division held in the appealed decision that:

- the subject—matter of Claim 1 of the Main Request (*Set C*, filed on 8 November 2004 and amended at the oral proceedings before the Opposition Division) lacked novelty under Article 54(3) EPC over D1 for all contracting states except LI. This conclusion was

justified by a combination of the disclosure in several passages of D1, which was said to be possible as long as there was no reason to prevent the skilled person from making such combinations.

- Auxiliary request 1 (*Set E,* filed on 8 November 2004 and amended at the oral proceedings before the Opposition Division) was not allowable under Articles 123(2) and 84 EPC.
- the subject-matter of Claim 1 of Auxiliary Request 2 (*Set M,* filed at the oral proceedings before the Opposition Division), which required the presence of at least two core layers, also lacked novelty over D1, whose disclosure encompassed multilayer structures having several layers made from a substantially linear ethylene copolymer, because the qualification "core layer" could not distinguish a layer from an "intermediate" or "inner layer", all made of the same material.

Claim 1 of each of these requests reads as follows:

Main Request (*Set C, as amended*)

"1. A heat-shrinkable, impact-resistant multilayer film comprising at least one core layer comprising a homogeneous single site catalyzed copolymer of ethylene and an alpha-olefin having from four to ten carbon atoms and having long chain branching, said copolymer having a density of from about 0.89 g/cc to about 0.91 g/cc, which film has been formed by an extrusion process followed by cooling the film to a solid state, reheating the film to its softening point, stretching the film in the longitudinal and transverse directions, and quickly cooling the film while retaining its stretched dimensions to set the film in the oriented molecular configuration."

Auxiliary Request 1 (*Set E, as amended*)

"1. A heat-shrinkable, impact-resistant multilayer film comprising at least one inner core layer comprising a homogeneous single site catalyzed copolymer of ethylene and an alpha-olefin having from four to ten carbon atoms and having long chain branching, said copolymer having a density of from about 0.89 g/cc to about 0.91 g/cc, which film has been formed by an extrusion process followed by cooling the film to a solid state, reheating the film to its softening point,
stretching the film in the transverse and longitudinal directions, and quickly cooling the film while substantially retaining its stretched dimensions to set the film in the oriented molecular configuration, said film having an instrumented peak value of 22 to 44 kg (49 to 98 pounds)."

Auxiliary Request 2 (*Set M*)

"1. A heat-shrinkable, impact-resistant multilayer film comprising at least two core layers, each of said core layers comprising a homogeneous single site catalyzed copolymer of ethylene and an alpha-olefin having from four to ten carbon atoms and having long chain branching, said copolymer having a density of from about 0.89 g/cc to about 0.91 g/cc, which film has been formed by an extrusion process followed by cooling the film to a solid state, reheating the film to its softening point, stretching the film in the longitudinal and transverse directions, and quickly cooling the film while retaining its stretched dimensions to set the film in the oriented molecular configuration."

VIII. On 14 March 2005 the Patent Proprietor (Appellant) lodged an appeal against the decision of the Opposition Division and paid the appeal fee on the same day.

With the Statement setting out the Grounds of Appeal filed on 6 May 2005, the Appellant maintained the rejected requests, i.e. amended *Set C* (Main Request), *amended Set E* (Auxiliary Request 1), *Set M* (Auxiliary Request 2) and submitted a further set of claims as Auxiliary Request 3, which corresponded to the Main Request as far as the claimed subject-matter was concerned but with the effect limited to the contracting state LI.

The Appellant argued that the subject-matter of all these requests not only satisfied the formal requirements of the EPC but was also novel over D1. Therefore it requested that the decision of the Opposition Division be set aside and the case be remitted to that Division for further examination.

IX. With letters dated 18 January 2006 and 18 April 2008, Respondent I (Opponent I) raised novelty objections on the basis of D1 as well as inventive step objections on the basis of D2 or its combinations with D5, D6 or D15, respectively, and on the basis of the combination of D6 with D15. It also argued that the introduction of product-by-process features was inadmissible because of procedural reasons and because they led to clarity problems.

X. With letters dated 23 September 2005, 25 November 2005 and 18 April 2008 Respondent II (Opponent II) maintained its objections, already raised before the Opposition Division, under Articles 123(2), 83, 84, 54 and 56 EPC.

With regard to Article 123(2) EPC it argued that the product-by-process features were not disclosed in combination with the other claimed features, that according to the original disclosure an irradiation step – not part of the currently claimed subject-matter - was obligatory, that

there was no support for a multilayer film having a single softening point and that the definition of the multilayer film should also comprise features related to the number, thickness and constitution of the layers.

Concerning Article 84 EPC it argued that a common softening point of the layers of a multilayer film was unrealistic. This was also a problem in relation to Article 83 EPC which was, furthermore, addressed in relation to information which was missing in the specification, thus rendering the claimed subject-matter unworkable.

Novelty was contested under Article 54(3) EPC in view of the disclosure of documents D1, D12 and D20.

Inventive step was contested on the basis of the combination of D6, considered as the closest state of the art, with one of D2, D15, D17, D23, D24 and D25. Respondent II argued that since a consistent improvement of any of the desired properties was not established by the experimental results reported in the specification, an inventive step could not be acknowledged. Thus replacing the VLDPE (very low density linear polyethylene) copolymer in the 4-layer shrinkable films of Examples 8 and 9 of D6 by a substantially linear ethylene copolymer comprising long-chain branching (SLEP) known from one of D2, D15, D17, D23, D24 and D25 was an obvious alternative.

XI. With a letter dated 20 September 2005, Respondent III (Opponent III) briefly argued that the decision under appeal should be upheld for the reasons given by the Opposition Division.

XII. With a communication dated 20 March 2008 the Board informed the parties of its intention to discuss all raised issues at the arranged oral proceedings and to take a final decision at those oral proceedings. The Board did not consider it appropriate to remit the case to the department of first instance for the examination of inventive step, since according to the minutes of the oral proceedings held before the Opposition Division that issue had been extensively discussed during these proceedings.

XIII. With a letter dated 18 April 2008, the Appellant withdrew the previous Main Request and Auxiliary Requests 1 and 3 and submitted a new Main Request (*Set L*), a new Auxiliary Request 2 (*Set N*) and a new Auxiliary Request 3 (*Set O*); previous *Set M* was maintained as Auxiliary Request 1.

This decision – in view of its outcome - only covers the Main Request and Auxiliary Request 1 (see the Grounds for the Decision, below). The twenty-six Claims of the Main Request correspond to the following granted Claims:

Independent Claims 1, 7, 16, 18 and 22 of the Main Request correspond to independent Claims 10, 16, 25, 28 and 32 of the granted Claims, respectively.

Dependent Claims 2-6, 8-15, 17, 19-21 and 23-26 of the Main Request correspond to dependent Claims 11-15, 17-24, 26, 29-31 and 33-36 of the granted Claims, respectively.

The Appellant argued that the newly submitted requests fulfilled the requirements of Articles 123(2) and (3), 83 and 84 EPC. It also argued that the claimed subject-matter of all these requests was novel over the disclosures of D12 and D20. Finally it argued that the claimed subject-matter was non-obvious over combinations of D5 with D2 as well as D6 with D15 or D2.

XIV. On 20 May 2008 oral proceedings were held before the Board in the absence of Respondent III, who had announced with a letter dated 23 April 2008 that it did not intend to attend them.

XV. The arguments put forward by the Appellant in its written submissions and at the oral proceedings can be summarized as follows:

Concerning the Main Request:
Admissibility

- The new Main Request (*Set L*) was not late-filed because it was submitted in reaction to the communication of the Board, in which it was stated that it was the intention of the Board to have all raised issues discussed and to come to a final decision at the oral proceedings without remittal of the case to the department of first instance.

Concerning Auxiliary Request 1:
Article 123(2) EPC

- The term "impact-resistant" found support in the original disclosure as this property was mentioned in the general description. The claim did not quantify this property and thus did not comprise added subject-matter.
- The process features found support in the application as filed. Despite the fact that other words were used, their meaning was nevertheless the same.
- Consequently the expression "it (the film) is initially cooled to a solid state" was equivalent to the expression "followed by cooling the film to a solid state", since the skilled person would readily understand that it was the extruded film that was cooled down.
- The expression "the material is heated to its softening temperature" had the same meaning as the expression "reheating the film to its softening point", since the skilled person would unambiguously understand that with the term "point" the "temperature" was meant.
- The expression "the film is quickly quenched" was interchangeable with the term "quickly cooling the film".

Article 84 EPC

- A skilled person would readily understand that the process features of the independent claims related to solid state orientation, *ie* orientation at a temperature at which one or more film components were not in the molten state. The softening point of a multilayer film was the temperature at which significant components remained at a temperature below their crystalline melting point but one high enough to permit the mechanical action of stretching of the (composite) film. Thus it was the overall stretching performance of the film that determined its softening temperature. Therefore the requirements of Article 84 EPC were met.
- The expression "quickly cooled" was also clear to the person skilled in the art.

Article 83 EPC

- The skilled person would be aware that the softening temperature of a film related to the solid state stretching conditions of the film in the longitudinal and transverse directions and would be in no doubt as to how to achieve this feature in practice (see D1, D5, D6, D20).
- Density was a fundamental parameter which any skilled person could determine without difficulty. The Respondents did not submit evidence to show that different values were obtained when using different methods for determining density.

Novelty D1

- The claimed subject-matter, which required the presence of at least two core SLEP (substantially linear ethylene-1-octene copolymer) layers in the multilayer film, was novel over D1, which did not directly and unambiguously disclose two SLEP containing core layers in combination with the other features of the claimed multilayer film.
- First of all, the entire document D1 emphasized the use of the particular copolymer in the surface layer.
- Therefore even if the specific passage on page 24, lines 14-17 of D1 was interpreted, in view of the wording "and/or", to comprise two SLEP layers, only one of them could be a core layer because the other one had to be a surface layer functioning as inner sealant layer of the multilayer film. Furthermore not any inner layer was to be understood as a core layer, since this term implied a certain minimum thickness not necessarily met by any intermediate, non-surface layer (see examples of the patent in suit).
- Moreover, even if it was admitted that SLEP was also comprised in an intermediate layer, the fact that D1 employed two different terms, namely core and intermediate, to designate two inner layers, made it clear that the intermediate layer should not be confused with a core layer. Thus D1 did not directly and

unambiguously disclose a film which comprised two core layers comprising SLEP.

- Furthermore, to arrive at the currently claimed SLEP density of from about 0.89 to about 0.91 g/cc a selection from D1´s preferred density range of 0.88 g/cc to 0.92 g/cc was necessary.
- Finally, other features would also have to be selected from the various alternatives disclosed in D1, namely that the film was shrinkable, multilayered, solid state oriented, and all these selected alternatives would have to be combined in order to arrive at the claimed subject-matter.

Inventive step

- Document D6 was the closest state of the art.
- Two differences distinguished the claimed film from that disclosed in D6. Firstly, SLEP was used instead of VLDPE and secondly at least two core layers were used in the film structure instead of one.
- The use of SLEP in the outer layer led to problems, since it tended to stick when exposed to the conditions of high orientation speed.
- The use of high orientation temperatures was also unacceptable because the film would have to be reheated to higher temperatures in order to be provided with the desired shrinkage effect.
- Thus the problem to be solved was to provide a film which contained SLEP and could be processed at a high orientation speed, a property emphasized in the patent in suit (paragraph [054], lines 14-15).
- The solution to that problem was provided by the use of at least two thinner SLEP core layers instead of a single (but thicker) SLEP core layer.
- This was evidenced in examples 29-48 and 91-95 of the patent in suit in which the multilayer film structure comprised two SLEP core layers whose total thickness corresponded to 52-66 % of the multilayer film while the individual thickness ranged between 42-53 % for one core layer and between 10-13 % for the other core layer.
- The experimental evidence of the patent in suit (table II on page 9) showed a significant improvement in orientation speed when VLDPE was replaced by SLEP (compare examples with the same irradiation dosage).
- The skilled person starting from D6 and replacing the VLDPE by SLEP following the teaching of D2, D15, D24 or D25 would run into problems because these documents required a SLEP surface layer which did not allow a high orientation speed. Furthermore, he would not venture to add a further core layer into the film structure because such a measure was not suggested anywhere in the available prior art.
- D5 was more remote from the claimed subject-matter than D6 and did not therefore qualify as a proper starting point for the assessment of inventive step.

- Especially, D5 did not disclose a multilayer film having two core layers. Moreover, the inner VLDPE layer referred to in Claims 5 and 13 of D5 could not be considered as a core layer.
- Furthermore, there was a disincentive to the combination of D5 with D2, the reason being that the VLDPE used according to D5 should have a low I_{10}/I_2 ratio (the highest exemplified value in Table II was 9.90) whereas according to D2 the SLEP should have a high I_{10}/I_2 (the highest value on page 41, Table 1, was 16.1). For this reason also the skilled person would have no reason to replace the VLDPE of D5 by the SLEP of D2.

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

Concerning the Main Request:
Admissibility

- The late-filed new Main Request should not be admitted into the proceedings. The subject-matter of this request was drastically different from the subject-matter of the withdrawn requests and had never been examined before. The Respondents were therefore taken by surprise by these new claims. The late filing was also contrary to the RPBA, which required that an appellant's complete case be submitted together with the filing of the grounds of appeal.

Concerning Auxiliary Request 1:
Article 123(2) EPC

- The term "impact-resistant" found no support in the originally filed claims. This term was only disclosed in the application as filed in relation to the specific structure seal/core/barrier/core/abuse.
- The claimed combination of the process features was not disclosed in the application as filed.
- That application disclosed that "The film ... is formed by extrusion processes... It is initially cooled to a solid state ..." whereas according to the presently claimed subject-matter "the film is formed by an extrusion process followed by cooling". The claimed sequence of process features was therefore not disclosed in the application as filed.
- In that application, after having been heated and stretched the film was "quickly quenched", whereas according to the now claimed subject-matter stretching was followed by "quickly cooling", cooling being broader than quenching.
- The application as filed related to reheating to an orientation temperature range and specified the "softening temperature" of the material. In contrast, the

claimed subject-matter related to the softening point of the film.

Article 84 EPC

- The term "quickly" in the expression "quickly cooled" was a relative term and lacked clarity.
- The expression "softening point" was unclear, since a single point could not define the softening behaviour of a film comprising various layers of different materials having different softening temperature ranges.

Article 83 EPC

- The claimed multilayer film, defined also by its preparation method, was insufficiently disclosed, because a softening temperature range should have been indicated instead of a softening point or a softening temperature. The latter could only relate to a single film layer. Furthermore, the method for determining this point/temperature had not been provided.
- The patent in suit did not disclose the method used for determining the density of the homogeneous ethylene alpha-olefin copolymer having long chain branching. Having regard to the fact that various documents disclosed different methods for doing so (see D2, D4, D7, D20), it followed that the patent did not draw a clear line between what was protected and what was not, with the consequence that the claimed subject-matter was not sufficiently disclosed. The value ranges claimed for density were very narrow and different methods would give different values.
- The preparation of the sample for the density measurement was not disclosed in the patent in suit, although the skilled person knew that the measured density value also depended on the way the sample was prepared.

Novelty D1

- The subject-matter of Claim 1 was anticipated by the disclosure of D1 (page 24, lines 14-17), which disclosed multilayer film structures (5-layer film structures) in which the same SLEP as that currently claimed was used either as a core layer, an outer surface layer, an intermediate layer and/or an inner sealant layer. Since the wording "core layer" did not allow a clear and unambiguous distinction between a core layer and an intermediate layer or inner layer, the cumulative alternative resulting from the expression "and/or" in the stated passage of D1 encompassed a film structure with SLEP in both the core and (an) intermediate layer(s) thus anticipating the subject-matter of Claim 1.
- All other features of the claimed subject-matter, such as density, were derivable from D1 (page 37, table 9).

Inventive step

- Respondent II held, like the Appellant, that D6 was the closest state of the art. This document (column 1, lines 5-10) related to multilayer films having the same properties as the films of the patent in suit.
- D6 (examples 8 and 9) disclosed multilayer films (4-layer films) in which an inner layer and an outer layer contained VLDPE of a density similar to the SLEP used according to the claimed subject-matter.
- The claimed multilayer films differed from those of D6 in that VLDPE was replaced by SLEP in the inner and outer layers and in that the outer layer became an inner layer (core layer).
- These differences solved two partial problems. The first was to provide an alternative for the VLDPE and the second was to provide an alternative film structure.
- The solution of the first partial problem was obvious in view of the expected improvement in processability as taught by the prior art documents D2, D15, D24 and D25.
- The experimental evidence of the patent in suit did not show any unexpected improvement resulting from the replacement of VLDPE by SLEP.
- As to the solution of the second partial problem no particular effect was evidenced in the patent specification for this measure, which had to be considered therefore as an obvious alternative.
- In fact, the results of Table II of the patent in suit concerning the orientation speed showed an effect related rather to the irradiation dosage, which was not reflected by the wording of the claims. It appeared that this feature, which was absent from the claimed subject-matter, was the decisive one for obtaining high orientation speeds and not the replacement of VLDPE by SLEP.
- It was not the outer layer alone, which provided the necessary impact strength to the film, but the whole film structure.
- No technical problem could be attributed to an outer layer comprising SLEP, since the claimed film structure did not exclude a SLEP layer as an outer layer.
- Respondent I argued that D5, which disclosed a multilayer film structure with two core layers comprising VLDPE (Claims 1, 4 and 5), represented the closest state of the art.
- The skilled person starting from D5 and trying to improve the characteristics of the disclosed multilayer film would find in D2 the hint to replace the VLDPE copolymer by the newly developed SLEP copolymers and would arrive at the claimed subject-matter without exercising an inventive skill.
- There was no disincentive to combine D5 with D2 and to replace the VLDPE by SLEP, since they were directly comparable copolymers and since the known advantageous properties of SLEP provided a motivation for such a replacement.

- The experimental part of the patent in suit did not show that a multilayer film with at least two core layers comprising SLEP provided any particular advantage over a similar film with one SLEP core layer.
- Even if it was considered that D5 did not disclose a two core layer structure, since multilayer film structures were common general knowledge, and since no technical benefit was shown to result from a multilayer film structure with at least two core layers, the alternative claimed was obvious to the skilled person in the art.

XVII. The Appellant requested that the decision under appeal be set aside and that the case be remitted to the department of first instance with the order to maintain the patent on the basis of Claims 1-26 of *Set L* (Main Request) or alternatively on the basis of Claims 1-26 of *Set M* (First Auxiliary Request) or of Claims 1-20 of *Set N* (Second Auxiliary Request) or of Claims 1-20 of *Set O* (Third Auxiliary Request).

XVIII. The Respondents I and II (Opponents I and II) requested at the oral proceedings that the appeal be dismissed.

The Respondent III (Opponent III) had requested in writing that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

Main Request

2. *Admissibility of the newly-filed requests*

2.1 The Appellant with letter dated 18 April 2008 replaced the previous requests with new requests, comprising *inter alia* a Main Request (*Set L*), whose Claims 1-26 corresponded to granted Claims 10-26 and 28-36, and an Auxiliary Request 1 (*Set M*) whose claims corresponded to those of Auxiliary Request 2. The latter request had been dealt with in the decision under appeal. It was also a request filed by the Appellant with the Grounds of the present appeal.

2.2 Under these circumstances, Auxiliary Request 1 is undoubtedly admissible in these proceedings.

2.3 On the other hand the Main Request, the subject-matter of which had been abandoned during the proceedings before the Opposition Division, was not dealt with in the appealed decision. Furthermore, it did not form part of the Statement setting out the Grounds of Appeal as required by Article 12(2) of the Rules of Procedure of the Boards of Appeal.

The Board applying its discretion on the basis of Article 13(1) of the Rules of Procedure of the Boards of Appeal considered that the Main Request should not be admitted in view of (i) the complexity of the new subject-matter, namely the unclear situation created by the deletion of the process features present in all previously submitted requests which did not *prima facie* allow an unambiguous distinction between the subject-matter of the Main Request and that of Auxiliary Request 1, (ii) the current state of the proceedings, having regard to the facts that the claimed subject-matter had not been considered in the Opposition Division's decision and had not been available for criticism by the Respondents in the period ending one month before the oral proceedings before the Board, and (iii) the restrictions imposed by the need for procedural economy in view of the risk of the undue prolongation of the proceedings resulting either from the postponement of the final decision or the remittal of the case to the department of first instance, as otherwise the first occasion on which the patentability of the Main Request would have been discussed, would have been at the oral proceedings before the Board.

The Board does not concur with the Appellant's argument, that this request was filed in reaction to the official communication of the Board, in which it expressed its intention not to remit the case but to have all raised issues discussed at the arranged oral proceedings. Firstly, the Board issued that official communication in reply to the request of Respondent II (letter dated 25 November 2005, page 3, first full paragraph), who wished to be informed whether the issue of inventive step would be the subject of a possible remittal or whether it was going to be dealt with at the scheduled oral proceedings before the Board. Secondly, the Board did not express any provisional opinion in that official communication which could have been interpreted as an invitation to file new requests.

Auxiliary Request 1

3. *Article 123(2) EPC*

The subject-matter of Auxiliary Request 1 fulfils the requirements of Article 123(2) EPC contrary to the arguments of the Respondents.

3.1 Thus, the contested term "impact-resistant", which was already present in the granted claims, finds support in the application as filed (paragraph bridging pages 12 and 13). It is evident from that passage that impact-resistance is a desired property of the entire subject-matter encompassed by the application as filed. Since, furthermore the term "impact-resistant" is merely used in the claim in a descriptive way without any quantitative qualification, the requirements of Article 123(2) EPC are undoubtedly met.

3.2 With regard to the contested wording of the now claimed subject-matter as compared with the content of the application as filed, namely the replacement of the terms "initially cooling" by "followed by cooling", "quickly quenching" by "quickly cooled" and "softening temperature" by "softening point", the Board considers that, though different words are used in the claimed subject-matter as compared with the application as filed (page 10, second full paragraph), their meaning is equivalent, with the consequence that in this specific situation the scope of the claimed subject-matter was disclosed in the application as filed.

The Board holds that there could not be any doubt for the skilled reader that the initial cooling is applied to the already-extruded film and that "initially cooling" is nothing else than "followed by cooling" in the context of the claimed process feature. It is also the Board's opinion that in the technical context of the patent in suit "quickly cooling" cannot be interpreted differently by the skilled reader from "quickly quenching", since the term "quenching" in this technical context only specifies the "quick cooling" as exemplified by the disclosed techniques of cascading water or chilled air (page 10, line 17); this is also evident from the use of these terms as equivalents in the same sentence of page 10, lines 26-30 (the film is quickly quenched ... to cool the film rapidly...). Finally, as the Appellant has correctly argued, in the context of stretching a polymer film, the expression "softening point" is equivalent to "softening temperature" and nothing else could be understood by the person skilled in the art.

4. *Article 84 EPC*

The claimed subject-matter fulfils the requirements of Article 84 EPC contrary to the arguments of the Respondents.

4.1 Thus, as far as the term "quickly cooling" of the stretched film is concerned, it relates to a conventional process step in shrinkable film preparation aimed at setting the film in the oriented molecular configuration, which the skilled person would have no problem in understanding. Moreover, the quantification of the term "quickly" has never been considered to be of importance for the decision on the novelty issue.

4.2 As far as the term "softening point" is concerned it would be unambiguous to the skilled person that this point relates to a temperature condition allowing solid state orientation of a multilayer film (patent in suit: page 5, lines 20-25), *ie* where one or more components of the film are not in the molten state but are sufficiently softened to allow the mechanical action of stretching of the film, which is necessary for the development of the desired heat-shrink behaviour.

5. *Article 83 EPC*

5.1 The Board, contrary to the Respondents argument, considers that the claimed invention is disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

5.2 Thus, as far as the method of orientation of the multilayer film is concerned, the Board considers that it is clear and enabling in view of the patent specification (paragraph [0039]), which discloses that the stretching is carried out in a solid state by first heating the film to a softening temperature/point which lies within its orientation temperature range and then stretching it in the longitudinal and transverse directions. In the Board's understanding the skilled person in the art, who is familiar with solid state orientation of multilayer films (see *eg* D5: column 4, line 56 to column 5, line 7; D6: column 4, lines 35-54), would be aware that this temperature must be sufficiently high so that on the one hand the film does not break and on the other hand it permits its biaxial orientation. The Board makes reference also to the experimental evidence in the patent in suit, which comprises preferred embodiments of the claimed subject-matter (see examples 29-46 and Table V) according to which the total film structure is oriented out of hot water by a trapped bubble technique at specific constant orientation preheat and hot bath temperatures (these corresponding to the softening temperature/point).

5.3 Furthermore, with regard to the method of measuring the density of the copolymer and the method for preparing the sample for the density measurement, the Board considers, and the Respondents did not dispute, that the skilled person would be aware of the standard methods for carrying out such a measurement, including the preparation of the necessary samples. On this basis the Board considers that the density parameter is a conventional parameter which the skilled person would measure using conventional means, as distinct from more exotic parameters in respect of which it might be necessary to specify a corresponding measuring method. The failure to specify a method of measuring the parameter in the patent in suit therefore does not amount to insufficient disclosure. Furthermore, to the extent that it may be true that different methods of measurement may deliver non-identical results, it has to be kept in mind that any margin of deviation existing due to the absence of a disclosure of the precise measurement method in the patent in suit is to be appraised to the Proprietor's disadvantage in situations of conflict with appropriately relevant prior art.

6. *Novelty over D1*

6.1 Interpretation of the claimed subject-matter

6.1.1 The term "core" layer

The Board has not found any specific definition of the "core" layer in the patent in suit which could differentiate it technically from an inner/interior layer of a multilayer film construction disclosed in the state of the art. Although the examples, which according to the Appellant persistently attribute to the definition of the core layer a certain thickness, may be understood to provide support for such an argument, the subject-matter as claimed is free from such a qualification. Therefore the Board sees no reason to distinguish between the core layer of the claimed film structure and an inner/interior layer of a film disclosed in the state of the art. Hence in the rest of this decision these terms are used as equivalents.

6.1.2 The multilayer film structure

According to the wording of independent Claim 1, the multilayer film comprises at least two core layers each of these layers comprising a homogeneous single site catalyzed copolymer of ethylene and an alpha-olefin having from four to ten carbon atoms and having long chain branching. Since Claim 1 defines only the core layers in more detail and leaves unrestricted the definition of the remaining layers of the film, any of these layers, such as the outer layer(s), can comprise the copolymer defined for the core layers.

6.2 The disclosure of D1

6.2.1 D1 (claims 1-4; page 1, lines 3-14; page 11, line 9 to page 12, line 32; page 17, lines 15-29; page 20, lines 15-34; page 30, lines 17-21; page 36, lines 17-20; Claims 15 and 16) discloses substantially linear ethylene interpolymers, preferably copolymers of ethylene and an alpha-olefin with three to twenty carbon atoms, the preferred alpha-olefin being 1-octene, which have a melt flow ratio $I_{10}/I_2 \geq 5.63$ and a molecular weight distribution, M_w/M_n, defined by the equation $M_w/M_n \geq (I_{10}/I_2)-4.63$. Thus, the currently claimed homogeneous single site catalyzed copolymers of ethylene and an alpha-olefin having four to ten carbon atoms and having long chain branching have to be selected from the interpolymers of D1.

6.2.2 Furthermore, D1 (page 12, line 11 to page 13, line 2) discloses that the density of the copolymers ranges more preferably from 0.88 g/cm^3 to 0.92 g/cm^3. This means that the claimed narrower density range of from about 0.89 g/cc to about 0.91 g/cc, also has to be selected from the broader density range disclosed in D1.

6.2.3 Additionally, D1 (page 24, lines 14-17) discloses multilayer film structures, namely 3- and 5-layered films, in which the substantially linear ethylene copolymer can be used as a core layer, an outer layer, an intermediate layer and/or an

inner sealant layer of the structure. While only a 5-layer structure might theoretically comprise two core layers, each of which containing the substantially linear ethylene copolymer described in D1, in reality this configuration does not form part of this document's disclosure, as explained below. Therefore, beside the necessary selections mentioned in above sections 6.2.1 and 6.2.2, only on this basis the claimed multilayer film requiring two such core layers is novel over D1.

6.2.4 When considering in detail the "and"-alternative of the term "and/or" of a 5-layer film structure as set out in the relevant passage of D1 (page 24, lines 14-17), five variants are encompassed wherein two layers of the 5-layer structure comprise the specific substantially linear ethylene copolymer. These alternatives are: core layer plus outer surface layer, core layer plus intermediate layer, core layer plus inner sealant layer, outer surface layer plus inner sealant layer, and outer surface layer plus intermediate layer. From these variants only one, *ie* the variant core layer plus intermediate layer, could be considered to meet the currently claimed requirement of a structure having two "core" layers. However, according to the established jurisprudence of the Boards of Appeal of the EPO the singling out of a specific embodiments from a group of embodiments would amount to an undisclosed selection.

In this context it is furthermore mentioned that, in view of the general teaching of D1 (page 14, lines 31-35, page 24, lines 17-21; page 25, lines 6-10; inventive example 11; page 43, line 10 to page 44, line 22; page 48, lines 1-18), the whole thrust of this disclosure relates to the use of the substantially linear ethylene copolymer in a surface layer. This means that in the specific configuration in which two of the layers contain the said copolymer, one is necessarily a surface layer. Thus it is even questionable whether the said passage of D1 could be construed to encompass a 5-layer structure not comprising such a surface layer.

6.2.5 The Board thus concludes that, in addition to the necessary multiple selections from the disclosure of D1 (page 9, line 24 to page 10, line 27; page 12, line 33 to page 13, line 2; page 21, lines 21-29; page 22, lines 31-33) concerning the density of the copolymer and the process features necessary to arrive at a heat shrinkable film whose copolymer density ranges from about 0.89 g/cc to about 0.91 g/cc, the undisclosed feature of two core layers in the multilayer film, removes any possible novelty destroying character from document D1.

7. *Inventive step*

7.1 Closest state of the art

7.1.1 Two documents have been considered by the parties as the closest state of the art, namely D6 (by the Appellant and Respondent II) and D5 (by Respondent I).

The Board for the reasons given below considers both documents to represent appropriate starting points for the assessment of inventive step.

7.1.2 D6 (column 3, lines 3-24; column 11, lines 11-13; column 12, lines 28-43; table I, sample number 13; table II-A, sample numbers 8 and 9; table II-B, sample numbers 8 and 9; column 19, lines 16-31) discloses heat-shrinkable, multilayer films combining orientation-, shrink- and abuse-resistant properties. Samples 8 and 9, which provide excellent values for these properties, are 4-layer films in which an interior layer (layer 2) and an outside layer (layer 4) comprise a very low density linear polyethylene (VLDPE), commercialized by Dow Chemical as Dow XU61512.08L. D6 specifies that this VLDPE has octene as comonomer, a density of 0.905 and a MI:0.80. Thus this document discloses similar multilayer heat-shrinkable films to those claimed with very close physical properties though using low density ethylene copolymers of an older technology.

7.1.3 D5 (claims 1, 4 and 5; column 1, lines 5-8; column 2, lines 7-18 and 37-47; column 10, lines 55-58; column 11, lines 13-27; table II, sample number Test 3) discloses heat-shrinkable multilayer films having excellent abuse resistance, good shrinkability characteristics and good orientation processing characteristics. In test 3, a 4-layer film is disclosed with improved properties, in which an interior layer (layer 2) comprises very low density linear low density polyethylenes (VLDPE), commercialized by Dow Chemical as XPR0545-37904-4H with a melt index of 0.8, a density of 0.905 and octene as comonomer. Thus this document also discloses multilayer heat-shrinkable films similar to those claimed, though again of an older technology, having very close physical properties.

7.1.4 Contrary to the interpretation of D5 by Respondent I, the Board does not find in this document the disclosure of a multilayer film with two core (interior) layers comprising VLDPE. In the Board's understanding Claim 5, on which Respondent I has based its arguments, discloses that the multilayer film comprises at least one layer of VLDPE which is an interior layer, thus implying that another layer of VLDPE can only be an outside layer. Under these circumstances the disclosure of D5 corresponds in that respect to that of D6.

7.1.5 The multilayer film of Claim 1 differs from that of D6 or D5 in that:

– the very low density linear polyethylene (VLDPE) of at least the interior (core) layer has been replaced by a homogeneous single site catalyzed copolymer of ethylene

and an alpha-olefin having from four to ten carbon atoms and having long chain branching (SLEP), said SLEP copolymer having a similar density, and

– an additional interior (core) layer comprising SLEP is inserted into the multilayer film structure.

7.1.6 The Board, contrary to Respondent II's allegations, does not consider that the absence of an outer SLEP layer according to the currently claimed invention can be used to establish a technical difference between these prior art embodiments and the currently claimed film structures, because as already mentioned above (section 6.1.2) the claimed multilayer film structure in its broadest definition may also comprise an outer layer comprising a SLEP copolymer. Thus any speculation relying on a technical effect related to the relocation of an outer SLEP layer to an interior place within the film structure is useless.

7.2 The technical problem

7.2.1 The patent in suit (page 4, lines 43-46; page 6, lines 3-5) discloses that the technical characteristics of the claimed multilayer film provide a film structure having improved physical properties such as improved optics and impact strength, excellent shrink properties and low extractables, which film is readily extruded and processed.

7.2.2 However, the technical evidence of the patent specification does not establish that these objectives have been attained. When considering the examples 29-88, which relate to the subject-matter claimed in Auxiliary Request 1, and the results presented on Tables IV and V the Board, in agreement with the Respondents, remarks that these results must be interpreted bearing in mind that it is only meaningful to compare films which are structurally comparable. Thus, in view of the comparative films 47 and 48 with a total thickness of 3 mils only examples with the same thickness, *ie* the films of examples 32 to 48, are considered for comparison. Furthermore, account being taken of the preparation conditions of these comparative films, comparative film 47 involving a preheat temperature of 194°F (90°C) and a hot bath temperature of 190°F (88°C) and comparative film 48 involving a preheat temperature of 200°F (93°C) and a hot bath temperature of 195°F (91°C), from the above mentioned examples 32 to 48 only these prepared under the same conditions are retained for comparison. Consequently only the films of examples 34, 36, 38 are compared with the film of comparative example 47 and only the films of examples 33, 35, 37, 39, 41, 43, 45, 46 with the film of comparative example 48. However, the comparison under the above set of conditions of the results of tables IV and V does not give any clear indication that any property has been improved. The Board therefore concludes that the disclosed technical problem has not effectively been solved.

7.2.3 Under these circumstances the Board considers that the technical problem has to be reformulated. The objective technical problem should then be to provide a heat-shrinkable, impact-resistant multilayer film alternative to the films disclosed by D6 or D5.

7.2.4 The claimed solution to the objective technical problem is a multilayer film comprising two core (interior) layers, each layer comprising a homogeneous single site catalyzed copolymer of ethylene and an alpha-olefin having from four to ten carbon atoms and having long chain branching, said copolymer having a density of from about 0.89 g/cc to about 0.91 g/cc.

7.3 Obviousness

The question which needs to be answered is whether the skilled person starting from D6 or D5 would find a suggestion in these documents or in the further prior art in the direction of this claimed solution, *ie* a suggestion to provide an alternative multilayer film by firstly replacing the VLDPE comprised in the interior (core) layer of the 4-layer film of D6 (Table II-A, sample number 8 and 9) or the film of D5 (Table II, Test 3) by the claimed SLEP and secondly by introducing into the multilayer structure a second interior (core) layer also comprising SLEP.

The Board, in agreement with the Respondents, acknowledges that there is ample information in the state of the art concerning the use in films of homogeneous single site catalyzed copolymers of ethylene and 1-octene with long chain branching and with densities within the range of 0.89 g/cc to 0.91 g/cc, which polymers combine improved processability with improved strength and toughness. The Board makes particular reference to D2 (Claims 1-4; page 3, lines 23-29; page 9, lines 17-21; page 55, lines 1-8), D15 (first page, last paragraph), D23 (full page 2), D24 (bridging paragraph pages 2 and 3; Table 1, samples CGCT 2 and CGCT 3) and D25.

The Board thus concludes that the state of the art provides the skilled person with an incentive to replace VLDPE by SLEP also in the interior layers of the 4-layer films of either D6 or D5. Therefore a multilayer film structure resulting from the combination of either D6 or D5 with either of D2, D15, D23-D24, which comprises an interior (core) layer comprising SLEP, is considered obvious to the skilled person in the art.

Nevertheless, this multilayer film structure still differs from the one claimed, in that the latter requires the insertion of a further interior (core) layer comprising SLEP into its multilayer film structure.

The Respondents admitted during the oral proceedings that they were not aware of any document disclosing or suggesting such an insertion of a further low density polyethylene copolymer interior (core) layer. Furthermore, the Respondents did not provide any plausible reason why this additional feature should have belonged in any way to the common general knowledge of the person skilled in the art. Under these circumstances the Board can only conclude that the allegation, that the insertion of a second core (interior) layer would be obvious, is based on hind-sight. In consequence the Board holds that the subject-matter of current Claim 1 involves an inventive step.

7.4 The subject-matter of the independent Claims 7, 16, 18, and 22, each corresponding to a preferred embodiment of the subject-matter of Claim 1, is *mutatis mutandis* not obvious and likewise involves an inventive step. The same applies *a fortiori* to the subject-matter of the dependent claims.

Order

For these reasons it is decided that:

The decision under appeal is set aside.
The case is remitted to the Opposition Division with the order to maintain the European patent on the basis of Claims 1-26 of *Set M* (pages 1-5 annexed to the Minutes of the oral proceedings of 20 May 2008) after any necessary consequential amendment of the description.

The Registrar: The Chairman:

G. Röhn P. Kitzmantel