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Datasheet for the decision of 12 July 2016

Case Number: T 0658/13 - 3.3.03

Application Number: 07757304.6

Publication Number: 1987097

IPC: C08L23/06, C08F10/00, C08F210/02, C08L101/00, F16L9/12

Language of the proceedings: EN

Title of invention:
POLYETHYLENE COMPOSITIONS AND PIPE MADE FROM SAME

Patent Proprietor:
CHEVRON PHILLIPS CHEMICAL COMPANY LP

Opponents:
Ineos Europe AG
Borealis AG

Headword:

Relevant legal provisions:
EPC Art. 83

Keyword:
Sufficiency of disclosure - (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
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Case Number: T 0658/13 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 12 July 2016

Appellant: (Patent Proprietor)	CHEVRON PHILLIPS CHEMICAL COMPANY LP 10001 Six Pines Drive The Woodlands, TX 77380 (US)
Representative:	Potter Clarkson LLP The Belgrave Centre Talbot Street Nottingham NG1 5GG (GB)
Appellant: (Opponent 2)	Borealis AG IZD Tower Wagramerstrasse 17-19 1220 Wien (AT)
Representative:	Kador, Utz Ulrich Kador & Partner Corneliusstrasse 15 80469 München (DE)
Party as of right: (Opponent 1)	Ineos Europe AG Avenue des Uttins 3 1180 Rolle,Vaud (CH)
Representative:	Smith, Julian Philip Howard Mathisen & Macara LLP Communications House South Street Staines-upon-Thames, Middx TW18 4PR (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 10 January 2013 concerning maintenance of the European Patent No. 1987097 in amended form.**

Composition of the Board:

Chairman	F. Rousseau
Members:	O. Dury
	R. Cramer

Summary of Facts and Submissions

I. The appeals by the patent proprietor and opponent 2 lie from the interlocutory decision of the opposition division maintaining patent EP 1 987 097, based on application No. 07 757 304.6, in amended form according to auxiliary request 10A filed on 27 November 2012.

II. Claim 1 of the granted patent read as follows:

"1. A multimodal polyethylene polymer composition comprising:
(a) a density equal to or greater than 0.947 g/cc;
(b) a high load melt index, determined in accordance with ASTM D1238, from 1 g/10min to 30 g/10min; and
(c) a tensile natural draw ratio, determined in accordance with ASTM D 638, less than about 14167ρ-12958, where ρ is the density(g/cc) of the composition, wherein the tensile natural draw ratio is the percent strain at the onset of strain-hardening and

wherein the composition comprises a tensile stress at break equal to or greater than 1.10 times the tensile yield stress of the composition."

III. Two notices of opposition to the patent were filed requesting revocation of the patent on the grounds of Art. 100(a) EPC (lack of novelty and of an inventive step), Art. 100(b) EPC and Art. 100(c) EPC.

IV. The decision under appeal was based on a main request and ten auxiliary requests. The main request and the first nine auxiliary requests were not allowed because they were considered to either lack clarity, novelty or because they were not inventive. Auxiliary request 10A was held to satisfy the requirements of

Art. 123(2)(3) EPC, Art. 84 EPC, Art. 83 EPC, Art. 54 EPC and Art. 56 EPC. According to section 16 of the contested decision, the compositions according to auxiliary request 10A could only be prepared using the specific catalysts disclosed in paragraph 41 of the patent in suit but the description of the patent in suit disclosed several other ways to prepare those compositions which, as shown by D5 (US 2007/0043182), did not work. Therefore, in order to satisfy the requirements of Art. 83 EPC the description of the patent in suit had to be limited to the specific method of preparation of the polyethylene compositions based on paragraph 41 of the patent in suit. Claim 1 of auxiliary request 10A read as follows:

"1. A multimodal polyethylene polymer composition comprising:
(a) a density greater than 0.952 g/cc;
(b) a high load melt index, determined in accordance with ASTM D1238, from 1 g/10min to 30 g/10min; and
(c) a tensile natural draw ratio, determined in accordance with ASTM D 638, less than about 14167ρ-12958, where ρ is the density(g/cc) of the composition, wherein the tensile natural draw ratio is the percent strain at the onset of strain-hardening and

wherein the composition comprises a tensile stress at break equal to or greater than 1.10 times the tensile yield stress of the composition, and

wherein the composition has a PENT failure time in excess of 7000 hours, wherein PENT is determined in accordance with ASTM F1473 where the initial applied load is 3.8 MPa and

wherein the composition comprises less than 1 weight percent of total non-polymeric additives."

V. The patent proprietor (appellant 1) lodged an appeal against the above decision. In its statement of grounds of appeal the patent proprietor requested that the decision of the opposition division be set aside and the patent be maintained as granted (main request) or, in the alternative, that it be maintained in amended form on the basis of any of auxiliary requests 1-12 filed therewith. Further arguments were submitted with letter of 26 September 2013.

VI. Opponent 2 lodged an appeal against the above decision and requested in its statement of grounds of appeal that the decision of the opposition division be set aside and the patent be revoked. Further arguments were submitted with letters of 4 October 2013 and 24 November 2014.

VII. With telefax of 7 October 2013 opponent 1 (party as of right) requested the dismissal of the patent proprietor's appeal.

VIII. In a communication issued by the Board on 28 April 2016 accompanying the summons to oral proceedings, issues to be discussed at the oral proceedings were specified.

IX. With letter of 10 June 2016 the patent proprietor submitted further arguments as well as a new set of requests (a main request and 11 auxiliary requests, essentially corresponding to the requests filed with their statement of grounds of appeal but renumbered as a result of the withdrawal of the main request).

X. Opponents 1 and 2 both submitted further arguments with letters of 10 June 2016.

XI. In the course of the oral proceedings before the Board held on 12 July 2016 in the presence of all parties the patent proprietor submitted new auxiliary requests 10, 11 and 12. However, the sole request maintained by the patent proprietor at the end of the oral proceedings as the operative main request was the request filed as auxiliary request 10 during said oral proceedings, all other requests being explicitly withdrawn. Said remaining request comprised 7 claims, of which claims 1 and 7 read as follows:

"1. A bimodal polyethylene polymer composition comprising:

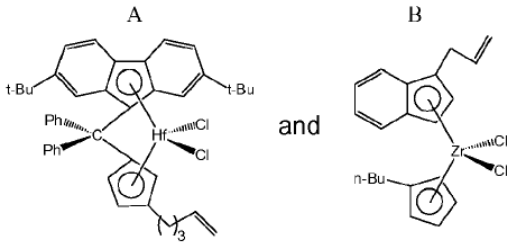
(a) a density greater than 0.952 g/cc;
(b) a high load melt index, determined in accordance with ASTM D1238, from 1 g/10min to 30 g/10min; and
(c) a tensile natural draw ratio, determined in accordance with ASTM D 638, less than about 14167ρ-12958, where ρ is the density (g/cc) of the composition, wherein the tensile natural draw ratio is the percent strain at the onset of strain-hardening and

wherein the composition comprises a tensile stress at break equal to or greater than 1.10 times the tensile yield stress of the composition, and

wherein the composition has a PENT failure time in excess of 7000 hours, wherein PENT is determined in accordance with ASTM F1473 where the initial applied load is 3.8 MPa,

wherein the composition comprises less than 1 weight percent of total non-polymeric additives

and wherein the composition is produced using a catalyst composition comprising



with sulfated alumina as the activator-support and with tri-isobutylaluminum as the cocatalyst."

"7. A pipe fabricated from the composition of claim 1."

Claims 2 to 6 were directed to embodiments of claim 1.

XII. At the end of the oral proceedings the Board announced its decision.

XIII. The patent proprietor's arguments, as far as relevant to the present decision, may be summarised as follows:

(a) The product-by-process formulation of claim 1 "wherein the composition is produced using a catalyst composition comprising A and B with ... catalyst" was a limiting feature of the claim and claim 1 only covered compositions produced using that catalyst. It would not be possible to eliminate all traces of the catalyst system in compositions so produced, even if the catalyst was to be washed out. Besides, the catalyst system had an effect on the chemical structure of the polymers so being prepared, which was reflected in the

combination of parameters specified in claim 1.

(b) The patent in suit taught that the polyethylene compositions according to claim 1 could be prepared using the catalyst system defined in operative claim 1 and in paragraph 41 of the specification. Specific processes were further disclosed in examples 1-4 of the patent in suit. Although the HLMI values (feature (b) of claim 1) were not disclosed for the examples of the patent in suit, it was derivable that those examples illustrated the invention. Therefore the HLMI feature of claim 1 was to be satisfied. In any case, since the range of HLMI mentioned in claim 1 was relatively broad, it was to be expected that the polyethylene compositions prepared in the examples had an HLMI according to claim 1. In the absence of any evidence that it was not possible to prepare polyethylene homopolymers or copolymers with other comonomers than that used in the examples of the patent in suit, namely 1-hexene, the opponents' objection was not supported by the facts and should be dismissed.

Therefore the requirements of Art. 83 EPC were met.

XIV. Opponent 1 and opponent 2's arguments, as far as relevant to the present decision, were essentially as follows:

(a) According to the Guidelines for Examination at the EPO, the product-by-process formulation of claim 1 was meaningless. The subject-matter of claim 1 was to be read as being directed to the compositions *per se* i.e. compositions "obtainable by using" a catalyst system as defined in claim 1, which did

not exclude that those compositions could be prepared using a different catalyst system. The only catalyst system which was shown to possibly lead to the combination of features specified in claim 1 was that of paragraph 41 of the patent in suit, which was the same as that used in examples 1-4 of the patent in suit. Considering that the patent in suit did not teach how to produce the compositions of claim 1 when using a different catalyst system than that mentioned in claim 1, the requirements of Art. 83 EPC were not met. In that respect, the argument put forward in respect of other requests dealt with at the oral proceedings and based on example 15 of D5 was also valid.

(b) Claim 1 encompassed polyethylene homopolymers and copolymers containing any kind of comonomers in any amounts. The examples of the patent in suit were only directed to ethylene copolymers with specific amounts of 1-hexene as sole comonomer. Besides, it was not even clear whether the examples of the patent in suit illustrated the subject-matter of claim 1 because no HLMI data was given for those examples. Therefore, the patent in suit did not provide sufficient information to prepare polyethylene compositions without undue burden over the whole scope of claim 1 (Art. 83 EPC).

XV. Appellant 1 (patent proprietor) requested that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the main request filed as auxiliary request 10 during the oral proceedings of 12 July 2016.

Appellant 2 (opponent 2) requested that the decision under appeal be set aside and that the patent be

revoked.

Opponent 1 (party as of right) requested that the patent proprietor's appeal be dismissed.

Reasons for the Decision

1. Sufficiency of disclosure

1.1 In order to meet the requirements of Art. 83 EPC, an invention has to be disclosed in a manner sufficiently clear and complete for it to be carried out by the skilled person, without undue burden, on the basis of the information provided in the patent specification, if needed in combination with the skilled person's common general knowledge. This means in the present case that the skilled person should be able to prepare a bimodal polyethylene polymer composition according to any of claims 1-6 and/or to make a pipe according to claim 7.

1.2 The bimodal polyethylene polymer composition of claim 1 is defined by

- the combination of five parameters as defined in features (a) to (c) as well as in terms of tensile stress at break and PENT failure time under a load of 3.8 MPa (hereinafter "high-stress PENT" which, as indicated in paragraph 57 of the patent specification is a lab-scale test for determining the resistance to slow crack growth);
- the requirement that it comprises less than 1 weight percent of total non-polymeric additives
- the product-by-process feature directed to a catalyst system "wherein the composition is

produced using a catalyst composition comprising A and B (...) with sulfated alumina as the activator-support and with tri-isobutylaluminum as the cocatalyst".

1.2.1 During the oral proceedings before the Board it was disputed by the parties whether or not the product-by-process feature identified above was a limiting feature of claim 1 or not.

1.2.2 During the oral proceedings before the Board, the patent proprietor argued that it would not be technically possible to completely eliminate from a polyethylene composition according to claim 1 any trace of the catalyst system that has been used to prepare it, either in the form of the catalyst itself or of its derivated products (should it be e.g. deactivated as argued by opponent 2), even if the composition was to be submitted to a purification step to wash out the catalyst. That argument was not contested by the opponents. Besides, it is accepted in the art that the catalyst system has an impact on the chemical structure of the polymer composition prepared therewith (e.g. chain length, (co)monomer distribution) and, therefore on the properties of those polymers. In the present case, it is in particular noted that it was not shown that a bimodal polyethylene composition satisfying the five parameters of claim 1, in particular a density higher than 0.952, a TNDR according to feature (c) and a high-stress PENT of higher than 7000 hours could be obtained using a different catalytic system. Therefore, it appears credible that, as argued by the patent proprietor, the use of the catalyst system according to operative claim 1 effectively leads to polyethylene compositions having a very specific structure (e.g. in terms of chain arrangement and monomer distribution)

which can only be obtained with the catalyst system defined in claim 1.

Therefore, in the present circumstances of the case and in view of the evidence on file, it is considered that the catalyst system of claim 1 determines the properties of the polymer and that its residues will be present in the polymers prepared therewith. Under such circumstances, the product-by-process feature of claim 1 effectively characterises the obtained product *per se* and can, in the present case, not be disregarded when determining the scope of claim 1.

In view of the above, it is agreed, as explicitly stated by the patent proprietor during the oral proceedings before the Board, that the subject-matter of operative claim 1 is limited to polyethylene compositions which have been prepared with the catalyst system defined therein.

1.2.3 The opponents' argument according to which the product-by-process feature was meaningless (i.e. non limiting) is based on section F.IV.15.4.12 of the Guidelines for Examination in the EPO (November 2015), in which it is stated that a claim defining a product in terms of a process is to be construed as a claim to the product as such. However, it cannot be agreed that said section of the Guidelines implies that a product-by-process formulation as such can only be meaningless. Rather, as is explicitly indicated in the paragraph of the Guidelines cited above related to T 205/83, when novelty of a claim defined using a product-by-process formulation is to be assessed, the question is to be answered whether the product so defined may be distinguished from other known products i.e. it has to be clarified if the "by-process" element of that claim

effectively characterises the subject-matter being claimed. In the Board's view, this is the case for the polyethylene compositions according to present claim 1 for the reasons indicated in section 1.2.2 above. Besides, in the Board's view, the same conclusion is also to be drawn independently of whether the product-by-process feature of claim 1 reads "produced using a catalyst composition ..." or "obtainable using a catalyst composition ..." (as proposed by opponent 1 during the oral proceedings before the Board) since in both cases the catalyst is mandatorily present in the claimed composition and has to be used in order to obtain a composition meeting the parametric definition set out in claim 1.

Therefore, the opponents' objection based on the argument that the subject-matter of claim 1 encompassed compositions obtained using a different catalyst system than that specified in that claim did not convince.

1.3 In order to prepare the composition according to claim 1 and the pipes according to claim 7, the patent in suit provides information regarding:

- the suitable (co)monomers (paragraph 16);
- the reactors to be used (paragraphs 22-30);
- the reaction conditions (paragraphs 31-34);
- the catalyst system defined in claim 1 (paragraph 41 and paragraph 35 indicating which catalyst is to be used for producing the HMW and LMW components of the composition);
- the making of pipes by extrusion (paragraphs 43-47).

The patent in suit further contains four examples, of which at least examples 1 and 4 unambiguously illustrate the preparation of bimodal

polyethylene1-hexene copolymer compositions containing less than 1 wt.% of total non-polymeric additives (Table 1; Fig. 2). Those compositions are prepared in a loop reactor using a catalyst system as defined in claim 1 and satisfy parameters (a), (c), TNDR, and high-stress PENT according to claim 1.

It was not disputed by the patent proprietor that the patent in suit does not disclose any data related to the high load melt index (HLMI) according to feature (b) of claim 1 in respect of any of examples 1 to 4 of the patent in suit. Nor was any evidence provided in that respect, in particular in reply to the Board's communication in which that issue was identified (section 6.2, second paragraph). However, as agreed by the parties during the oral proceedings before the Board, the range of HLMI defined in claim 1 is broad. Further considering that the examples indicated as "inventive run" in Table 2 of the patent in suit are said to be according to the invention (paragraph 66), there is, in absence of any evidence to the contrary, no reason to believe that those examples do not fulfil the HLMI requirement defined in granted claim 1. Therefore, examples 1 and 4 are held to illustrate the subject-matter of operative claim 1 and to exemplify specific ways to carry out the invention.

1.4 According to EPO case law an objection of insufficient disclosure presupposes that there are serious doubts, substantiated by verifiable facts and the burden of proof is primarily on the opponent(s) (Case Law of the Boards of Appeal of the EPO, 8th. Ed., 2016, II.C.8).

1.4.1 In the present case, the opponents' assertions that it would not be possible to prepare the claimed compositions with either an homopolymer, with other

comonomer(s) than 1-hexene or with different amounts thereof are not supported by any evidence. Therefore, the opponents have not discharged their burden of proof and their objection has to be rejected.

1.4.2 During the oral proceedings before the Board and in the first instance proceedings, example 15 of D5 was addressed in respect of sufficiency of disclosure.

Example 15 of D5 deals with the production of bimodal polyethylene compositions using as catalyst system two metallocene catalysts C and N, sulfated alumina as catalyst support and tri-n-butyl aluminium as cocatalyst (D5: Table 3 and paragraph 67). Such a catalyst system corresponds to that indicated in paragraph 36 of the patent in suit, wherein catalyst C corresponds to the first metallocene with the formula given in paragraph 36 of the patent in suit (but not that of formula A according to paragraph 41 of the patent in suit or of operative claim 1), catalyst N corresponds to the second metallocene catalyst having a formula according to paragraph 37 of the patent in suit (which is identical to catalyst B according to paragraph 41 of the patent in suit or to operative claim 1), and the organoaluminum compound having the formula specified in paragraph 40 of the patent in suit (but not of tri-isobutylaluminum according to paragraph 41 of the patent in suit or of operative claim 1). The polyethylene prepared in example 15 of D5 exhibits a PENT under a load of 2.4 MPa of 613 h, which implies that it would have a high-stress PENT (i.e. under a load of 3.8 MPa) outside the range defined in operative claim 1, as agreed by the patent proprietor during the oral proceedings before the Board. However, although the catalyst composition used in said example 15 falls under the general disclosure of the patent as

granted, it does not correspond to the catalyst composition now indicated in claim 1 (and corresponding to that disclosed in paragraph 41 of the patent in suit and used in the examples of the patent in suit) because it neither comprises metallocene catalyst A nor tri-isobutylaluminum. Considering the conclusion drawn in section 1.2 above, example 15 of D5 does not constitute evidence that operative claim 1 lacks a sufficient disclosure.

1.5 In the Board's view, the patent proprietor has in the present case overcome the sufficiency objections put forward by the opponents by amending the claims, thereby changing the "invention" referred to in Art. 83 EPC so that it no longer encompasses the insufficiently disclosed previously claimed aspects (Case Law of the Boards of Appeal of the EPO, 8th Ed., 2016, II.C.1).

1.6 For those reasons, the main request meets the requirements of sufficiency of disclosure pursuant to Art. 83 EPC.

2. During the oral proceedings before the Board, both opponents explicitly stated that they had no further objection against the operative main request, in particular not in respect of Art. 84 EPC, Art. 123(2) EPC, Art. 54 EPC and Art. 56 EPC.

In respect of Art. 123(2) EPC, the patent proprietor's argument according to which the subject-matter of claim 1 was based on original claims 5, 8, 12, paragraph 56 and examples 1-4 of the application as filed, which constituted a pointer to the combination of features now being specified in claim 1, was in particular not contested. The Board has no reason to

deviate from that view.

Also, the objections of lack of an inventive step made by the opponents in writing against auxiliary request 11 filed with the statement of grounds of appeal (see e.g. opponent 2's letter of 10 June 2016, section 4.14; opponent 1's letter of 10 June 2016, bottom of page 3), which was similar to the present operative main request, were not pursued and thus effectively withdrawn during the oral proceedings.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent in amended form on the basis of the claims of the main request, labelled auxiliary request 10, filed during the oral proceedings before the Board, and after any necessary adaption of the description.

The Registrar: The Chairman:

B. ter Heijden F. Rousseau

Decision electronically authenticated