

Internal distribution code:

- (A) [] Publication in OJ
(B) [] To Chairmen and Members
(C) [X] To Chairmen

D E C I S I O N
of 18 June 1996

Case Number: T 0681/94 - 3.2.1
Application Number: 86113010.2
Publication Number: 0217252
IPC: B65D 65/40, B32B 27/32

Language of the proceedings: EN

Title of invention:

Thermoplastic multi-layer packaging film and bags made therefrom

Patentee:

W. R. Grace & Co.-Conn.

Opponent:

- 01: American National Can Company
02: Dixie Union Verpackungen GmbH
03: Viskase Corporation
04: Asahi Kasei Kogyo Kabushiki Kaisha
05: Dow Benelux N.V.
06: Kureha Kagaku Kogyo Kabushiki Kaisha

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56, 123(2)

Keyword:

- "Added subject-matter (no)"
"Novelty - main request (no)"
"Disclaimer (allowed)"
"Inventive step (no)"
"Late submitted amendments - not considered"

Decisions cited:

T 0004/80, T 0192/82, T 0069/83, T 0095/83, T 0201/83,
T 0206/83, T 0153/85, T 0170/87, T 0597/92

Catchword:

-



Europäisches
Patentamt

European
Patent Office

Office européen
des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Case Number: T 0681/94 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 18 June 1996

Appellant:
(Proprietor of the patent)

W. R. Grace & Co.-Conn.
Grace Plaza
114 Avenue of the Americas
New York
New York 10036 (US)

Representative:

Uexküll & Stolberg
Patentanwälte
Beselerstrasse 4
22607 Hamburg (DE)

Respondents:
(Opponent 01)

American National Can Company
8770 West Bryn Mawr Avenue
Chicago
Illinois 60631-3542 (US)

Representative:

MacGregor, Gordon
Eric Potter Clarkson
St. Mary's Court
St. Mary's Gate
Nottingham NG1 1LE (GB)

Opponent 02:

Dixie Union Verpackungen GmbH
Römerstrasse 12, Postfach 1410/1420
D-87437 Kempten (DE)

Representative:

Vossius & Partner
PO Box 86 07 67
D-81634 München (DE)

Opponent 03:

Viskase Corporation
6855 West 65th Street
Chicago
Illinois 60638 (US)

Representative:

Weinhold, Peter, Dr.
Patentanwälte
Dr. Weinhold, Dannenberg
Dr. Gudel, Schubert
Siegfriedstrasse 8
80803 München (DE)

Opponent 04: Asahi Kasei Kogyo Kabushiki Kaisha
2-6 Dojimahama 1-chome Kita-ku Osaka-shi
JP-Osaka 530 (JP)

Representative: Strehl Schübel-Hopf Groening & Partner
Maximilianstrasse 54
80538 München (DE)

Opponent 05: Dow Benelux N.V.
Postbus 48
NL-4530 AA Terneuzen (NL)

Representative: de Jong, Nicolaas Henricus Maria
Dow Benelux N.V.
Patent Department
PO Box 48
4530 AA Terneuzen (NL)

Opponent 06: Kureha Kagaku Kogyo Kabushiki Kaisha
No. 1-9-11, Nihonbashi Horidome-cho
Chuo-ku, Tokyo 103 (JP)

Representative: Kraus, Walter, Dr.
Patentanwälte Kraus, Weisert & Partner
Thomas-Wimmer-Ring 15
D-80539 München (DE)

Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 16 June 1994
revoking European patent No. 0 217 252 pursuant to
Article 102(1) EPC.

Composition of the Board:

Chairman: F. A. Gumbel
Members: S. Crane
J.-C. Saisset

Summary of Facts and Submissions

I. European patent No. 0 217 252 was granted on 13 November 1991 on the basis of European patent application No. 86 113 010.2.

II. The granted patent was opposed by a total of six opponents, the present respondents. They requested the revocation of the patent in its entirety, relying on all three available grounds of opposition namely lack of novelty and/or inventive step (Article 100(a) EPC), insufficiency of disclosure (Article 100(b) EPC) and addition of subject-matter (Article 100(c) EPC).

Among the prior art documents relied upon by the respondents in the course of the opposition proceedings were the following:

- D1: EP-A-0 141 597
- D6: JP-A-58/082752 (with English translation)
- D7: JP-A-58/102762 (with English translation)
- D16: US-A-4 424 243
- D18: US-A-4 456 646
- D24: Modern Plastics International, October 1984, pages 6 to 8
- D28: Plastics Technology, October 1984, pages 13 to 15
- D32: Product information brochure "Stamylex PE" published by DSM in February 1984.

III. By its decision given at oral proceedings on 13 April 1994, and issued in writing on 16 June 1994, the Opposition Division revoked the patent.

The reasons given in the decision were essentially the following:

The feature included in granted claim 1 that the copolymer had a density "of 0.915 g/cm³ or less" had no counterpart in the original disclosure and offended against Article 100(c) EPC. The subject-matter of the claim also lacked novelty, inter alia with respect to Example 1 of document D7.

Claim 1 according to the first auxiliary request no longer offended against Article 100(c) EPC and its subject-matter was novel. It did not, however, involve an inventive step. The respective claims 1 of the second and third auxiliary requests were inadmissible for formal reasons.

- IV. An appeal against this decision was filed on 16 August 1994 and the fee for appeal paid at the same time.

The statement of grounds of appeal was filed on 26 October 1994. With the statement of grounds the appellants (proprietors of the patent) submitted a new main request and first to 23rd auxiliary requests for maintenance of the patent in amended form.

- V. On 19 October 1995 the Board issued a summons to oral proceedings. In an annex attached to the summons the Board made various objections to the terms of the claims according to several of the auxiliary requests. It also indicated that it tended to the view that the subject-matter of claim 1 according to the main request lacked novelty with respect to document D7 and that it would be necessary to consider whether the use of a disclaimer, as proposed by the appellants in their requests, was a suitable means of avoiding anticipation in the present case. As for the question of inventive step reference

was made to the fact that some comparative examples appeared to exhibit better shrinkability than the embodiments of the invention so that it was difficult to recognise the improvement of shrinkability as being the primary technical object with which the claimed invention was concerned.

VI. With a letter received on 10 May 1996 the appellants submitted new sets of claims A, B and C corresponding to a main, and first and second auxiliary requests for maintenance of the patent in amended form.

Claim 1 of set A (main request) reads as follows:

"A thermoplastic multi-layer hot-water shrinkable film for food packaging comprising an outer polymer layer, an inner heat sealing layer and an oxygen barrier layer between said inner and said outer layers

wherein said heat sealing layer comprises at least 50% by weight, based on the sealing layer composition, of linear low density polyethylene (LLDPE) or a very low density polyethylene (VLDPE) which is a linear copolymer of ethylene and x to y % by weight, based on the copolymer, of an α -olefin with 4 to 8 carbon atoms per molecule, wherein $x = 0.5n_c + 8$ and $y = 1.25n_c + 15$ with n_c being the number of carbon atoms in the α -olefin, said copolymer having a density of not higher than 0.915 g/cm^3 , and

said oxygen barrier layer comprises a polymer selected from the group comprising polyvinylidene chloride (PVDC) and hydrolysed ethylene vinyl acetate (EVOH) copolymers."

Claim 1 of set B (first auxiliary request) corresponds to claim 1 of set A except in that it includes the following disclaimer:

"with the proviso that films are excluded which comprise a layer consisting of a blend of

- (A) at least one polymer selected from copolymers of ethylene and monomers selected from vinyl ester monomers, aliphatic unsaturated monocarboxylic acids and alkyl esters of said monocarboxylic acids and linear low-density polyethylene,
- (B) a soft elastomer consisting of an ethylene- α -olefin copolymer and having a density of 0.91 g/cm³ or below, and
- (C) crystalline polypropylene or crystalline polybutene-1 or a mixture thereof."

Claim 1 of set C (second auxiliary request) also otherwise corresponds to claim 1 of set A, but the disclaimer is in different terms:

"with the proviso that films are excluded which comprise a soft elastomer consisting of an ethylene- α -olefin copolymer and having a density of 0.91 g/cm³ or below."

VII. Oral proceedings before the Board were held on 18 June 1996.

Opponents 01, 02 and 05 did not attend.

Opponents 01 and 05 had already announced their intention in this respect in letters dated 31 May 1996 and 21 May 1996 respectively. In accordance with Rule 71(2) EPC the oral proceedings were continued without the missing parties.

At the oral proceedings the appellants submitted two further sets of claims D and E corresponding to third and fourth auxiliary requests for maintenance of the patent in amended form.

Claim 1 of set D corresponds to claim 1 of set A except in that the density of the copolymer is defined as being "less than 0.915 g/cm³". Claim 1 of set E also otherwise corresponds to claim 1 of set A except in that the density of the copolymer is defined as being "not higher than 0.911 g/cm³".

Furthermore, according to fifth to ninth auxiliary requests for maintenance of the patent in amended form, the words in claim 1 of sets A to E respectively "comprises at least 50% by weight, based on the sealing layer composition, of" were replaced by "consists of".

The appellants requested that the decision under appeal be set aside and the patent be maintained on the basis of one of the sets of claims in the order as submitted. The respondents requested that the appeal be dismissed and the revocation of the patent confirmed.

VIII. The main arguments put forward by the appellants in support of their request can be summarised as follows:

There was clear support in the originally disclosed application for the limitation of the density of the copolymer to not higher than 0.915 g/cm³ since this value was that of the highest density to be found in any

of the preferred embodiments. It was well-established practice to allow the limitation of an originally disclosed broader range in this way.

The subject-matter of claim 1 of set A was novel with respect to the generic disclosures to be found in documents D6, D7, D16 or D18. None of these documents taught the skilled person to use a copolymer falling within the class defined in the claim. Insofar as these documents referred to density values of 0.90 or 0.91 g/cm³ as range end points they were purely speculative since linear low density polyethylenes (LLDPE) of this density could not be made at the relevant dates. The only specific examples found in documents D6, D16 or D18 had a copolymer density significantly higher than 0.915 g/cm³.

As for Example 1 of document D7 this purported to teach the use of a copolymer of ethylene and octene-1 with a density of 0.915 g/cm³. It was not clear, however, whether the reference to 3.5 mole % of octene-1 referred to the composition of the copolymer itself or to the proportion charged into the reactor. In the latter case the much lower take-up rate of octene-1 than of ethylene would tend to an octene-1 content in the final polymer of less than 3.6 wt%. Furthermore, an ethylene-octene-1 copolymer of density of 0.915 g/cm³ having a melting point of 116°C with a peak at 120° and a Vicat temperature of 98°C, as stated in Example 1, was not commercially available at the date of publication of D7 and the skilled person was not told how to produce it. According to the statement of Mr Ruinaard (filed originally in the opposition proceedings and re-filed as Annex 9 to the appellants letter of 10 May 1996) an ethylene-octene-1 copolymer of this density would have a melting point of 121°C with a peak at 124°C and a Vicat temperature of 92°C. It therefore could not be seen how

the material referred to in Example 1 of document D7 could exist. Since the disclosure of this document did not enable the skilled person to make a film falling within the scope of claim 1 of set A it could not be prejudicial to novelty (T 206/83, OJ EPO 1987, 5).

If, however, document D7 were held to constitute an enabling disclosure it was permissible to avoid anticipation by means of a disclaimer. There was no suggestion in document D7 that the use of LLDPE for the heat sealing layer improved hot-water shrinkability, in fact the opposite was true, so that any anticipation had to be seen as being of a purely accidental character. According to document D7 hot-water shrinkability is obtained by using a three component composition (ABC) for the base layer of the film wherein the component B is a soft elastomer consisting of an ethylene- α -olefin copolymer of density of 0.91 g/cm³ or below. It was therefore appropriate to disclaim the disclosure of document D7 by reference to this composition (claim 1 of set B) or alternatively the component B (claim 1 of set C). Although comparative Example 16 of document D7 related to a film without an ABC layer it was evident that this film was defective. This example could not therefore be seen as disclosing a "hot-water shrinkable film for food packaging" since it could not be used for this purpose.

Sets D and E of the claims had been filed at this late stage in response to the objections to the use of disclaimers made by opponents 06 in their letter of 30 May 1996. In the respective claim 1 of these sets the copolymer of the heat sealing layer had been distinguished from that referred to in Example 1 of document D7 by means of a positive restriction of the upper density limit. These restrictions found a proper

basis in the original disclosure, viz. dependent claim 3 for the value of less than 0.915 g/cm^3 set D) and the preferred embodiment of ethylene-octene-1 copolymer with a density of 0.911 g/cm^3 set E).

The most appropriate starting point for the evaluation of inventive step was document D6. This proposed a hot water shrinkable film with a heat sealing layer consisting of LLDPE or preferably a blend of LLDPE and ethylene-vinyl acetate copolymer (EVA). The density range for the LLDPE was given as 0.900 to 0.950 g/cm^3 and the single specific example disclosed had a density of 0.922 g/cm^3 . In 1984 a new product known as very low density polyethylene (VLDPE), with a density of 0.915 g/cm^3 or less, became commercially available. The appellants had surprisingly found that the use of VLDPE for the heat sealing layer of a hot-water shrinkable film led to significant improvement in the obtainable shrink rate. There was nothing in the literature concerning VLDPE which might suggest this. References there to "shrink films" were not to hot-water shrinkable films but to films which were stretch-oriented and subsequently shrunk at temperatures above their melting points. The mechanisms involved in the two cases were completely different. Furthermore, it was clear from all of documents D6, D7, D16 and D18 that the contribution of LLDPE to the actual shrink behaviour of the films proposed there was negative. Since the structure of VLDPE was essentially similar to that of LLDPE the skilled person would have had no expectation of benefit in relation to improving shrink using VLDPE. That the improvement of the shrink behaviour of the film whilst maintaining at the same time other desirable characteristics, in particular cold seal strength and sealability through contamination, was the essential technical problem with which the invention was concerned was clear from the application as originally filed.

Moreover, it could be seen from the exemplified embodiments that this technical problem had actually been solved. Further evidence of this had been provided in the test report filed as Annex 2 to the statement of grounds.

Lastly, taking account of what was said in document D6, D16 and D18 as to the necessity of blending LLDPE with EVA to obtain good stretchability (and conversely therefore shrinkability) it was particularly surprising that excellent shrink behaviour could be achieved by using VLDPE alone (auxiliary requests five to nine).

IX. The main arguments of the respondents in reply were as follows:

Claim 1 of set A now effectively disclosed, for example, an ethylene-heptene-1 copolymer with a density of 0.915 g/cm³ whereas the only copolymer with this density originally disclosed was ethylene-octene-1. There was no basis for generalising the density value from one specific embodiment and applying it to all conceivable C₄-C₈ α -olefins.

Similar considerations applied with even more force to the new limitations included in the respective claim 1 of sets D and E. In particular, the value of "less than 0.915" was originally disclosed exclusively in relation to the ethylene-butene-1 copolymer and the value of 0.911 g/cm³ exclusively in relation to the embodiment with the ethylene-octene-1 copolymer of lower density. It was clearly inappropriate to take the lower value of those disclosed and turn it into the upper end point of

a range. In any case there was no excuse for submitting these new claims on the day of the oral proceedings. The Board, in accordance with the established jurisprudence, should therefore disregard them.

There was broad generic overlap between the copolymers defined in claim 1 of set A and those disclosed in documents D6, D7, D16 and D18 so that the subject-matter of the claim could not be seen as fulfilling the requirements for novelty by selection. In any case, Example 1 of document D7 clearly disclosed the use of an individualised copolymer falling within the terms of the claim. It was wholly apparent in the circumstances that the 3.5 mole % of octene-1 referred to related to the composition of the copolymer. The fact that this copolymer may not have been a commercially available product was completely irrelevant since the process for producing LLDPE was well known and the appellants had produced no credible evidence that it would not have been technically possible to make an ethylene-octene-1 copolymer with the parameters described in the example.

The present case was not one where amendment by way of disclaimer to avoid anticipation was appropriate since document D7 could in no way be seen as an accidental disclosure of the relevant subject-matter and logically had to be seen as the closest state of the art. Furthermore, the terms of the proposed disclaimers were unclear and, particularly with respect to claim 1 of set C, much broader than was justified to avoid anticipation. It also had to be noted that comparative example 16 of document D7 did not comprise the disclaimed material so that this film still anticipated claim 1 of sets B and C.

The inappropriateness of the disclaimers became very evident when it came to consider inventive step since the subject-matter of the claims was distinguished from document D7 solely by the absence of a material of a particular composition. It was however clear from document D7 that this material was provided to obtain heat shrinkability at very low temperatures, lower than those associated with the film of the claimed invention. If the skilled person wished to forgo this advantage he merely had to leave the material out. This could not be seen as inventive.

Even if document D6 were taken as the closest starting point for evaluating inventive step, the same negative conclusion would be arrived at. Once VLDPE became commercially available the skilled person had every incentive on the basis of its published properties, see for example documents D24, D28 and D32, to include it as the heat sealing layers of a hot-water shrinkable film. To say that there was a "prejudice" against the use of LLDPE in this context, and by extension therefore inherently also against VLDPE, was clearly inconsistent with the teachings of documents D6, D7, D16 and D18. The appellants claimed that there was a "surprising" improvement in heat shrinkability when VLDPE was used, but this claim was not backed up by the information given in the patent specification where it could be seen that in some instances the shrinkability of the comparative examples was better than that of the embodiments. In any case, any improvement that was achieved in shrinkability was a mere "bonus effect" following automatically from the obvious use of VLDPE.

Reasons for the Decision

1. The appeal complies with the formal requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC. It is therefore admissible.

2. *Technological background*

Hot water shrinkable film is a material generally used for packaging food products such as fresh meat and cheese. A conventional structure of film of this type comprises an "outer" or "base" polymer layer, and "inner" layer which in use contacts the food product and which is capable of being heat sealed to itself, and an intermediate layer of a polymer which is substantially impermeable to oxygen, in particular polyvinylidene chloride (PVDC) or hydrolysed ethylene-vinyl acetate copolymer (EVOH). The film has been oriented by stretching it in quenched amorphous state below its crystalline melting temperature, e.g. by the "trapped bubble" process, and when subsequently subjected to temperatures in the order of the orientation temperature will shrink in an attempt to regain its previous shape. (The mechanisms are explained in more detail in the expertise of Professor Menges, Annex 3 filed by the appellants on 19 January 1995.)

Conventionally, a film of the above type is used in the following way. The product to be packed is placed in an open-sided pouch or bag formed by heat-sealing the film to itself along three sides. The interior of the bag is then evacuated and the fourth side closed by heat-sealing. The bag and product are then immersed for a short time, e.g. two seconds, in a hot water bath with a temperature in the order of 80°C-95°C to shrink the

film. This shrinkage removes the wrinkles in the film caused on evacuation and produces an optically pleasing package with the film tightly and smoothly pressed against the surface of the product.

Another form of shrink film used in large quantities in the packaging industry, e.g. for the palletization of stacked goods, is stretch oriented, e.g. by the hot blown process, at a temperature above its melting point and quickly cooled. When the film is again heated to a temperature above its melting point it undergoes shrinkage, but in view of the state of the film little or no shrink force is generated at this time. Instead, the shrink force required for packaging purposes is generated as a result of thermal contraction of the heat-shrunk film as it returns to room temperature.

In view of its generally good heat-sealability and other favourable properties low density polyethylene was one of the materials conventionally used to form the inner layer of hot-water shrinkable packaging films. In the late 1970's a new form of polyethylene, linear low density polyethylene (LLDPE), was introduced on a large commercial scale. This material, which is a copolymer of ethylene and an α -olefin, was seen as combining the more favourable properties of high density and low density polyethylenes and quickly established a large market share, replacing low density ethylenes in many areas where they had been previously used. In 1984 there was then wide coverage in the technical press (see for example documents D24 and D28) of a further breakthrough in polyethylene technology, the commercial introduction of very low density linear polyethylene (VLDPE). This material was said to have a structure similar to that of LLDPE but to be superior to it in various respects. These will be gone into later.

3. *Main request*

According to claim 1 of set A the heat sealing layer of a hot-water shrinkable film of otherwise conventional structure comprises at least 50% by weight of a linear copolymer of ethylene and x to y % by weight, based on the copolymer, of an α -olefin with 4 to 8 carbon atoms per molecule, wherein $x=0.5n_c+8$ and $y=1.25n_c+15$ with n_c being the number of carbon atoms in the α -olefin.

The above formula results in the following permissible contents of α -olefin in the copolymer:

Number of carbon atoms in α -olefin	weight % of α -olefin	mole % of α -olefin
4	10 - 20	5.3 - 11.1
5	10.5 - 21.25	4.5 - 9.8
6	11 - 22.5	4.0 - 8.8
7	11.5 - 23.75	3.6 - 8.2
8	12 - 25	3.3 - 7.7

The formula for α -olefin content has not been changed from that found in claim 1 of the application as originally filed. What has been changed is the limiting value for the density of the copolymer. The amendment, worded in slightly different terms, was made voluntarily in the course of the pre-grant examination proceedings after the appellants became aware of relevant prior art, including documents D6 and D16. According to claim 1 of set A the density is not higher than 0.915 g/cm³, whereas in the original claim 1 it was stated to be less than 0.920 g/cm³. It is therefore necessary to consider whether, as argued strenuously by the respondents, the amendment leads to an extension of subject-matter beyond the content of the application as filed.

In the particular embodiments disclosed in the original application three different copolymers conforming to the requirements of present claim 1 (and originally filed claim 1) are used. The first of these contains 15% butane-1 and has a density of 0.906 g/cm³, the second 19% octene-1 with a density of 0.911 g/cm³ and the third 13% octene-1 with a density of 0.915 g/cm³. Furthermore, in comparative examples, there are used a copolymer with a content of 8% butene-1 and a density of 0.918 g/cm³ and a copolymer with a content of 10.5% octene-1 and a density of 0.920 g/cm³. In the opinion of the Board it would be clear to the skilled person from the test results that there was a general trend to improvement in the desired properties of the film the lower the density of a particular copolymer (ie with the same number of carbon atoms in the α -olefin). It was also apparent that this improvement was obtainable at a relatively higher density with an α -olefin of relatively higher carbon number. Since the density value of 0.915 g/cm³ was the maximum value used to exemplify the invention as originally disclosed and was associated with the α -olefin of highest carbon number the Board can see no objection to taking this value to form the end point of a more restricted range, since there is nothing about this value which would make it unique and peculiar to the specific α -octene copolymer disclosed (see T 201/83, OJ EPO 1984, 481).

The objection of the respondents that present claim 1 now effectively disclosed for example an ethylene-heptene-1 copolymer with a density of 0.915 g/cm³, of which there was no disclosure in the original application, so that the claim failed the so-called "novelty test", cannot be followed by the Board. Present claim 1 (as well as the originally filed claim 1) does not "disclose" a set of individualised copolymers each of which has a density of 0.915 g/cm³ or less. Instead,

what the claim does is set out a class of copolymers of composition and density within the ranges specified in it. Thus, in the same way that the originally filed claim 1 did not disclose, for example, an ethylene-heptene-1 copolymer with any specific density neither does present claim 1.

The respondents have alleged lack of novelty of the subject-matter of present claim 1 with respect to documents D6, D7, D16 and D18.

The disclosure of documents D6, D16 and D18, which all stem from the same company (opponents 06), are very similar. There is proposed therein a hot-water shrinkable packaging film having good gas barrier properties, oil resistance and heat sealability. According to document D6 this is achieved by means of a film comprising a core layer of PVDC or EVOH sandwiched between an inner and an outer layer of a preferably a mixture of LLDPE and EVA, wherein the outer layer has been cross-linked by exposure to radiation. The LLDPE is stated to be a copolymer of ethylene and α -olefin having 4 to 18 carbon atoms and a density of 0.900 to 0.950. The content of the α -olefin in the copolymer is stated to be 1.0 to 30% by weight. The two examples of LLDPE given both have a density of 0.922 g/cm³. The nature of the α -olefin and content thereof in these examples is not given. According to document D16 the required combination of properties is obtained by the interposition of a fourth layer, preferably of EVA or ethylene-ethyl acrylate, between the core layer of PVDC or EVOH and one of the inner and outer layers, these being of LLDPE or a mixture of LLDPE and EVA. Here, the LLDPE is stated to be a copolymer of ethylene and an α -olefin with 5 to 14 carbon atoms and a density of 0.900 to 0.950 especially 0.900 to 0.940 g/cm³. The specific examples have a density of 0.922 and

0.935 g/cm³. Again, the α -olefin and contents thereof are not given. Document D18 also proposes a three layer laminate with a core layer of PVDC and outer layers of a mixture of LLDPE and EVA, whereby the amount of LLDPE is less than 65% by weight of the total amount of LLDPE and EVA in both these layers. The definition of LLDPE corresponds essentially to that given in document D6, the examples having densities of 0.922, 0.93 and 0.935 g/cm³.

Present claim 1 specifies the copolymers to be used for the heat sealing layer in terms of three related, but not co-terminus parameters, i.e. the carbon number of the α -olefin, the content of the α -olefin, and the density. For each of the ranges given for these parameters there is broad overlap with the ranges given in documents D6, D16 and D18. The Boards of Appeal have generated a considerable body of jurisprudence related to the question of novelty of selection in situations such as there (see the recently published "Case Law of the Boards of Appeal of the EPO", pages 74 to 77). Of the various considerations addressed there the present Board is of the opinion that the one of most relevance to the case in hand is the question whether the skilled person in the light of the technical facts would "seriously contemplate" applying the teaching of the prior art document in the area of overlap. In this context it has particularly to be noted that density ranges given in the cited documents, ie 0.900 to 0.940 or 0.950 g/cm³ are extremely broad and at the relevant dates of publication of these documents the minimum density thought to be feasible with LLDPE technology was 0.915 g/cm³ (see e.g. document D24), so that any reference to densities of the order of 0.900 g/cm³ must be seen as being purely speculative. Furthermore, the minimum density of 0.922 g/cm³ of any specific example to be found in these documents is significantly spaced

(in the context of the technology involved) from the maximum values of 0.915 g/cm³ permitted by present claim 1. In view of these considerations the Board comes to the conclusion that the answer to the question identified above must be in the negative, and that the subject-matter of the claim is novel with respect to the disclosures of documents D6, D16 and D18.

The situation with regard to document D7 is however different since this proposes, in the context of a hot-water shrinkable film comprising a three component carrier layer, PVDC oxygen barrier layer and an LLDPE heat sealing layer, the use of LLDPE having a density in the range of 0.910 to 0.935 g/cm³, more preferably 0.910 to 0.925 g/cm³, and in one embodiment discloses LLDPE having a density of 0.915 g/cm³. The relevant teaching is to be found on page 42 of the translation with respect to Example 1. It is stated there that "LLDPE (with an MI of 2.0, a density of 0.915 g/cm³, an mp of 116°C having a peak at 120°C and a Vsp of 98°C prepared by copolymerising 3.5 mole % of octene-1 as the α -olefin) was used as the resin for the surface layer". It is not in dispute that 3.5 mole % of octene-1 would correspond to approximately 12.7 weight %, a value falling within the range specified in present claim 1.

The appellants' first line of defence is however that the 3.5 % mole does not refer to the content of octene-1 in the copolymer but to the relative proportions of ethylene and octene-1 charged into the reactor and that because of the lower reaction rate of the octene-1 its actual content in the copolymer would be less than 1 mole %. The Board cannot accept that this would in the context be a reasonable interpretation of the relevant passage by the skilled person. Firstly, to refer to the reaction conditions rather than the product would be a very unusual and unhelpful way of characterising it.

Secondly, in the absence of any indication to the contrary the term "copolymerising" must be assumed to relate to the completed act, in other words to mean that the 3.5 mole % of octene-1 have been copolymerised with the ethylene for forming the copolymer. Thirdly, since there is a generally inverse relationship between the density of an LLDPE and the content of α -olefin, it is apparent that a density as low as 0.915 could not be achieved with a content of less than 1 mole % of octene-1. This confirmed by the statement of Mr Ruinaard.

Their second line of defence is that Example 1 of document D7 does not constitute an "enabling disclosure", in other words does not disclose the hot-water shrinkable film to which it relates in a manner sufficient to allow others to reproduce it. Their objection resides in the fact that the skilled person is not told how to obtain the particular LLDPE required as a starting material and they rely in particular on what is said in T 206/83 (OJ EPO 1987, 5) in this respect. They emphasise that the skilled person in the present case is not a polymer chemist with expert knowledge of the production of polyethylenes but instead someone who is primarily concerned with the processing of polymers into packaging films. Furthermore, they have provided a listing (Annex 12 to their letter of 10 May 1996) to show that an LLDPE with the physical parameters given in Example 1 of document D7 did not correspond to any commercially available material. They therefore argue that the skilled person, having established that no corresponding material was commercially available, and seeing that he was not told how to make it, would assume that what is said about the LLDPE was incorrect. He would therefore turn to that commercially available material which with respect to its published physical parameters was the closest to that described in document

D7. They have identified the material ULTZEX 1520 L in this respect and shown by analysis (Annexes 13, 13a and 13b to their letter of 10 May 1996) that it was not a material falling within the terms of the definition given in claim 1 since the content of α -olefin (4-methyl-1-pentene) is too low. Lastly, they dispute, on the basis of the statement of Mr Ruinaard, that the LLDPE described in Example 1 of document D7 can be made at all.

Despite the considerable effect the appellants have put into developing and supporting their argument of non-enabling disclosure the Board cannot accept it as being correct. Once the skilled person has established that an LLDPE with the required properties is not commercially available he will, if he does not have the specialist knowledge himself, refer the problem to a polymer chemist. The technology of LLDPE production was at the relevant date well documented and generally known to the latter. The Board can see no reason why a polymer chemist on the basis of this information could not produce the required LLDPE. All that Mr Ruinaard states in this respect is that the ethylene-octene-1 copolymer produced by his company (DSM) has melting points of 121°C and 124°C and a Vicat temperature of 92°C compared to the corresponding values of 116°C, 120°C and 98°C given in document D7. The octene-1 content and the melt index of this copolymer are not given, but if, as can be assumed, the material referred to is their commercially available product Stamylex 09-046, this would have an octene-1 content of 14 weight % and a melt index of 4.4 (see Annex 2 of the statement of grounds). In other words it is not a material which otherwise conforms to the requirements of document D7, i.e. an octene-1 content of 12.7 weight % and a melt index of 2.0. It seems wholly plausible that these distinctions could account for the differences mentioned above.

The situation considered in T 206/83 (supra) is not comparable with the present case. There it was held that a prior art document did not constitute an enabling disclosure as it did not contain sufficient information to allow the skilled person to make one of the starting materials, a complex organic molecule, and that he was not in position to do this on the basis of his general knowledge. In the present case, however, the contentious starting material is merely a member of a well-known class of polymers and defined by particular physical parameters, these being obtainable by the skilled person by suitable adaptation of the production process variables.

The Board therefore comes to the conclusion that the subject-matter of claim 1 of set A lacks novelty (Article 54 EPC).

4. *First auxiliary request*

Claim 1 of set B has been derived from claim 1 of set A by the addition of a disclaimer. The disclaimer sets out the composition of the three component blend (ABC) of which the carrier layer of the film disclosed in document D7 is made.

4.1 Novelty

It is clear from T 4/80 (OJ EPO 1982, 149) that amendment by way of disclaimer to avoid anticipation was considered an exceptional measure to be used in particular circumstances (for example so-called "accidental" anticipation) where the limitation of the claim in positive terms could not be done clearly or concisely, or would lead to an unfair result. In view of the apparent stringency of that requirement disclaimers have become relatively commonplace, indicating that in

practice the Boards interpret it somewhat liberally. The appropriateness of the use of a disclaimer in the present case has been challenged by the respondents. They argue that document D7 is not an "accidental" anticipation but objectively the closest state of the art and that to allow the disclaimer in such a situation has the inevitable effect that inventive step will be argued on its basis, ie that particular features are not present. This would be contrary to the jurisprudence of the Boards, see T 170/87 (OJ EPO 1989, 441) and T 597/92 (OJ EPO 1996, 135).

If the Board were also convinced that document D7 represented the closest state of the art for evaluating the inventive step of the claimed invention over its whole ambit then it would share the reservations of the respondents as to the admissibility of the disclaimer. However, since document D7 is concerned with the overall structure of the film and the weight of its disclosure is concentrated on the interplay between the materials of various layers, rather than any benefit of the LLDPE layer *per se*, the Board is of the opinion that document D6, as argued by the appellants, is the most appropriate starting point. The Board accepts therefore that there is no objection in principle to the use of the disclaimer in the present case. The respondents also argued that comparative example 16 of document D7 not only comprised all of the technical features positively stated in claim 1 of set B but also did not comprise a layer of a blend as defined in the disclaimer. Now, it is indeed true that the film of comparative example 16 comprises solely inner and outer layers of the LLDPE of density 0.915 g/cm³ described above, two adhesive layers of EVA and a core layer of PVDC. It is however clear from what is said on page 64 of document D7 that when it was attempted to stretch the film at the temperatures required to give it the required hot-water shrinkability

this could not be done satisfactorily and the film punctured. It is self-evident that such a punctured film would not exhibit the primary utility required by the claim of being a "hot-water shrinkable film for food packaging".

In view of the above the Board comes to the conclusion that the subject-matter of claim 1 of set B is novel with respect to document D7, and for the reasons explained with respect to the subject-matter of claim 1 of set A also novel with respect to documents D6, D16 and D18.

4.2 Inventive step

The patent specification contains a number of statements of object and advantage which are not wholly consistent in their terms. For example, it is stated on page 2 at lines 51 to 58 that

"It is an object of the present invention to provide a multi-layer laminated packaging film and bags made therefrom which have improved shrink characteristics over the materials used in the past. This means that at a given temperature the shrink in percent (the mean between the shrink in the longitudinal and transversal direction) should be higher and the tolerated maximum shrink temperature should also be higher. The maximum shrink temperature is dependent on the seal strength at elevated temperatures. It is a further object of this invention to provide a packaging material with improved cold seal strength and thereby a reduced risk of breakages when bags made of the film material are utilized in automated loading process."

On page 3, at lines 5 to 7 it is stated that

"Finally and most importantly it is an object of this invention to provide a material combining the above advantages, i.e. improved shrinkability, increased maximum shrink temperature, good cold seal strength and sealability through contamination."

The appellants argue that it is clear from the above statements that the primary technical problem with which the claimed invention is concerned is the improvement in the shrink characteristics, while maintaining the balance of other desirable properties such as cold seal strength and sealability through contaminations. They observe that an improvement in shrinkage rate at the expense of for example cold seal strength leads to a material which is unsatisfactory and does not solve the technical problem. They apply this comment in particular to comparative examples 2 and 5 which had been mentioned by the Board in the annex to the summons to oral proceedings. At the oral proceedings they placed particular emphasis on the shrink rate of the films that was obtained at the maximum usable shrink temperature, which was defined as the temperature at which the hot-burst pressure drops below 650mm/H₂O. To back this up they produced tables, equivalent to Tables II and IV of the patent specification, in which the shrink rate at 650mm/H₂O hot-burst pressure were included. (Most of these values had been determined by interpolation from the values given in the original tables.)

The situation with respect to Table II (comparative examples 1 to 4 and examples 1 to 3, where in all cases the heat sealing layer and (except comparative example 1) a core layer of EVA were cross-linked by irradiation) seems clear. The lowest shrink rate of any example of the invention at 650mm/H₂O hot-burst

corresponds to that of comparative example 2 with the ionomer heat sealing layer, but exhibits a better cold seal strength. The picture with respect to Table IV (comparative examples 5 and 6 and examples 4 to 10, no cross-linking) is somewhat different. Here comparative example 6, which comprises a heat sealing layer of a copolymer of ethylene and 8 weight % of butene-1 with a density of 0.918 g/cm³ is shown as having a shrink rate at 650mm/H₂O hot-burst which is higher than that of all of examples 7 to 10 of the invention, in which the heat sealing layer is made of various blends of ethylene- α -olefin copolymers according to the terms of claim 1 and EVA, and equal to that of example 5, in which the material of the heat sealing layer is an ethylene-octene-1 copolymer with a density of 0.915 g/cm³. Whereas examples 5 and 7 to 9 do exhibit a higher cold seal strength than comparative example 6, example 10 does not.

Thus based on the technical effects actually deriving from the invention as disclosed in the patent specification the Board is of the opinion that it would be incorrect to adopt the approach of the appellants to the question of inventive step and to determine this by asking the question whether it was obvious for the skilled person to use an ethylene- α -olefin copolymer as defined in claim 1 in order to improve the shrink characteristics of known films. The proper question to be asked is whether it was obvious to do this in the expectation of an improvement in the overall balance of the required properties of such a film in particular shrinkage, cold seal strength and hot seal strength.

Although claim 1 refers to both LLDPE and VLDPE the appellants put the weight of their arguments with respect to inventive step on VLDPE, which is a material which only became commercially available a short time

before their original application (earliest priority date 30 September 1985) was made. The appellants do not dispute that VLDPE's with an α -olefin content and density as specified in the claim were known and commercially available before this priority date. Two examples are the Stamylex PE grades 08-076, with a density of 0.911 g/cm³, and 09-046, with a density of 0.915 g/cm³, described in document D32. According to Annex 2 to the statement of grounds Stamylex 08-076 contains 17.5 weight % of octene-1 and Stamylex 09-046 14% of octene-1. Stamylex 08-076 is described in document D32 in the following terms:

"Linear polyethylene with a very low density and a high melt index. It is a grade with great elasticity and outstanding toughness, but is primarily characterised by its extremely low sealing temperature and exceptional sealing properties.

Main applications:

Sealing layer in, oriented or non-oriented, co-extruded film."

Another prior art document which specifically discloses VLDPE's of α -olefin content and density as required by claim 1 is document D3 (examples 2 to 5). The VLDPE's disclosed there are said to have better transparency, impact strength, tear strength, blocking resistance, low temperature sealability, heat resistance and environmental stress cracking resistance than conventional LLDPE (see page 8, lines 32 to 34).

Documents D24 and D28 are more general in ambit and do not specifically disclose any VLDPE which can be seen to fall within the terms of claim 1. They indicate that VLDPE combines the favourable properties of LLDPE and EVA. Suggested uses include shrink and stretch film, and

co-extruded film (document D24). In document D28 reference is made to VLDPE's ability to be drawn down extremely thin without pinholes and retaining good toughness and tear resistance.

The Board can accept the argument of the appellants that there is no direct teaching in the state of the art to use VLDPE in a hot-water shrinkable film, and that the references to "shrink film" should not be understood in this way. However, in view of the information available to him, in particular from documents D3 and D32, the skilled person nevertheless had a clear incentive to replace the LLDPE or LLDPE/EVA heat sealing layer of the hot-water shrinkable film known from document D6 by a VLDPE conforming to the definition of present claim 1, such as Stamylex 08/076, in full expectation that this would lead to an improvement in the heat sealability and resultant seal strength of the film. On the basis of the information there was no reason to fear that the other important properties of the film would suffer through the use of VLDPE. The fact that in practice there may also have been an improvement in shrinkability is a fortuitous collateral advantage or so-called "bonus effect" which cannot substantiate an inventive step (see T 69/83, OJ EPO 1984, 357 and T 192/82, OJ EPO 1984, 415).

In view of this finding there is no need to deal in great detail with the extensive arguments of the appellants that there was some form of abstract "prejudice", not against the use of LLDPE in hot-water shrinkable films (having regard to the teachings of documents D6, D7, D16 and D18 this cannot be the case) but against the negative contribution this material made to shrinkability, and that this prejudice would have been carried over to VLDPE and therefore have discouraged the skilled person from using it to achieve

an improvement in this property. These arguments could only have had any relevance to the very restricted approach to evaluation of inventive step proposed by the appellants, which for the reasons given previously has been rejected by the Board. In any case the assumption that a "prejudice" against LLDPE in this respect would be transferred to VLDPE is at odds with their argument based on the expertise of Professor Menges that it is not possible to predict the level of shrink obtainable with a new polymer and that trial and error remains the only practical way.

Having regard to the above the Board therefore comes to the conclusion that the subject-matter of claim 1 of set B lacks inventive step (Article 56 EPC).

5. *Second auxiliary request*

The above finding of lack of inventive step with respect to claim 1 of set B applies with equal force to claim 1 of set C since the terms of the disclaimer can self-evidently have no bearing on it.

It has in any case never been made clear what the purpose of the different form of disclaimer is. Generally, a disclaimer should not be more comprehensive in its terms than is necessary to avoid anticipation. It is therefore difficult to see any logic in having a lower ranking auxiliary request with a broader disclaimer than a higher ranking one.

6. *Third and fourth auxiliary requests*

It belongs to the established jurisprudence of the Boards of Appeal that the admission of amended claims into appeal proceedings, particularly when the amendments are first submitted at oral proceedings, is

at the discretion of the Boards, see for example T 95/83 (OJ EPO 1985,75) and T 153/85 (OJ EPO 1988, 1). The factors which need to be taken into account when exercising this discretion include whether there is some clear justification for the late submission of the amendment and whether the amended documents are clearly allowable, firstly in the sense of conforming with the formal requirements of the EPC and secondly in the sense of having at least a reasonable prospect of removing the outstanding substantive objections against the documents previously on file.

The appellants originally presented the submission of claim sets D and E at the oral proceedings as being in response to the objections raised by opponents 06 against the use and form of the disclaimer in their letter of 30 May 1996 and that these claims were only to be considered on the condition that the Board held the disclaimer to be unallowable. Subsequently, however, they removed this condition and stated that they wanted these claims considered as auxiliary requests in their own right, thus also removing the only justification they had given for their late filings.

As for the formal and substantive issues involved it is apparent first of all that the reasons given in point 3 above for accepting the density limit of "not higher than 0.915 g/cm³ cannot be applied to the limits of "less than 0.915 g/cm³" (claim 1 of set D) or "not higher than 09.11 g/cm³" (claim 1 of set E) so that it is not clear that these claims meet the requirements of Article 123(2) EPC. Secondly, it is not apparent how these limitations could lead to a change in the negative evaluation of inventive step, since corresponding VLDPE's were in any case known (cf. Stamylex 08-076, with a density of 0.911 g/cm³).

The Board therefore comes to the conclusion that these auxiliary requests are inadmissible and accordingly rejects them.

7. *Fifth to ninth auxiliary requests*

These requests correspond to the main request and first to fourth auxiliary requests respectively with the added limitation that the heat sealing layer consists of (and no longer merely comprises at least 50% by weight of) the stated LLDPE or VLDPE copolymer.

The requests are all rejected for the same or equivalent substantive, formal or procedural reasons given in points 3 to 6 for the corresponding higher ranking auxiliary requests. In particular, the subject-matter of claim 1 according to the fifth auxiliary request (ie claim 1 of set A plus "consists of") lacks novelty with respect to document D7, the heat sealing layer disclosed there also consisting of LLDPE alone. As for the question of inventive step with respect to the subject-matter of claim 1 according to the sixth auxiliary request (ie claim 1 of set B plus "consists of") the Board is of the opinion that the first approach of the skilled person who had decided to use VLDPE for the heat sealing layer of a hot-water shrinkable film would be to see whether this material would give satisfactory results by itself, especially as VLDPE was considered to combine the favourable properties of LLDPE and EVA, which were the two components of the blend proposed in document D6. Thus he would inevitably have arrived at the subject-matter of the claim.

Order

For these reasons it is decided that:

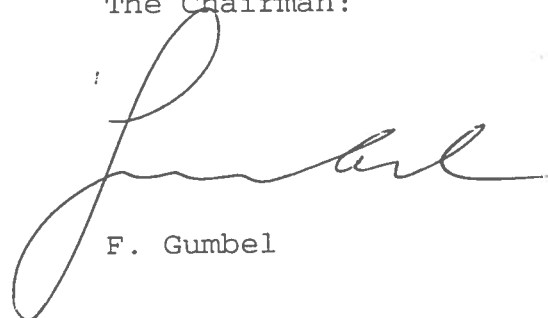
The appeal dismissed.

The Registrar:




S. Fabiani

The Chairman:



F. Gumbel



1704.D
