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Datasheet for the decision of 7 May 2013

Case Number: T 1228/12 - 3.3.03

Application Number: 06777149.3

Publication Number: 1922342

IPC: C08F 10/02, C08L 23/08, C08F 297/08

Language of the proceedings: EN

Title of invention:
Polymer composition

Patent Proprietor:
INEOS Manufacturing Belgium NV

Opponents:
Total Research & Technology Feluy
Borealis AG
Basell Polyolefine GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 83

Keyword:
"Sufficiency of disclosure - undue burden - (yes) - (all requests)"

Decisions cited:
-

Catchword:

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1228/12 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 7 May 2013

Appellant: (Patent Proprietor)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 16 April 2012 revoking European patent No. 1922342 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman: B. ter Laan
Members: M. C. Gordon
R. Cramer

Summary of Facts and Submissions

I. The appeal lies from the decision of the opposition division announced on 28 March 2012 and posted on 16 April 2012 revoking European patent number EP-B1-1 922 342 (granted on European patent application number 06 777 149.3, derived from international application number PCT/EP2006/008576, published under the number WO 2007/028552).

II. The patent was granted with a set of 15 claims, whereby claims 1, 3, 8, 9 and 13 read as follows:

"1. Composition comprising polymer of ethylene and from 0.5 to 5 wt% of a C_4-C_8 alpha-olefin which has a natural density of 935-956 kg/m^3, a melt index MI_5 of 0.15 - 0.5 g/10min, a dynamic complex viscosity at 100 rad/s and 190°C (η_{100}) of no more than 2500 Pa.s, a relationship between η_{100} and dynamic complex viscosity measured in Pa.s at 0.01 rad/s and 190°C ($\eta_{0.01}$) defined by the equation $\eta_{0.01}>115000+30.\eta_{100}$, and an environmental stress crack resistance as measured by a notched pipe test performed according to ISO13479:1997 on 110 mm SDR 11 pipes at 80°C and a pressure of 9.2 bar, of greater than 1000 hours, which composition is made by a polymerisation process employing a Ziegler-Natta catalyst.

3. Composition comprising polymer of ethylene and from 0.5 to 5wt% of 1-hexene, 1-pentene or 1-octene and having a natural density of 935-956 kg/m^3, a melt index MI_5 of 0.15 - 0.5 g/10min, and a relationship between dynamic complex viscosity at 100 rad/s and 190°C (η_{100}) and dynamic complex viscosity measured in Pa.s at 0.01

rad/s and 190°C ($\eta_{0.01}$), defined by the equation $\eta_{0.01}>115000+30.\eta_{100}$, which composition is made by a polymerisation process employing a Ziegler-Natta catalyst.

8. Composition according to any preceding claim, which is formed from a multimodal polyethylene resin comprising from 30 to 70 wt% of an ethylene homopolymer (A) having a melt index MI_2 of 5 - 1000 g/10min and a density of at least 965 kg/m^3, and from 30 to 70 wt% of a copolymer (B) of ethylene and a C_4-C_8 alpha-olefin having a melt index MI_5 of 0.001 - 2g/10min and a density of 910 to 945 kg/m^3.

9. Composition according to claim 8 wherein the multimodal polyethylene has a ratio of ethylene homopolymer (A) to ethylene copolymer (B) of 45:55 to 55:45, preferably 48:52 to 55:45.

13. Process for preparing a composition as defined in any preceding claim, comprising the steps of:

either polymerising ethylene in a first reactor to form ethylene homopolymer (A), and then in a second reactor polymerising ethylene plus either 1-hexene, 1-pentene or 1-octene and optionally another alpha-olefin containing from 4 to 10 carbon atoms in the presence of homopolymer (A) to form ethylene copolymer (B);

or polymerising ethylene plus cither [*sic*] 1-hexene, 1-pentene or 1-octene and optionally another alpha-olefin containing from 4 to 10 carbon atoms in a first reactor to form ethylene copolymer (B), and then in a second reactor

polymerising ethylene in the presence of copolymer (B) to form ethylene homopolymer (A), the catalyst employed being Ziegler-Natta catalyst."

III. Three notices of opposition were filed on 7 July 2010 The grounds of opposition pursuant to Art. 100(a) and (b) EPC (all opponents) as well as Art. 100(c) EPC (Opponents 1 and 2) were invoked.

The following documents, *inter alia* were cited in support of the opposition:

D1: WO-A-00/22040
D8: EP-A-1 460 105

IV. The decision of the opposition division was based on an amended set of seven claims filed as the main and only request at the oral proceedings before the opposition division. Claim 1 differed from claim 1 as granted in that the following wording was added at the end:

"[...], and is formed from a multimodal polyethylene resin comprising from 30 to 70 wt% of an ethylene homopolymer (A) having a melt index MI_2 of 5-1000 g/10min and a density of at least 965 kg/m^3, and from 30 to 70 wt% of a copolymer (B) of ethylene and a C_4-C_8 alpha-olefin having a melt index MI_5 of 0.001-2g/10min and a density of 910 to 930 kg/m^3, wherein the multimodal polyethylene has a ratio of ethylene homopolymer (A) to ethylene copolymer (B) is [*sic*] 48:52 to 55:45."

Claims 2-6 were dependent on claim 1. There were no claims corresponding to claims 3 or 13 of the patent as granted.

According to the decision, the claims met the requirements of Art. 84 and 123(2) EPC. The requirements of Art. 83 EPC were however not satisfied.

Claim 1 relied *inter alia* on the parameter that the MI_5 of copolymer (B) was 0.001 to 2 g/10 min.
The patent proprietor had explained that said parameter was determined by a calculation, and had given the applicable formula. The information that the formula was to be employed was missing from the patent specification and had not been shown to be in the public domain at the priority date of the patent in suit. Without this information it was not possible to work the invention with the consequence that the requirements of Art. 83 EPC were not satisfied.

Consequently the patent was revoked.

V. On 29 May 2012 the patent proprietor lodged an appeal against the decision, the prescribed fee being paid on the same date.

The statement of grounds of appeal was received on 24 August 2012 accompanied by six sets of claims forming a main request and first to fifth auxiliary requests.

VI. The opponents, now the respondents, replied with letters dated as follows:

2 January 2013 (Opponent O1)
7 January 2013 (Opponent O3)
8 January 2013 (Opponent O2).

VII. On 17 January 2013 the Board issued a summons to attend oral proceedings. In a communication dated 18 February 2013 the Board set out its preliminary assessment of the case.

VIII. By letter dated 5 April 2013 the appellant submitted six sets of claims forming a main request and first to fifth auxiliary requests. The claims of all requests retained the features relating to the relationship between the dynamic complex viscosities measured under two shear conditions and the environmental stress crack resistance of a pipe formed from the composition.

IX. The respondents made further written submissions by
Letter dated 2 April 2013 (Opponent O2)
Letter dated 4 April 2013 (Opponent O1)
Letter dated 5 April 2013 (Opponent O3).

X. Oral proceedings were held before the Board on 7 May 2013.

At the commencement of the oral proceedings the appellant withdrew the main request of 5 April 2013 and replaced it by a newly filed main request, consisting of 13 claims.

Claim 1 of this request differed from claim 1 as considered in the decision under appeal in that the phrase "which composition is made by a polymerisation

process employing a Ziegler-Natta catalyst" was placed, in amended form, at the end of the claim, i.e.: "and the composition is made by a polymerisation process employing a Ziegler-Natta catalyst". Further a number of editorial amendments were made.

The respondents did not object to the admission of this amended request to the procedure.

XI. The arguments of the appellant with respect to Art. 83 EPC can be summarised as follows:

The invention related to an optimisation of the polymer compositions known in particular from D1 and D8 in terms of the mechanical properties, as expressed by the environmental stress crack resistance and in terms of the rheological properties, as expressed by the melt index and by the dynamic complex viscosity values determined under different conditions, and further by the relationship between said dynamic complex viscosities as expressed by the inequality.

From D1 and D8 it was known how to attain the required rheological properties, which consequently were not part of the invention.

Not every composition falling within the compositional features defined in the claims would exhibit the required combination of rheological and physical properties.

Whilst the ESCR (physical property) would inevitably be attained by compositions meeting the compositional requirements of claim 1, for the specified dynamic

viscosity profile (rheological properties) further information relating to the nature of the composition and the reaction conditions would be required. However the skilled person would be aware from the established knowledge of the field how to adapt the reaction conditions and the compositions in order to attain the claimed property profile because the patent related to a further development and optimisation within a mature, well-understood technical field.

As a consequence it was not necessary, with respect to the requirements of sufficiency of disclosure, for the patent in suit to provide a discussion of the link between the various product properties specified in the claims.

In any case, the patent contained all the information relating to catalyst, reactor conditions etc. needed to prepare the polymer. Although it was not necessary to consult the six examples of the patent, they established that it was possible to achieve the claimed compositions. The lack of a detailed discussion of the comparative compositions could not be taken as evidence of a lack of sufficiency of disclosure. Indeed, no conclusions with respect to sufficiency of disclosure could be drawn from the comparative examples since those related to commercial products for which only limited information was available, in particular with regard to their manufacture.

The above considerations with respect to Art. 83 EPC applied to all requests.

XII. The arguments of the respondents with respect to Art. 83 EPC can be summarised as follows:

There was no guidance or teaching in the patent in suit what to do if a composition falling within the scope of the compositional features of the claim did not exhibit the required rheological properties and/or did not result in a pipe having the specified mechanical properties. There were several parameters - not only compositional but also relating to the manufacture, e.g. details of the catalyst system - which had to be adjusted, and several possible adjustments of each parameter. A complicating factor was that the parameters were interdependent meaning that adjusting one would have an influence on the others. The patent in suit however provided no guidance to assist the skilled person to arrive in a directed and structured manner at the subject matter claimed.
The skilled person seeking to reproduce the claimed subject matter consequently faced a significant burden of trial and error.

XIII. The appellant (patent proprietor) requested that the decision under appeal be set aside and that the Board find that one of the sets of claims, i.e. the main request submitted at the oral proceedings or the first to fifth auxiliary requests as submitted with the letter of 5 April 2013, meets the requirements of Article 83 EPC, and remit the case to the first instance for further prosecution.

XIV. The respondents (opponents) requested that the appeal be dismissed. Respondent O2 further requested that in the case that the decision under appeal was not upheld,

the case be remitted to the first instance for further prosecution.

Reasons for the Decision

1. The appeal is admissible.

2. Art. 83 EPC

2.1 Claim 1 of the main request is directed to a product characterised by two aspects:

- features relating to the constituent (co)polymers A and B, namely
  - density
  - melt index
  - the proportions of (co)polymers A and B
- properties relating to the composition itself and articles manufactured therefrom, namely
  - density
  - multimodality
  - rheological properties (melt index, dynamic complex viscosities and the relationship between these)
  - the mechanical properties of a pipe manufactured from the composition (environmental stress crack resistance - ESCR)
  - a reference to the manner of manufacture (Ziegler-Natta catalyst).

2.2 The patent contains six examples showing compositions according to the claims as well as three comparative examples which, as submitted by the appellant, relate

to commercial products for which little or no information was available.

The compositions of the examples corresponding to the claimed subject-matter have viscosities of about 950 kg/m^3, i.e. towards the upper end of the claimed range, MI_5 values of 0.23-0.29, situated at the lower portion of the claimed range and dynamic complex viscosities determined at 100 rad/s that are close to the upper limit given in the claim.

The values of ESCR reported in the examples range from 1825 to 6992 hours.

2.3 According to submissions of the appellant, any composition falling within the compositional features of the claim would exhibit the required ESCR properties. This statement is consistent with the evidence of the examples of the patent.

Furthermore, it was submitted by the appellant that the preparation of compositions with the required rheological properties was known from the prior art, in particular D1 and D8.

Neither of these submissions was disputed by the respondents.

2.4 The patent provides no general discussion or teaching relating to the interaction of the compositional features specified in the claims, such as the nature and proportion of constituent polymers (including manufacturing aspects), the specified rheological properties of the resulting composition and the

mechanical properties of pipes prepared therefrom (ESCR). Nor has the appellant identified any documents that could establish that the required information was available to the skilled person. Neither D1 nor D8 contain any discussion or elucidation of the relevant aspects.

This defect is not overcome by the fact that, as noted above, in all the examples the ESCR as specified in the claims is attained. On the contrary, the exemplas provide nothing more than isolated disclosures of individual compositions. It has not been demonstrated that the evidence provided by the examples either taken alone or together with the information in the description would put the skilled person in a position to understand the relationships and interactions underlying the observed results in order to know what to change if a property fell outside the claimed range.

2.5 The comparative examples do not assist in elucidating this aspect since, as noted by the appellant, no detailed information is available for the compositions thereof, meaning that it is not possible on the basis of the comparative examples to derive information relating to the influence of the nature of the polymer components on the overall properties of the compositions.

2.6 According to the appellant, the patent in suit relates to a "mature" technical field, to the extent that it is known in the art how to adjust the compositions in order to attain a particular rheological profile, on which aspect the patent is indeed silent. However, the patent in suit is also silent on the matter of how to

attain specifically the aspects highlighted in paragraph [0007] and indicated by the appellant as being the "achievement" of the patent in suit, i.e. the simultaneous optimisation of the rheological and mechanical properties, in particular the ESCR.

2.7 Regarding the submissions of the appellant, that the fact that the technical field to which the patent in suit relates is mature has to be taken into account when assessing the level and detail of disclosure required for the requirements of sufficiency to be satisfied, the Board observes that also in mature technical fields the disclosure relating to any improvement or optimisation needs to be sufficient to enable the skilled person to carry out the invention over the whole scope claimed, and not merely in certain isolated cases.

In particular, as noted in section 2.4 above, the patent in suit fails to elucidate the interplay between the individual technical features underlying the optimisation and consequently provides no guidance to assist the skilled person, when confronted with a (known) composition that meets some but not all of the requirements of the claim, in identifying which aspects, whether relating to the composition itself or its manufacture, it is necessary to modify and in what manner in order to obtain, in a structured and guided manner, a composition meeting the requirements of the claims. On the contrary, the skilled person seeking to carry out the claimed subject-matter is faced with a considerable burden of experimentation to identify the appropriate ranges for the various parameters specified in the claims and description.

2.8 This leads to the conclusion that the requirements of Art. 83 EPC are not satisfied by the main request.

2.9 Since all auxiliary requests contain claims directed to the same combination of features (albeit in more restricted form), this conclusion applies also to the first to fifth auxiliary requests.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

E. Goergmaier B. ter Laan