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**Datasheet for the decision
of 10 May 2011**

Case Number: T 1243/08 - 3.2.05

Application Number: 98913447.3

Publication Number: 981431

IPC: B29C45/00

Language of the proceedings: EN

Title of invention:

INJECTION MOULDING PROCESS AND PRODUCT OBTAINABLE FROM THE
PROCESS

Patent Proprietor:

Zestron Research Pty Ltd

Opponent:

Tec Tubes Sweden AB

Headword:

Relevant legal provisions:

EPC Art. 54, 56, 83, 84, 112(1), 113(2)
RPBA 13(1)

Keyword:

Clarity of amendments - yes
Sufficiency of disclosure - yes
Novelty - yes
Inventive step - yes
Admissibility of appellant(opponent)'s request concerning a
possible amendment of a claim - no
Referral to the Enlarged Board of Appeal - no

Decisions cited:

Catchword:



Case Number: T1243/08 - 3.2.05

D E C I S I O N
of the Technical Board of Appeal 3.2.05
of 10 May 2011

Appellant:
(Opponent)

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Decision under appeal:

**Interlocutory decision of the Opposition
Division of the European Patent Office posted
9 May 2008 maintaining European patent
No. 0981431 in amended form pursuant to
Article 101(3) (a) EPC.**

Composition of the Board:

Chairman: W. Zellhuber
Members: S. Bridge
E. Lachacinski

Summary of Facts and Submissions

- I. The appellant (opponent) lodged an appeal against the interlocutory decision of the opposition division maintaining European patent No. 981 431 in amended form.

The opposition was filed against the patent as a whole based on Article 100(a) EPC (Articles 54 and 56 EPC) and Articles 100(b) and (c) EPC.

- II. Oral proceedings were held before the Board of Appeal on 10 May 2011.

- III. The appellant requested that the decision under appeal be set aside and that European patent No. 981 431 be revoked in its entirety, and, as first auxiliary request, that claim 1 should clearly define the steps of the test procedure to form part of the manufacturing process and, as second auxiliary request, that the questions cited in the submission received on 25 March 2011 under the points 1A, 1B and 2A to 2C be referred to the Enlarged Board of Appeal.

The respondent (patent proprietor) requested that the appeal be dismissed and that US document 5,525,695 should not be admitted into the proceedings.

- IV. Independent claims 1 and 12 of the patent in suit as maintained during the opposition proceedings read as follows:

- "1. A process for the manufacture of flexible, thin-walled articles comprising the steps of:
1) using a polymer blend comprising at least one nucleating agent wherein the polymer blend

has an ESCR as herein defined of greater than 10 hours when tested according to the following procedure:

- i) a plurality of strips of the polymer blend incorporating any post moulding treatment intended for the final article having the cross-sectional dimensions of 0.65mm in thickness and 10mm in width are injection moulded under high shear, long flow length conditions, similar or identical to those intended for use in the manufacture of the flexible thin-walled article;
- ii) the strips are bent back upon themselves and stapled 3mm from the bend;
- iii) the bent strips are immersed in a solution of a stress crack agent wherein the stress crack agent is a 10% solution of nonylphenol ethoxylated with 9 moles of ethylene oxide and held at a temperature of 50°C;
- iv) the strips are observed for signs of cracking; and
- v) the time to failure is when 50% of the strips show signs of cracking;

and wherein at least one polymer of the polymer blend is a plastomer, a substantially linear polyethylene polymer or a polypropylene copolymer having a density of between 0.87 and 0.92 g.cm⁻³ and an MFI of greater than 10;

- 2) melting said polymer blend;
- 3) ramming the molten polymer blend into a mould said mould having a cavity which produces a thin-walled article having a thin section of 1mm or less in thickness and wherein the thin section is substantially continuous for greater than 50mm in the direction of flow of the molten polymer blend in the mould; and

4) removing from the mould the thin-walled article formed from the polymer blend."

"12. A thin-walled tube produced in accordance with the process of claim 1."

V. The following documents are referred to in the present decision:

D1: US-A-5,589,128

D2: AU-A-19446/92

E1: WO-A-92/05024

E4: WO-A-92/00224

E5: Test report TR1, English translation and data sheets of materials used

E11: US-A-5,759,647

E13: US-A-5,149,484

E14: US-A-4,585,817

VI. The arguments of the appellant in the written and oral proceedings can be summarised as follows:

Interpretation of claim 1

In claim 1 it is not clear whether the steps of the ESCR test procedure form part of the claimed manufacturing process or not. The steps of the manufacturing process are mixed in with those of the ESCR test procedure thereby rendering claims 1 and 12 as maintained in the opposition proceedings neither clear nor concise, because the subject-matter is not defined by its technical features but in terms of a goal to be achieved such that the person skilled in the art has to use inventive skills in order to find the appropriate material compositions and process parameters.

Clarity of amendments

There are no indications concerning the quantities of the nucleating agent and the at least one polymer in claim 1 as maintained in the opposition proceedings. A presence in an amount corresponding to an impurity suffices thus rendering the definition of the polymer blend meaningless. Furthermore, the term "*plastomer*" is unclear as such. For these reasons claim 1 is unclear.

Insufficiency of disclosure

The steps of the ESCR test procedure are non-standard and, as set out in claim 1 as maintained in the opposition proceedings, contain many variables which have to be determined by arbitrary choices of the skilled person. These variables include factors such as the length of the test strips, the actual injection moulding conditions corresponding to "*high shear, long flow length conditions, similar or identical to those intended for use in the manufacture of the flexible thin-walled article*", the orientation of the bend of the test strip with respect to the polymer flow direction, the amount of curvature of the bend of the test strip, the duration of the immersion in the stress crack agent, the regulation, if any, of the evaporation of the stress crack agent during the test and what should be considered as "*signs*" of cracking. The results obtained the ESCR test procedure thus depend on the particular choices made and are therefore not consistently reproducible. For example, the polymer, Dowlex 2552E, passes the ESCR test procedure when carried out by the appellant (document E5) whereas, according to paragraph [0006] of the patent in suit, it does not. Therefore, the test procedure as set out in

claim 1 as maintained in the opposition proceedings is not sufficiently disclosed.

Similarly, the MFI testing conditions for determining an MFI greater than 10 are undefined.

In addition, the unspecified quantity and nature of the nucleating agent and the unspecified quantities of plastomer, a substantially linear polyethylene polymer or polypropylene copolymer in the polymer blend provide such a large set of possibilities that they place an undue burden on the skilled person trying to determine suitable polymer blends.

Therefore, the patent as maintained in the opposition proceedings does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

Novelty

Document E1 concerns injection moulding of thin walled tubes made of material such as "*linear low PE*" with "*a melt flow index sufficiently high to enable the molten plastic to be injected into the mould and to flow down the cavity to the end of the mould ... and which provide acceptable stress crack resistance ... to be used commercially*" (document E1, page 1, lines 4 to 6; page 11, lines 12 to 26; claim 25). Impurities inevitably present in the polymer blend will act as nucleating agents.

A similar disclosure is contained in document E4.

Therefore, the subject-matter of claims 1 and 12 as maintained in the opposition proceedings lacks novelty over the disclosure of each of documents E1 and E4.

Inventive Step

Assuming that the subject-matter of claim 1 differs from the process disclosed in document E1 in that:

- the length of the thin section of the article is specified,
- a blend of polymers is used,
- a nucleating agent is included in the polymer blend, and
- the polymer blend has an ESCR value of more than 10 hours when tested according to the procedure set out in claim 1 as maintained in the opposition proceedings,

these differences do not give rise to a synergistic or unexpected effect. Instead they each relate to a different issue, which issues, and their respective solutions, are already known from the prior art:

- Document E4 discloses the extent of injection mouldable thin sections (page 3, lines 31 to 33).
- The use of polymer blends for injection moulding thin walled articles with good environmental stress cracking resistance is known from document D1 (column 1, lines 11 to 36; column 2, lines 35 to 37) or document D2 (page 1A, lines 1 to 9; page 4, lines 2 to 22).
- The use of nucleating agents in the context of injection moulding is known in the art, for example see document E11 (column 7, lines 48 to column 8, line 28) or document E13 (column 2, lines 6 to 18; claim 1).
- An ESCR-value as defined in claim 1 as maintained in the opposition proceedings is not explicitly

disclosed in document E1. This is not surprising since the method for determining ESCR described in the contested patent is completely new and was introduced by the contested patent. Therefore it is not possible to find any quantitative comparable data in any document published before the contested patent. However, according to document E1, ESCR resistance is improved by cross-linking the formulations of linear low PE by incorporating cross-linking agents such as silanes and peroxides (page 11, lines 17 to 26). This approach corresponds to that disclosed in the patent in suit (page 6, line 51 to page 7, line 8, of the patent specification). Hence, the ESCR-value defined in the opposed patent would be achieved by the person skilled in the art following the instructions on how to mix the polymer blend and this feature is therefore implicitly known from document E1.

Therefore, the subject-matter of claim 1 as maintained in opposition proceedings is not based on an inventive step with respect to document E1 in combination with documents E4, D1 or D2, and E11 or E13.

In addition, it is obvious for the skilled person starting from either documents D1 or D2 to seek to use the respective material disclosed therein for an injection moulding process according to document E4. As the respective materials disclosed in documents D1 or D2 concern the same type of polymer as claimed in claim 1 as maintained in opposition proceedings, they will also meet the ESCR requirement. The skilled person will thus immediately arrive at the subject-matter of claim 1 as maintained in opposition proceedings.

Conversely, the skilled person may also start from document E4 and seek to determine a suitable thermoplastic. As already argued above, suitable materials are known from documents D1, D2. In addition, known materials from US Patent 5,525,695 (cited in paragraph [0029] of the patent in suit) or referred to in paragraphs [0022] and [0023] of the patent in suit are such that the ESCR-value may be assumed to be met. The skilled person would thus again immediately arrive at the subject-matter of claim 1 as maintained in opposition proceedings.

Document US Patent 5,525,695, cited in paragraph [0029] of the patent in suit, discloses substantially linear polyethylenes which, by implication, have the required material properties. This document should therefore be introduced into the proceedings. Furthermore, it is obvious for the skilled person starting from this document to seek to use the material disclosed therein for an injection moulding process according to document E4, thus immediately arriving at the subject-matter of claim 1 as maintained in opposition proceedings.

The lack of inventive step arguments raised in the context of the method of manufacture of claim 1 as maintained in opposition proceedings carry over to the corresponding product claim 12 as maintained in opposition proceedings.

In addition, the skilled person starting from document E14 would use the linear low density polyethylene blends including a nucleating agent disclosed therein (column 1, lines 21 to 27 and 45 to 64) for the manufacture of thin walled articles in accordance with the teaching of document E1 and thereby

immediately arrive at the subject-matter of claim 1 as maintained in opposition proceedings. Implicitly such a product should also fulfil the ESCR test since it is made according to the constructive features described in claim 1. Hence, the invention lacks an inventive step also in view of document E14 combined with document E1.

Therefore, the subject-matter of claims 1 and 12 as maintained in the opposition proceedings lacks an inventive step.

First auxiliary request

To ensure clarity, claim 1 of the patent in suit should be amended to include the test procedure as part of the manufacturing process, for instance by adding to claim 1 the phrase "*wherein the process for the manufacture of flexible, thin-walled articles comprises the step of carrying out the complete test procedure defined in steps 1i -1v*".

Second auxiliary request

The following questions should be referred to the Enlarged Board of Appeal under Article 112(1) (a) EPC:

"1A. *Can the subject-matter of a claim be considered to exhibit novelty when there is no evidence that the subject-matter is novel and where it is impossible to show whether prior art discloses the subject-matter defined?*"

"1B. *If question 1A is answered in the affirmative, can the claim still be considered to be novel when the subject-matter is a material that is defined by a parameter obtained with a novel or at least unknown*

test procedure that has not been used or described in the prior art and that cannot be applied to prior art products?"

"2A. Does a claim meet the requirements of the EPC when the only contribution to prior art is not defined in the claim?"

"2B. If question 2A is answered in the affirmative, does the claim still meet the requirements of the EPC when the contribution to prior art is a test procedure for selecting a material to be used in a known process, but where the claim does not define the performing of the test procedure but instead defines a test parameter that a material qualifying as a selected material would have if tested according to the test procedure?"

"2C. If question 2B is answered in the affirmative, does the claim still meet the requirements of the EPC when a material that has this test parameter not necessarily is novel as such?"

VII. The arguments of the respondent in the written and oral proceedings can be summarised as follows:

Interpretation of claim 1

Step 1 of claim 1 as maintained in the opposition proceedings merely specifies the use of particular polymer blends. The test procedure is not part of the claimed manufacturing process. Furthermore, as the steps of the test procedure were already present in claim 1 as granted, the issue of clarity concerning the presence of these steps no longer arises in opposition appeal proceedings.

Clarity of amendments

The term "*plastomer*" in claim 1 as maintained in the opposition proceedings is clear for the skilled person when it is interpreted according to the description of the patent in suit where it is defined on page 4, lines 44 to 49 of the patent specification. The presence of a nucleating agent in the polymer blend is based on granted claim 8 and does not lead to any inconsistencies in the claim. Furthermore, quantities of nucleating agent and at least one polymer, i.e. the *plastomer*, substantially linear polyethylene polymer or polypropylene copolymer, in amounts corresponding to an impurity are not consistent with the disclosed invention (see paragraph [0061] and the examples of the patent in suit). Therefore, claim 1 as maintained in the opposition proceedings is clear.

Insufficiency of disclosure

Injection moulding under high shear, long flow length conditions increases the alignment of the polymers in the direction of flow. This increased alignment of the polymers is the dominant cause for the deteriorated properties of the moulded polymer blend when bent about an axis aligned with the direction of flow (patent in suit, page 2, lines 36 to 38 and 45 to 47). The skilled person carrying out the test will consult the description of the patent in suit and only make reasonable choices: thus he will necessarily test the strips along their line of greatest weakness. In addition, for such thin test strips the first sign of cracking is effectively the failure of the material. For these reasons, any remaining choices to be made when carrying out the test procedure do not have a significant effect on the ESCR test results. The test

performed by the appellant (document D5, translation of test report TR1) differs significantly from the one set out in claim 1 as maintained in the opposition proceedings. For example, the test strips were clamped instead of stapled. Thus, there is no evidence that the ESCR test procedure cannot be carried out.

Furthermore, the claimed polymer blends are clearly defined (see discussion on clarity) and the patent in suit contains working examples so as not to place an undue burden on the skilled person when determining a suitable polymer blend.

Similarly, the measurement of a MFI value is an industry standard.

Therefore, the patent as maintained in the opposition proceedings discloses the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

Novelty

The objection of lack of novelty was not raised in the grounds of appeal and should not be admissible at this late stage of the proceedings. However, the grounds of appeal did refer to document E1 as a starting point for an inventive step argument. The list of materials set out in document E1, page 11, lines 12 to 26 only contains generic polymers and there is no basis for asserting that any of these materials pass the ESCR test. Thus, the disclosure of document E1 does not anticipate selecting particular polymer blends as specified in claim 1 and from which the products according to claim 12 are made, namely a plastomer, a substantially linear polyethylene polymer of a

polypropylene copolymer, wherein a key characteristic of these materials is their composition distribution, i.e. the uniformity of distribution of comonomer within and among the molecules of the polymer (see page 4, lines 44 to 46 of the patent specification).

Furthermore, document E1 provides no indication of the dimensions of a thin section according to step 3 of claim 1 and which are implicitly included in the product according to claim 12. Therefore, the subject-matter of claims 1 and 12 as maintained in the opposition proceedings are new with respect to document E1.

Inventive Step

US document 5,525,695 was never discussed in the proceedings prior to the oral proceedings and should not be admitted at this late stage. Furthermore, its use in an inventive step argument is based on hindsight.

Document E1 is considered to be the closest item of prior art. The objective problem addressed by the invention is to improve the injection moulding of thin walled articles. The solution of claim 1 as maintained in the opposition proceedings involves a particular selection of polymer blends which further have to satisfy the ESCR test as set out in the claim. This selection of materials is not derivable from either documents E1 or E4. Similarly, there is no indication or evidence that plastomers in general or the materials disclosed in documents D1 or D2 satisfy this ESCR test. In consequence, the use of such materials does not inevitably lead to the subject-matter of claim 1 as maintained in the opposition proceedings.

The same argument applies to document E14 which describes polymer compositions whose crystallisation temperature and crystallisation rate are increased by means of nucleating agents and that may also be moulded by a variety of techniques other than injection moulding into various products, none of which are explicitly thin-walled (column 1, lines 21 to 27 and lines 32 to 38). Document E14 is also silent about environmental stress cracking. Thus Document E14, even in combination with other prior art, does not inevitably lead to the subject-matter of claim 12 as maintained in the opposition proceedings.

Therefore, the subject-matter of claims 1 and 12 as maintained in the opposition proceedings involve an inventive step.

First auxiliary request

The appellant/opponent is not entitled to request changes in the wording of the patent in suit and the patent proprietor/respondent does not make such a request. Therefore, such a request is not admissible.

Second auxiliary request

Questions 1A, 1B and 2A to 2C are not relevant to the present appeal. Furthermore, they neither concern the uniform application of the law, nor do they raise a point of law of fundamental importance. Therefore, these questions are not to be submitted to the Enlarged Board of Appeal.

Reasons for the Decision

Main Request

1. Interpretation of claim 1 as maintained in the opposition proceedings

Step 1 of claim 1 as maintained in the opposition proceedings only requires the use of a particular polymer blend which polymer blend is specified, *inter alia*, in terms of having an ESCR greater than 10 hours, when tested according to a particular test procedure. Although, the steps of this test procedure are set out in the claim as steps i) to v) and have to be carried out at least once in order to ascertain the corresponding ESCR value of a particular polymer blend, they are not in fact part of the claimed manufacturing process.

The test procedure was already present in claim 1 as granted so that the issue of lack of clarity and lack of conciseness due to the presence of test procedure steps amongst the manufacturing steps of claim 1 as maintained in the opposition proceedings does not arise in opposition appeal proceedings, because lack of clarity and lack of conciseness are not grounds for opposition (Article 100 EPC).

2. Clarity of the amendments

- 2.1 Claim 1 as maintained in the opposition proceedings differs from claim 1 as granted in that:

- the feature, the "*polymer blend comprising at least one nucleating agent*", is added to step 1)
- in step iii), the definition of the stress crack agent is changed from "*such as an ethoxylated nonylphenol, eg. a 10% solution of Teric N9 which*

is a nonylphenol ethoxylated with 9 moles of ethylene oxide by Orica Australia Pty Ltd" to "wherein the stress crack agent is a 10% solution of nonylphenol ethoxylated with 9 moles of ethylene oxide", and

- *the expression "wherein at least one polymer of the polymer blend has an MFI of greater than 10" is replaced by "wherein at least one polymer of the polymer blend is a plastomer, a substantially linear polyethylene polymer or a polypropylene copolymer having a density of between 0.87 and 0.92 g.cm⁻³ and an MFI of greater than 10".*

2.2 The feature, the *"polymer blend comprising at least one nucleating agent"*, corresponds to the second alternative in granted claim 8. Furthermore, the skilled person is familiar with nucleating agents and their introduction into claim 1 does not lead to any inconsistency. This amendment is thus clear.

2.3 As the term *"plastomer"* is not explicitly defined in claim 1 as maintained in the opposition proceedings, the skilled person has to interpret it in terms of the description of the patent in suit which discloses that *"a key characteristic of plastomers ... is their composition distribution, i.e. the uniformity of distribution of comonomer within and among the molecules of the polymer"* (page 4, lines 44 to 46, of the patent specification). This property enables a skilled person to identify plastomers and distinguish them from arbitrary thermoplastics: polymers without this property are not plastomers according to the patent in suit. The term *"plastomer"* is thus clear.

2.4 The absence of quantitative information concerning the amount of nucleating agent and/or the amounts of the

various materials of the polymer blend is an issue related to the scope of the claimed subject-matter and does not, as such, introduce a lack of clarity.

Furthermore, when interpreted in terms of the disclosure of the patent in suit, the term "*nucleating agent*" implies a nucleating effect in terms of "*causing the formation of a greater number of small crystals than would otherwise be the case*" (paragraph [0061]). A quantity of nucleating agent only present in an amount corresponding to that of an impurity does not provide such an effect and is therefore not consistent with the disclosed invention. Similarly, the examples in the patent in suit only disclose polymer blends in which the elastomer, substantially linear polyethylene polymer or polypropylene copolymer form a large proportion of the polymer blend: for example, the elastomer represents 60%, 95% and 97.5% of the polymer blend in examples 5 to 7. Thus, the disclosure of the invention in the patent in suit is not consistent with these polymers being merely present in the claimed polymer blend in an amount corresponding to that of an impurity and the skilled person would not consider such a possibility when carrying out the invention according to the patent in suit.

2.5 In addition, the skilled person is familiar with "*substantially linear polyethylene polymer*" and "*polypropylene copolymer*" as well as with the definition of the density of a polymer of between 0.87 and 0.92 g.cm⁻³. The clarity of this amendment was not contested.

2.6 The amended, more specific definition of the stress crack agent is clear for the skilled person and again was not contested.

2.7 In consequence, the amendments made to claim 1 as maintained in the opposition proceedings meet the clarity requirements of Article 84 EPC.

3. Sufficiency of disclosure, Article 83 EPC

3.1 ESCR testing procedure

The skilled person wishing to carry out the test will consult the description of the patent in suit and make reasonable choices: thus he will necessarily test the strips along their line of greatest weakness (patent in suit, page 2, lines 36 to 38 and 45 to 47) in order to obtain meaningful results. In addition, there is no support in the patent in suit for bending the test strips in any other direction (patent in suit, page 15, lines 15 to 17). There is also no support in the patent in suit for merely dipping the test strips into the stress crack agent and such procedure would furthermore be alien to the purpose of an ESCR test, i.e. a test which assesses the effect of prolonged exposure to a particular environment. Neither is there any support in the description for increasing the curvature of the test strip beyond that necessary to bend it back upon itself for stapling according to step ii).

The skilled person will also make reasonable choices with respect to the remaining parameters of the test procedure, such as the length of the test strips or the injection moulding conditions corresponding to "*high shear, long flow length conditions, similar or identical to those intended for use in the manufacture of the flexible thin-walled article*". No evidence was provided as to why the skilled person would not be able to select reasonable values for such parameters or not

be able to subsequently carry out the test on that basis.

The appellant's ESCR test of polymers such as Dowlex 2552E does not correspond to the test procedure steps of claim 1, because the stress crack agent solution only contained 5% of ethoxylated nonyphenol (document D5, translation of test report TR1, page 2, third paragraph) instead of the 10% required (claim 1, step iii). The appellant acknowledged this difference during the oral proceedings. The results of the tests carried out by the appellant therefore cannot be compared with those of the ESCR test of steps i) to v) of claim 1 as maintained in opposition proceedings.

Thus, there is no evidence that the choices required to determine the parameters of the test procedure would lead to inconsistent ESCR results. Similarly, no evidence was provided for the ESCR test not being reproducible due to any ambiguity in the observation of signs of cracking.

Therefore, there is no evidence that the skilled person is not able to carry out the test procedure as set out in claim 1 as maintained in the opposition proceedings or that the test procedure carried out on the basis of reasonable, alternative parameter values leads to conflicting results.

3.2 Alleged undue burden in selecting a suitable polymer blend

The claimed polymer blends are clearly defined (see above discussion on clarity) and the patent in suit contains 14 examples (paragraphs [0091] to [0101] of the patent specification) which form so many starting

points so as not to place an undue burden on the skilled person when determining a suitable polymer blend.

Similarly, the skilled person is familiar with testing conditions for determining an MFI as these are covered by standards. No evidence was provided that the skilled person would not be able to determine an MFI value for the polymers.

3.3 Therefore, there is no evidence that the patent as maintained in the opposition proceedings does 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 thus the requirement of Article 83 EPC is met.

4. Novelty, Article 54 EPC

4.1 Admissibility of the novelty objection with respect to document E4

The objection of lack of novelty was not raised in the notice of appeal and is therefore late filed.

Document E4 merely discloses otherwise unspecified "*thermoplastics*" (page 1, lines 7 to 10, claim 1) as the polymers to be used and thus does not go beyond document E1 in this respect.

Therefore, the late filed novelty objection based on document E4 is *prima facie* not relevant and thus the Board exercises its discretion under Article 13(1) RPBA not to admit it into the proceedings.

4.2 Novelty with respect to document E1

As the notice of appeal contained an objection of lack of inventive step in view of document E1, the question what distinguishes the subject-matter of the independent claims as maintained in the opposition proceedings with respect to the disclosure of document E1 has to be answered.

Document E1 discloses the manufacture of flexible, thin-walled tubes having a substantially constant thickness in the range 0.4mm to 0.7mm by injection moulding using "*formulations of ... linear low PE ... with sufficient environmental stress crack resistance ... for general commercial acceptance*" (page 1, lines 4 to 6; page 2, lines 22 to 24; page 3, lines 3 to 9 and 15 to 16; page 11, lines 14 to 17).

Document E1 thus does not disclose nucleating agents or an ESCR value and does not directly and unambiguously disclose the manufacture of a thin walled article wherein the thin section is substantially continuous for greater than 50mm in the direction of flow of the molten polymer blend in the mould.

Therefore, the subject-matter of claim 1 as maintained in the opposition proceedings is new.

5. Inventive step, Article 56 EPC

5.1 The closest prior art is represented by document E1. According to document E1, sufficient ESCR resistance is obtained by cross-linking the formulations of linear low PE by incorporating cross-linking agents such as silanes and peroxides (page 11, lines 17 to 26).

5.2 The object of the patent in suit is to provide a method wherein thin-walled articles having long, thin sections can be injection moulded without being too susceptible to failure (cf. paragraph [0003] of the patent in suit).

5.3 The subject-matter of claim 1 as maintained in the opposition proceedings is distinguished over the disclosure of document E1 by the use of a particular polymer blend, namely a polymer blend comprising at least one nucleating agent wherein the polymer blend has an ESCR of greater than 10 hours when tested according to the procedure set out in claim 1 (see above discussion of novelty with respect to document E1) and wherein at least one polymer of the polymer blend is a plastomer, substantially linear polyethylene polymer or polypropylene copolymer. These polymer blends have been found particularly suitable for the production of flexible thin-walled articles wherein a key characteristic is the uniformity of distribution of comonomer within and among the molecules of the polymer (paragraph [0020], patent in suit). Furthermore, the nucleating agent is believed to increase the ESCR *"by causing the formation of a greater number of small crystals than would otherwise be the case. These greater number of small crystals result in an increase in the number of amorphous areas within the polymer which are capable of absorbing or dispersing stresses introduced into the tube mouldings during injection moulding - thus increasing the ESCR and flex resistance of the product"* (paragraph [0061], patent in suit).

This polymer blend thus permits injection moulding of articles having a thin section which is substantially

continuous for greater than 50mm in the direction of flow of the molten polymer blend in the mould.

- 5.4 Document E11 discloses long tubular articles made of a thermotropic liquid crystal resin (column 1, lines 6 and 7; column 9, lines 33 to 36). In document E11, inorganic filler which includes substances such as talc, mica or oxides of various metals (which are used as nucleating agents in the patent in suit, see paragraph [0061]) is added in the context of improving strength, modulus, dimensional accuracy and heat resistance (column 7, line 46 to column 8, line 9 of document E11).

Document E13 is concerned with reducing haze in injection moulded articles. The solution involves a composition comprising linear low density polyethylene and polypropylene (column 1, lines 17 to 35). A nucleating agent is added to the polypropylene to allow the polymer to be crystallized at a higher temperature during injection moulding (column 2, lines 6 to 12).

Document E14 concerns crystallisable linear low density polyethylene containing a nucleating composition which increases the temperature and rate of crystallisation whereby the cycle time can be reduced and production rates increased. The production methods considered include injection moulding (column 1, lines 8 to 30).

These documents thus provide no incentive for the skilled person to use a polymer blend having the required ESCR, which involves

- 1) identifying a suitable polymer blend in accordance with the test procedure as defined in steps i) to v) of claim 1 as maintained in the opposition proceedings

- 2) using a polymer blend wherein at least one polymer of the polymer blend is a plastomer, substantially linear polyethylene polymer or polypropylene copolymer.

Moreover, although the addition of nucleating agents is known in the context of injection moulding, the skilled person is not motivated to further consider the addition of nucleating agents in the context of attaining an ESCR value greater than 10 hours (when tested according to steps i) to v) of claim 1 as maintained in the opposition proceedings) for injection moulded articles having a thin section of 1mm or less in thickness which is substantially continuous for greater than 50mm in the direction of flow of the molten polymer blend in the mould.

The subject-matter of claim 1 as maintained in the opposition proceedings thus involves an inventive step with respect to the combination of document E1 with any one of documents E11, E13 and E14.

5.5 Documents D1, D2 and E4

Document D1 concerns super high flow ethylene compositions for injection moulding thin-walled articles with improved environmental stress crack resistance (column 2, lines 6 to 11 and 35 to 37; column 4, lines 35 to 45). Similarly, document D2 concerns a resin blend including a linear low density copolymer of ethylene for injection moulding articles such as tubes and bottles having improved environmental stress crack resistance (page 1A, lines 1 to 9; page 4, lines 1 to 16).

Documents D1 and D2 thus disclose generic materials for which there is no indication that they would achieve an ESCR value of greater than 10 hours (when tested according to the procedure set out in steps i) to v) of claim 1 as maintained in the opposition proceedings), that they include at least one nucleating agent and that they are suitable for producing a thin-walled article having a thin section of 1mm or less in thickness and wherein the thin section is substantially continuous for greater than 50mm in the direction of flow of the molten polymer blend in the mould.

Document E4 relates to injection moulded thermoplastic containers having a body length of 60 mm and a wall thickness of less than 1 mm (page 1, lines 7 to 10; page 3, lines 31 to 33, claim 6). Thus although the size of article is provided there is no characterisation of the material beyond being a "*thermoplastic*". Therefore, document E4 provides no motivation for the use polymer blend wherein at least one polymer is a plastomer, substantially linear polyethylene polymer or polypropylene copolymer.

The subject-matter of claim 1 as maintained in the opposition proceedings thus involves an inventive step when starting from any one of documents D1, D2 or E4 in combination with any one of documents E11, E13 and E14.

Furthermore, even if the skilled person were to consider document E4 in combination with any one of documents E1, D1 and D2, he would not arrive at the subject-matter of claim 1 as maintained in the opposition proceedings as the nucleating agent and the use of a polymer blend wherein at least one polymer is a plastomer, substantially linear polyethylene polymer or polypropylene copolymer having an ESCR value greater

than 10 hours (when tested according to steps i) to v) of claim 1 as maintained in the opposition proceedings) are not derivable from any of the documents E1, E4, D1 or D2.

5.6 US Patent 5,525,695

US Patent 5,525,695 was not referred to in any discussions prior to the oral proceedings before the Board. The request for its introduction at such an advanced stage of the proceedings is therefore belated.

Furthermore, there are no indications that the "*substantially linear polyethylenes*" disclosed therein meet the ESCR criterion set out in claim 1 as maintained in the opposition proceedings. Any presumption that the ESCR criterion is met, is based on hindsight caused by US Patent 5,525,695 being cited in paragraphs [0024] and [0029] of the patent in suit. Thus US Patent 5,525,695 is *prima facie* not relevant. As in addition the request for the introduction of this document is late filed without any justification for the late filing, the Board exercises its discretion under Article 13(1) RPBA not admit it.

5.7 In addition, none of the remaining cited prior art documents suggests the solution to the above problem as specified in claim 1, that is, the particular polymer blends including a nucleating agent which meet the ESCR criterion set out in claim 1 as maintained in the opposition proceedings and which permit injection moulding of articles having a thin section of 1mm or less in thickness which is substantially continuous for greater than 50mm in the direction of flow of the molten polymer blend in the mould.

5.8 Therefore, the subject-matter of claim 1 of the patent as maintained in opposition proceedings involves an inventive step.

The subject-matter of claims 2 to 11 which are appendant to independent claim 1 similarly involves an inventive step.

6. Product claims

The material from which the product according to claim 12 is made can be determined and necessarily consists of the material as defined in claim 1. Furthermore, a product according to claim 12 also exhibits a thin section as specified in step 3) of claim 1.

The arguments concerning novelty and inventive step presented above in the context of method claim 1 therefore carry over to corresponding product claim 12.

Therefore, the subject-matter of claim 12 as maintained in the opposition proceedings is new and involves an inventive step.

The subject-matter of claims 13 and 14 which are appendant to independent claim 12 similarly involves an inventive step.

7. First auxiliary request

The appellant's first auxiliary request concerning an amendment to the wording of claim 1 of the patent in suit is contrary to the principle of party disposition according to which only the patent proprietor, here respondent, is entitled to request amendment to the

text of the claims of the patent in suit (Article 113(2) EPC). Therefore, the appellant's first auxiliary request has to be refused.

8. Second auxiliary request - questions for referral to the Enlarged Board of Appeal

As the subject-matter of claim 1 as maintained in the opposition proceedings is new (see above novelty discussion) and, furthermore, there is no evidence that the test procedure cannot be carried out (see above sufficiency of disclosure discussion) the prerequisites of question 1A are not met, so that an answer to this question is not necessary for the present decision.

An answer to question 1B is also not necessary for the present decision since it is conditional on an affirmative answer to question 1A.

The contributions made to the prior art by the subject-matter of claim 1 as maintained in the opposition proceedings are set out in the above discussions with respect to novelty and inventive step and are founded on technical features defined in the claim. Therefore, the prerequisites of question 2A are not met, so that an answer to this question is again not necessary for the present decision.

Furthermore, answers to questions 2B and 2C are not necessary either for the present decision, because they are respectively conditional on a respective affirmative answer to questions 2A and 2B.

Thus, answers to questions 1A, 1B and 2A to 2C are not required to clarify a fundamental point of law, because they are not needed for the Board to be able to decide

the present appeal. Furthermore, the questions formulated by the appellant are not questions which need to be answered to ensure uniform application of the law, since there is no contradictory case law.

The proposed questions therefore fail to meet the requirements of Article 112(1)(a) EPC. In consequence, it is not considered necessary or appropriate to refer these questions to the Enlarged Board of Appeal.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

G. Nachtigall

W. Zellhuber