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Datasheet for the decision of 21 January 2020

Case Number: T 1518/17 - 3.3.03

Application Number: 11734139.6

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IPC: C08L23/12, C08F297/08

Language of the proceedings: EN

Title of invention:
PROPYLENE POLYMER COMPOSITIONS

Patent Proprietor:
Basell Poliolefine Italia S.r.l.

Opponent:
Borealis AG

Relevant legal provisions:
EPC Art. 54, 56, 114(2)

Keyword:

Novelty - (yes)
Inventive step - (no) (all requests)
Multiple documents as closest state of the art- need to show inventive step with respect to each
Late submitted material - document admitted (yes)
Late-filed auxiliary requests - admitted - (yes) - response to findings of decision (auxiliary request I)

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Case Number: T 1518/17 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 21 January 2020

Appellant: (Patent Proprietor)	Basell Poliolefine Italia S.r.l. Via Pontaccio 10 20121 Milano (IT)
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Respondent: (Opponent)	Borealis AG IZD Tower Wagramerstrasse 17-19 1220 Wien (AT)
Representative:	Lux, Berthold Maiwald Patentanwalts- und Rechtsanwaltsgesellschaft mbH Elisenhof Elisenstraße 3 80335 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 8 May 2017 revoking European patent No. 2596060 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	D. Semino
Members:	M. C. Gordon
	R. Cramer

Summary of Facts and Submissions

I. The appeal of the patent proprietor lies against the decision of the opposition division posted on 8 May 2017 revoking European patent number 2 596 060.

II. The patent was granted with a set of 7 claims, whereby claim 1 read as follows:

"A propylene polymer composition comprising (percent by weight):

A) 68%-80%, of a propylene homopolymer having a Polydispersity Index (P.I.) value of from 4.7 to 10 and MFR L (Melt Flow Rate according to ISO 1133, condition L, i.e. 230°C and 2.16 kg load) from 10 to 30 g/10 min;

B) 20%-32%, of a copolymer of propylene containing from 40.1% to 42.5% extremes included of ethylene derived units;

the composition having an intrinsic viscosity of the fraction soluble in xylene at 25°C comprised between 3 and 6 dl/g and a MFR L from 4 to 12 g/10 min."

III. A notice of opposition was filed in which revocation of the patent on the grounds of Article 100(a) EPC in combination with Article 56 EPC and Article 100(b) EPC was requested.

The following documents, *inter alia*, were cited in the decision:

D2: EP-A-1 788 022
D5: WO-A-2006/037705
D10: ASTM D 3900
D13: Declaration of M. Gahleitner, dated 14 January 2017, submitted with letter of

2 February 2017.

IV. The decision was based on the claims of the patent as granted (main request) and an auxiliary request.

In claim 1 of the auxiliary request the MFR of the propylene homopolymer had been limited to the range 12 to 25 g/10 min and the intrinsic viscosity of the xylene soluble fraction to the range 3.5 to 5 dl/g.

According to the decision, the requirements of sufficiency of disclosure were satisfied. The objections raised related to matters of clarity. With respect to inventive step, two documents were considered as being equally valid for consideration as the closest state of the art, namely D2 and D5. The patent as granted did not meet the requirements of inventive step with regard to D2. The specified value of P.I., in view of measurement uncertainties, represented at best a minimal distinction over that disclosed in the relevant example of D2. The objection of lack of inventive step with regard to D5 as closest prior art was, on the contrary, not found convincing.

The claims of the sole auxiliary request were held to contravene the requirements of Article 123(2) EPC.

V. The patent proprietor (appellant) lodged an appeal against the decision.

With the statement of grounds of appeal the claims of the patent as granted were maintained as main request. Two sets of claims forming auxiliary requests I and II were submitted.

Claim 1 of auxiliary request I differed from claim 1 as granted by restricting the P.I. of component (A) to 5.1 to 10.

Claim 1 of auxiliary request II differed from claim 1 as granted by defining the MFR of component (A) as being in the range 12-25 g/10 minutes and further by defining the IV of the xylene soluble fraction ("XSIV") as being 3.5-5.0 dl/g.

Three additional documents - D16, D17, D18 - were filed:

D16: Pasquini, N.(Ed.), Polypropylene Handbook, 2nd Edition, Carl Hanser Verlag 2005, page 310;
D17: Tripathi, D. Practical Guide to Polypropylene; Rapra Practical Guide Series, 2002, Page 62;
D18: Propylene - The Definitive User's Guide and Databook, 1990, pages 171 and 172.

VI. The opponent (respondent) replied submitting six further documents.

VII. The Board issued a summons to attend oral proceedings and a communication.

VIII. Both parties made further written submissions.

The respondent with letter of 16 December 2019 filed two further documents including:

D25: Declaration of M. Gahleitner dated 12 December 2019.

IX. Oral proceedings were held before the Board on 21 January 2020.

X. The arguments of the appellant, insofar as relevant for the decision, can be summarised as follows:

(a) Admittance of documents

D17 and D18 had been filed as a response to the analysis of inventive step starting from D2 as the closest prior art, in particular in respect of the aspect of low shrinkage. They should therefore be admitted.

D25 of the respondent had been filed late and there had been no possibility to verify the data thereof. Hence it should not be admitted to the procedure.

(b) Main request - inventive step

(i) Closest prior art

In the present case it was not appropriate to consider two documents as alternatives as closest state of the art.

D5 was clearly more relevant in terms of technical problem and effect since it addressed the aspects of elongation at break and impact resistance whilst maintaining rigidity. D2 on the other hand emphasised impact strength and low shrinkage, which was essential to the end uses envisaged therein, but was silent on elongation at break. Furthermore D2 could not be considered as the most promising

springboard since it failed to disclose the polydispersity index.

(ii) Distinguishing feature

Within D2 the most relevant aspect was example P3, the subject-matter claimed being distinguished therefrom by:

- P.I. of the matrix polymer, which as shown by D13, was 4.5 and hence below the claimed range of 4.7-10 in claim 1;
- ethylene content of the copolymer component of 30 % which was distinct from the range of 40.1-42.5 % in claim 1.

(iii) Technical effect

Example 1 and comparative example 1 of the patent showed that the effect of these differences was an improvement in impact properties. Despite certain other differences between the inventive and comparative compositions, for example the MFR, the effect on impact strength was so pronounced that it could not solely be the result of features other than the P.I. and ethylene content. Similarly the difference in the molecular weight of component A between the example and comparative example of the patent was not so great as to invalidate the conclusion to be drawn from the evidence. Furthermore comparative example 1 was more remote from example P3 of D2 in terms of molecular weight, but was closer to the claims in terms of the ethylene content meaning that these aspects

were balanced and the data could be seen as providing a valid comparison with the teaching of D2.

(iv) Objective technical problem

On this basis, the objective problem was the provision of compositions with improved properties, in particular impact strength.

(v) Obviousness

D2 contained no suggestion to make the modifications as defined by operative claim 1. The broadening of the molecular weight distribution (MWD) as indicated by the defined P.I. went against the explicit teaching of D2 in respect of obtaining compositions with low shrinkage. As taught by D17 and D18, broad MWD resulted in high shrinkage. Thus even if the problem were to be formulated only as the provision of further compositions, the conclusion would still be that the claimed subject-matter was non-obvious with respect to D2.

The teaching in D2 that multiple stage reactors could be used to produce the polymer did not necessarily mean a broader P.I. (or molecular weight distribution), since other factors of the polymerisation conditions affected these properties of the polymers.

(c) Auxiliary request I

(i) Admittance

The request had been filed with the statement of grounds of appeal and was directed to addressing the findings of the decision in respect of the significance of the difference between the defined value of P.I. and that of D2, example P3.

(ii) Inventive step

The arguments in respect of inventive step were the same as for the main request.

(d) Auxiliary request II - inventive step

The definition of a range for XSIV represented a further distinction over the teaching of D2. The comparative example showed that the claimed subject-matter resulted in an improvement in terms of impact strength and elongation at break which could be seen as associated with the defined range of XSIV. At the very least the claimed subject-matter represented a non-obvious modification with respect to D2 which did not contain any recognition of the significance of XSIV and hence provided no incentive to modify this property. Furthermore the only example of D2 which disclosed XSIV in the claimed range (P7) was a comparative example. This was to be seen in combination with the further differences, including in particular the difference in the ethylene content, making the claimed subject-matter a non-obvious alternative.

XI. The arguments of the respondent can be summarised as follows

(a) Admittance of documents

The objection of lack of inventive step with respect to D2 had been raised during opposition proceedings, meaning that D17 and D18 could and should have been filed at that stage. They should therefore not be admitted.

D25 reinforced the argument already submitted in particular by the declaration D13 during opposition proceedings that the catalyst was nothing out of the ordinary or "special" compared to other known catalysts.

(b) Main request - inventive step

(i) Closest prior of the art

Either of D2 or D5 could be seen as the closest prior art. The appellant had not demonstrated that D2 was unsuitable to be considered as closest prior art, only that potentially D5 might be somewhat more relevant. The purpose and objects of both documents overlapped to a considerable extent.

(ii) Distinguishing features

It was agreed that the P.I. and ethylene content were the distinguishing features.

(iii) Technical effect

Even accepting that example 1 of the patent was within the scope of the claim with respect to the ethylene content - the determination of which was subject to a degree of uncertainty - the comparative example of the patent in suit was not representative of the teaching of D2, example P3 due to the differing P.I. of the propylene homopolymer and the MFR of the compositions. Accordingly there was no evidence for a technical effect with respect to D2.

(iv) Objective technical problem

The only technical problem which could be formulated was the provision of further or alternative compositions to those known from D2.

(v) Obviousness

D2 suggested the use of multistage processes which would necessarily result in increase of P.I., rendering this feature of the claim obvious. Examples E6 and CE7 of D2 confirmed that nevertheless acceptable impact strength properties were achieved, the lower impact strength being offset by higher stiffness. This effect did not exceed that which would be expected and predicted by the skilled person. The variations according to claim 1 were therefore obvious when aiming to solve the

posed problem.

(c) Auxiliary request I

(i) Admittance

The request diverged from that presented before the department of first instance, incorporating features from the description, namely the range of P.I. that had previously not been in the claims. This request could and should have been presented at that stage. Consequently it was not to be admitted to the proceedings.

(ii) Inventive step

As accepted by the appellant, the same considerations in respect of inventive step applied as for the main request.

(d) Auxiliary request II - inventive step

The assessment in terms of technical effect and objective problem remained the same. The subject-matter represented simply an alternative to the compositions known from D2. This was also obvious since D2 itself taught that values of the intrinsic viscosities up to 3.5 dl/g were acceptable, shrinkage being too high only at higher values. The specified range of IV was not a selection, since it was disclosed in example P7 of D2 showing that the polymer with these properties could be made. D2 therefore did not teach away from this subject-matter and the amendments did not result in any difference in the situation with respect to

inventive step.

XII. The appellant requested that the decision under appeal be set aside and the patent be maintained as granted (main request), or alternatively be maintained in amended form on the basis of one of the sets of claims according to auxiliary request I or II, both filed with the statement of grounds of appeal.

XIII. The respondent requested that the appeal be dismissed. It further requested that auxiliary request I not be admitted into the proceedings.

Reasons for the Decision

1. Admittance of documents

1.1 D17, D18

These documents provide information in respect of the shrinkage of polypropylenes. They were cited in reaction to the finding of the decision that - contrary to the position argued by the appellant - D2 could be considered as closest prior art.
The citing of these documents can thus be regarded as a direct response to an aspect of the decision, and an attempt to address this. It has not been shown or rendered credible that there would have been any reason to submit such documents in the proceedings before the first instance, particularly in view of the positon of the appellant that the closest prior art was in fact D5. There are no reasons to hold these documents inadmissible.

1.2 D25

Declaration D25 of the respondent can be regarded as providing additional information or support for arguments previously advanced in particular to take account of the counter-arguments of the appellant. Accordingly there are no grounds to exclude this document from consideration.

2. Main request - inventive step

2.1 Closest prior art

The patent in suit relates to polypropylene compositions having an optimum balance of properties in particular improved elongation at break and impact strength at room and low temperatures (paragraphs [0001], [0006], [0012]). The compositions are intended for the production of moulded, in particular injection moulded, articles (paragraph [0029]).

Two documents have been proposed as closest prior art, namely D2 and D5.

D2 relates to polypropylene resin compositions with low shrinkage, excellent impact strength, high stiffness and scratch resistance (title, paragraph [0001]). In particular the document addresses the problem of avoiding shrinkage upon moulding (paragraph [0006]). Among the possible fields of use of the compositions is in body parts such as bumpers or trim and other interior components for automobiles (paragraph [0007]).

As observed by the appellant, elongation at break is not discussed in the document.

D5 is directed to elastomeric polyolefin compositions which are required to exhibit good elongation and impact strength at low temperatures without loss of rigidity (page 1, in particular final three paragraphs). Similar fields of use as in D2 are envisaged, as is injection moulding to form the articles (page 2, third paragraph).

According to the problem-solution approach the first step is to identify the closest prior art, i.e. a document disclosing subject-matter conceived for the same purpose or aiming at the same objective as the claimed invention and having the most relevant technical features in common (see "Case Law of the Boards of Appeal of the European Patent Office", Ninth Edition, 2019, section I.D.3.1).

Both D2 and D5 as well as the patent in suit relate to propylene based compositions for injection moulding to prepare articles for similar end uses, even if the precise property profile required differs. Nevertheless both documents in principle qualify as a suitable starting point for consideration of inventive step.

A further criterion is that the closest prior art should have most features in common, i.e. require the minimum of modification.

Both D2 and D5 relate to compositions of homopolypropylene and an ethylene/propylene copolymer (see the respective claim 1 of each document). Accordingly neither document can be considered as having more features in common or being a more promising starting point (*ibid).* It is correct, as argued by the appellant, that D2 does not present any

consideration of elongation at break, whereas the patent in suit and D5 do consider this property. In this context it is recalled that even if prior art for the same purpose is available it is not excluded that a document relating to a similar purpose might be considered to be either a better or at least an equally plausible choice as closest prior art if it were apparent that the subject-matter thereof could be adapted to the purpose of the claimed invention (*ibid*, 3.4.1). In the present situation this is clearly the case since, as noted above, both the patent in suit and D2 are directed to the provision of injection moulded articles with good impact properties, also at low temperature.

Accordingly either of D2 or D5 can be qualified as the closest prior art and it is necessary to consider inventive step based on each of these documents.

In such circumstances where two documents are both suitable to serve as the closest prior art it is necessary that an inventive step be demonstrated with respect to each. A finding of obviousness in respect of one document will necessarily lead to the conclusion that the requirements of Article 56 EPC are not met even if carrying out the same exercise on the basis of the other document would lead to a different conclusion.

2.2 Inventive step with respect to D2 as closest prior art

2.2.1 Distinguishing feature

Within D2 the most relevant disclosure is that of example P3. This was the finding of the decision (section 16.4.19), and was followed by both the

appellant (statement of grounds of appeal, page 2, 9 lines from bottom) and the respondent (rejoinder, section 4.29).

This example (paragraphs [0062]-[0067] and Table 1) discloses a composition of:
69 % polypropylene homopolymer, with MFR of 25g/10 min
31 % ethylene/propylene copolymer having 70% propylene, 30% ethylene with IV of 3.2 dl/g.

The composition has a MFR_2 of 7 g/10 minutes.

The P.I. of the polypropylene homopolymer is not disclosed. However according to respondent's experimental report D13, reporting a replication of the example, the value was 4.5. This was not disputed by the appellant.

Accordingly the subject-matter of claim 1 is distinguished from the disclosure of D2 by the ethylene content of the copolymer, which according to claim 1 is required to be 40.1 to 42.5%, and by the value of P.I. of the homopolymer which according to the claim is in the range 4.7 to 10.

2.2.2 Technical effect

The patent in suit contains an example and two comparative examples whereby comparative example 1 is of relevance:

Table 2

Example		1	Comp ex 1	Comp ex 2
MFR of the component A)	g/10'	25	32	72
Polydispersity Index		5.7	4.3	5.4
%copolymer component B)	wt%	25	23	30
%C_2^- component B)	wt%	40.5	38	43
MFR of the composition	g/10'	7.0	11.6	13
XSIV	dl/g	3.7	3.4	3.05
Flexural Modulus	MPa	1100	1100	1010
Izod Impact 23°C	kJ/m2	52.0	42.1	49.2
Izod Impact 0°C	kJ/m2	31.0	10	10.3
Izod Impact -20°C	kJ/m2	11.3	8.2	9.2
Elongation at break	%	573	425	378
C_2^-= ethylene				

Whilst example 1 and comparative example 1 do differ in respect of the above identified distinguishing features, there are also a number of other differences which are not contingent on either of the distinguishing features.

Thus the MFR of the polypropylene component and of the final compositions are different as are the content of the copolymer and the intrinsic viscosity of the xylene soluble fraction.

These multiple differences mean that these data do not make it possible to ascertain whether any technical effect results from the distinguishing features, either individually or in combination. The arguments of the appellant that differences in the inventive and comparative compositions such as the MFR of the polypropylene component were not so large as to invalidate the comparison are speculative and supported by no evidence. Similarly the observation that comparative example 1 is more remote from composition P3 of D2 in terms of MFR of component A but closer in

terms of the ethylene content such that these aspects would balance out/cancel out is supported by no evidence and has not otherwise been shown to be a valid assumption, for example taking into account theoretical considerations based on knowledge of the relevant technical field.

2.2.3 Objective technical problem

Under these circumstances the only technical problem that can be formulated is the provision of further composition based on those known from D2.

This is achieved according to claim 1 by the P.I. of the homopolymer and the monomer composition of the copolymer.

2.2.4 Obviousness

D2 itself shows compositions with copolymers having monomer compositions ranging from 37/63 to 70/30 wt.-% propylene/ethylene (see Table 1), which encompasses the range specified in claim 1, rendering this aspect of the claim obvious.

The P.I. of the polypropylene component is not disclosed in D2. However it appears that no particular requirements are placed on this in D2. In particular either Ziegler-Natta or metallocene catalysts can be used to prepare it (D2, paragraph [0018]). It would thus be a matter of routine for the skilled person to adjust this parameter in the quest for further polymer compositions or alternatives based on those of D2.

Accordingly this aspect of the claim also has to be seen as an obvious route to solving the objective

technical problem.

On that basis the composition of claim 1 does not involve an inventive step starting from D2 as the closest prior art.

In view of the conclusion reached, there is no need to perform the analysis starting from D5 as the closest prior art (see last paragraph of section 2.1 above).

3. Auxiliary request I

3.1 Admittance

As observed by the respondent (see section XI.(c).(i), above) the claim diverges from claim 1 as granted in the restriction of the P.I. taken from the description. The decision in section 12.2.2 relied in its findings against inventive step in part on the small difference in P.I. of the homopolymer between the claimed subject-matter and the closest prior art D2. Accordingly this amendment can be seen as a direct response to the findings of the decision.

Thus the Board does not consider that submission of this claim can be seen as an abuse of procedure, or an otherwise inappropriate response to the decision. The Board therefore sees no reason not to admit the request to the procedure (Article 12(4) RPBA 2007).

3.2 Inventive step

In spite of the amendment, the appellant had no additional arguments for auxiliary request I with respect to the main request. Taking into account that the amended feature was already considered as a

distinguishing feature, and that no specific effect or peculiarity associated with the new range was argued or made evident by the appellant, the same considerations apply in respect of inventive step as for the main request and the same conclusion is reached.

4. Auxiliary request II - inventive step

4.1 Distinguishing feature

Claim 1 of auxiliary request II differs from claim 1 of the main request by restriction of the range of the MFR of component (A) to the range 12-25 g/10 minutes and by restriction of the intrinsic viscosity of the xylene soluble fraction (XSIV) to the range 3.5 to 5.0 dl/g.

The definition of the MFR of the polypropylene component does not introduce any additional distinction with respect to D2, example P3 since in that composition the polypropylene component has a MFR value of 25g/10 minutes, i.e. at the upper limit of the claimed range.

The amended range for the intrinsic viscosity of the xylene soluble fraction introduces a further distinguishing feature with respect to example P3 of D2 as it has a value of 3.2 dl/g.

4.2 Technical effect and objective technical problem

In spite of the presence of a further distinguishing feature the same considerations detailed for the main request (section 2.2.2, above apply) as to the presence of a technical effect, since example 1 and comparative example 1 still differ from each other not only in the distinguishing features, but also in further respects

(MFR of the homopolymer, MFR of the composition, copolymer content). Therefore also the objective technical problem remains as formulated for the main request (section 2.2.3, above).

4.3 Obviousness

The analysis and conclusions for inventive step of auxiliary request II remain the same as indicated above for the main request as far as the differences in ethylene content of the copolymer and in P.I. of the homopolymer are concerned. As to the intrinsic viscosity of the xylene soluble fraction, D2 specifies in claim 1 a range including 3.5 dl/g as an upper limit. Therefore the skilled person aiming at the provision of a further composition would consider such a value without inventive skills.

In this respect it is immaterial that the teaching of D2 is to lower values of XSIV as can be derived from Table 1 of D2 whereby all of examples P1-P6 have XSIV below 3.5 dl/g and solely example P7 - which in the context of D2 is to be seen as a comparative example - has a value above this limit. Regardless of this, the value of 3.5 dl/g is explicitly disclosed in D2 by claim 1 as belonging to the invention thereof.

It is therefore concluded that also the composition of claim 1 of the auxiliary request II does not involve an inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

B. ter Heijden D. Semino

Decision electronically authenticated