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Datasheet for the decision of 28 August 2008

Case Number: T 1812/06 - 3.3.03

Application Number: 01310060.7

Publication Number: 1215239

IPC: C08L 23/20

Language of the proceedings: EN

Title of invention:
Poly-1-butene resin composition and uses thereof

Patentee:
Mitsui Chemicals, Inc.

Opponent:
Basell Poliolefine Italia s.r.l.

Headword:
-

Relevant legal provisions:
EPC Art. 114(1), 123(2), 56
RPBA Art. 12(4)

Keyword:
"Amendments - added subject-matter (no)"
"Inventive step - no (all requests)"

Decisions cited:
T 0002/83, T 0381/02

Catchword:
-

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Case Number: T 1812/06 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 28 August 2008

Appellant: (Opponent)
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office dated 20 September 2006 and posted 11 October 2006 concerning maintenance of European patent No. 1215239 in amended form.

Composition of the Board:

Chairman: R. Young
Members: W. Sieber
E. Dufrasne

Summary of Facts and Submissions

I. The mention of the grant of European patent No. 1 215 239, in respect of European patent application No. 01310060.7, in the name of Mitsui Chemicals, Inc., filed on 30 November 2001 and claiming priorities of 30 November 2000 (JP 2000364993) and 21 November 2000 (JP 20001356112), was published on 25 February 2004 (Bulletin 2004/09). The granted patent contained 10 claims, whereby Claim 1 read as follows:

"A poly-1-butene resin composition comprising:

90 to 99.95% by weight of a poly-1-butene resin (A) obtainable by (co)polymerizing 80 to 100% by mol of 1-butene and 0 to 20% by mol of an α-olefin of 2 to 10 carbon atoms other than 1-butene and having a melt flow rate (MFR; ASTM D 1238, 190°C, load of 2.16 kg) of 0.01 to 50 g/10 min, and

0.05 to 10% by weight of a polypropylene resin (B) having a melt flow rate (MFR; ASTM D 1238, 230°C, load of 2.16 kg) of 0.01 to 50 g/10 min."

II. A notice of opposition was filed by Basell Poliolefine Italia S.p.A. (now Basell Poliolefine Italia s.r.l.) on 25 November 2004 requesting revocation of the patent in its entirety on the grounds that the claimed subject-matter was not novel and did not involve an inventive step (Article 100(a) EPC).

The following documents were *inter alia* cited with the notice of opposition:

D1: EP 0 045 455 A1;

D4: EP 0 264 193 A2; and

D6: EP 0 476 660 A2.

In the course of the opposition procedure, the opponent filed further documents, namely:

D7': EP 0 331 408 A2;

D10: Explanations for ASTM D 1238; and

D11: BE 695803 A.

III. During prosecution of the case before the opposition division, the proprietor filed a set of claims according to a first auxiliary request. Claim 1 of the first auxiliary request corresponded to Claim 1 as granted except that at the end of the claim the following restriction for resin (A) had been inserted:

";… wherein said poly-1-butene resin (A) comprises:

60 to 95% by weight of a poly-1-butene resin (a1) having a melt flow rate (MFR; ASTM D 1238, 190°C, load of 2.16 kg) of 0.01 to 5 g/10 min, a molecular weight distribution (Mw/Mn), as determined by a GPC method, of not more than 6, and an isotactic index (mmmm %), as measured by NMR, of not less than 90, and

5 to 40% by weight of a poly-1-butene resin (a2) having a melt flow rate (MFR; ASTM D 1238, 190°C, load of 2.16 kg) of 20 times or more the MFR value of the poly-

1-butene resin (a1), a molecular weight distribution (Mw/Mn), as determined by a GPC method, of not more than 6, and an isotactic index(mmmm %), as measured by NMR, of not less than 90."

Furthermore, the unit for the melt flow rate of resin (B) in Claim 1 was (apparently inadvertently) amended to "g/min" (the unit in Claim 1 as granted was "g/10 min").

Claims 2 to 9 of the first auxiliary request were based on Claims 2 and 4 to 10 as granted.

IV. By an interlocutory decision which was announced orally on 20 September 2006 and issued in writing on 11 October 2006, the opposition division refused the proprietor's main request (claims as granted) and maintained the patent in amended form according to the proprietor's first auxiliary request.

(a) The opposition division introduced the late-filed documents D7' and D10 into the proceedings. It did not, however, introduce D11 into the proceedings because this document was not more relevant than the teaching of D6.

(b) The opposition division refused the main request because the subject-matter of Claim 1 as granted lacked novelty over D4.

(c) The opposition division found that the subject-matter as claimed in the first auxiliary request was novel and involved an inventive step. As regards inventive step, D6 was considered to

represent the closest prior art. The objective problem was seen in improving the flatness of pipes made from a poly-1-butene resin. In order to solve this problem, a person skilled in the art would not have consulted any of the other cited documents because they were not concerned with the problem of improving the flatness of pipes. In this connection, reference was made to T 2/83 (OJ EPO 1984, 265).

V. On 6 December 2006, the appellant (opponent) filed a notice of the appeal against the above decision with simultaneous payment of the prescribed fee.

A statement setting out the grounds of appeal was filed on 9 February 2007 including document D11. The arguments of the Appellant may be summarized as follows:

D6 was considered to represent the closest prior art. This document disclosed a poly-1-butene resin composition comprising two poly-1-butene resins falling within the definitions of components (a1) and (a2) of the patent in suit. Further, D6 taught the inclusion of a nucleating agent whereby on page 4, lines 41-42 four examples were given, namely polyethylene resins, polyethylene waxes, ethylenebisstearoamide, and polypropylene resins. Accordingly, to arrive at a composition as defined in Claim 1 as allowed by the opposition division, polypropylene must merely be selected from the four nucleating agents disclosed in D6, and the correct melt flow rate chosen. D6 clearly explained on page 4, lines 36-40 that the addition of a nucleating agent was preferred in pipe moulding in

order to achieve many improvements, among which an enhancement of the rigidity. Clearly an enhancement of the rigidity would contribute to reduce the pipe flattening. In view of such teaching the person skilled in the art would have considered the four alternatives in order to obtain pipes with improved mechanical properties, translating also into an improved resistance to flattening. Further, T 2/83 (*supra*), cited in the decision under appeal, did not apply in the present case, because with respect to the teaching of D6 no hidden or unrecognized problem was solved by the claimed invention. Actually the measurement of resistance to flattening was just one of the many possible ways of testing the enhancement of mechanical properties. The further testing of a technical solution explicitly disclosed in the prior art did not amount to an inventive step.

The other cited documents, namely D1 and D11, made it even clearer that the nucleating effect of polypropylene, and the consequent improvement of mechanical properties of poly-1-butene when added to it in an amount of below 10% was well known in the art.

VI. With its reply dated 18 June 2007, the respondent (proprietor) submitted a main request and first to third auxiliary requests.

(a) The claims of the main request (Claims 1 to 9) corresponded to Claims 1 to 9 of the first auxiliary request allowed by the opposition division (point III, above), except that the erroneous unit "g/min" for the melt flow rate of resin (B) in Claim 1 was amended to "g/10 min".

(b) The claims of the first auxiliary request correspond to the claims of the main request except that Claim 1 read as follows (amendments underlined):

"A poly-1-butene resin composition comprising:

90 to 99.95% by weight of a poly-1-butene resin (A) obtainable by (co)polymerizing 80 to 100% by mol of 1-butene and 0 to 20% by mol of propylene and having a melt flow rate (MFR; ASTM D 1238, 190°C, load of 2.16 kg) of 0.01 to 50 g/10 min, and

0.05 to 10% by weight of a polypropylene resin (B) having a melt flow rate (MFR; ASTM D 1238, 230°C, load of 2.16 kg) of 0.01 to 50 g/10 min,

wherein said poly-1-butene resin (A) comprises:

60 to 95% by weight of a homopolymer of 1-butene or a copolymer of 1-butene and propylene (a1) having a melt flow rate (MFR; ASTM D 1238, 190°C, load of 2.16 kg) of 0.01 to 5 g/10 min, a molecular weight distribution (Mw/Mn), as determined by a GPC method, of not more than 6, and an isotactic index (mmmm %), as measured by NMR, of not less than 90, and

5 to 40% by weight of a homopolymer of 1-butene or a copolymer of 1-butene and propylene (a2) having a melt flow rate (MFR; ASTM D 1238, 190°C, load of 2.16 kg) of 20 times or more the MFR value of the poly-1-butene resin (a1), a molecular weight

distribution (Mw/Mn), as determined by a GPC method, of not more than 6, and an isotactic index(mmmm %), as measured by NMR, of not less than 90.

(c) The claims of the second auxiliary request corresponded to the claims of the main request, but contained the further limitation to Claim 1 that the composition contained a nucleating agent. Further, the dependent claim relating to the presence of a nucleating agent was deleted.

(d) The claims of the third auxiliary request were derived from those of the first auxiliary request, but contained the further limitation to Claim 1 that the composition contained a nucleating agent. The third auxiliary request therefore incorporated the limitations of both the first and second auxiliary requests.

VII. The arguments of the respondent may be summarized as follows:

(a) As regards the main request, D6 was regarded as the closest prior art. The difference between compositions of D6 and those according to the present claims was the presence of the polypropylene component in the latter. Comparative Examples 1-4 of Table 2 of the patent in suit could therefore be considered to represent compositions of D6, because they contain poly-1-butene, but no further polypropylene resin. As illustrated in Table 2, this difference led to the improvement in flattening of pipes when wound on

to a drum. Therefore, the objective technical problem had to be defined as the flattening of pipes when wound on to a drum.

None of the cited documents, including D6, recognised this problem. Accordingly, none of the documents presented any solution to this problem. Therefore, as discussed in the decision under appeal, the skilled person would not consult any of the other documents. The subject-matter of Claim 1 of the main request was therefore inventive over the prior art. The opposition division correctly cited T 2/83 (*supra*) in their decision where it was stated that the discovery of an unrecognised problem might give rise to patentable subject-matter.

(b) As regards the first auxiliary request, the specific embodiment wherein component (A) comprised a propylene-1-butene copolymer was inventive over D6. D6 mentioned the possibility of producing a copolymer of 1-butene with an α-olefin. It listed seven olefin monomers in an non-exhaustive list of options, of which propylene was one. However, there was no teaching of a preference for propylene, nor was a copolymer of 1-butene and propylene employed in any of the examples. Accordingly, to arrive at this embodiment, the skilled person must make the further selections to form a copolymer of 1-butene and to use propylene as the copolymer.

(c) The claims of the second auxiliary request were inventive over the cited prior art because they

required the presence of both a nucleating agent and a polypropylene resin (B) as defined in Claim 1. D6 did not teach the inclusion of a nucleating agent together with a polypropylene resin. Starting from the teaching of D6, the skilled person must decide to include both a nucleating agent and a further thermoplastic polymer. Then he must select polypropylene as that thermoplastic polymer and ensure that it was present in the amounts and with the same melt flow rate as defined in Claim 1 of the second auxiliary request. It was therefore not obvious to produce a composition according to Claim 1 of the second auxiliary request.

(d) The claims of the third auxiliary request combined the limitations of the first and the second auxiliary requests. The claims of the third auxiliary request were therefore inventive to at least the same extent as those of each of the first and second auxiliary requests. Further, the skilled person, starting from D6, must combine all the features of Claim 1 of the first and second auxiliary requests to arrive at a composition according to Claim 1 of the third auxiliary request.

VIII. On 28 August 2008, oral proceedings were held before the board.

(a) As regards D11, re-filed with the statement of grounds of appeal, the appellant regarded this document relevant for establishing the status of polypropylene as a nucleating agent in polybutene

compositions and requested its introduction into the proceedings. The respondent requested to refuse this request because D11 was not more relevant than the other documents on file.

(b) The appellant raised no objection against the amendment in Claim 1 of the main request.

(c) As regards inventive step both parties considered D6 as the closest prior art. However, as already submitted in writing, they held different views as to the problem to be solved. Thus, the discussion focussed on the question as to whether or not the problem relied on by the respondent (flattening of pipes) was connected with the technical effects described in D6, ie faster curing time and faster moulding. A decisive question in this connection appeared to be whether flattening of pipes was a completely different problem or simply a particular instance of an old problem, namely the development (evolution) of the properties of poly-1-butene resins with time. Further, the point was raised whether the examples in the patent specification were in principle suitable to demonstrate an improvement in flattening of pipes over the closest prior art.

(d) As regards the first auxiliary request, the chairman pointed out that Claim 1 of this request comprised as component (A) a homopolymer of 1-butene or a copolymer of 1-butene. To the extent that Claim 1 concerned the homopolymer, the scope of the claims of the first auxiliary request was identical to the scope of the main request. Thus,

the inventive step objection raised against the main request applied equally to the claims of the first auxiliary request. The respondent did not whish to make further submissions concerning the first auxiliary request.

(e) As regards the second auxiliary request, the chairman pointed out that one component of Claim 1, namely component (A), was defined by its chemical structure and another component, namely the nucleating agent, was defined by its function whereby the latter overlapped with component (A). Hence, it was at least questionable whether the amendment provided a further limitation to Claim 1 at all. Since, however, the amendment was based on a granted claim, it was not open to an objection under Article 84 EPC.

The appellant was of the opinion that the presence of a further nucleating agent was merely a normal obvious extension of the prior art, ie the presence of two nucleating agents instead of one nucleating agent. The respondent was of the opinion that Claim 1 had to interpreted as comprising polypropylene and a further nucleating agent. The examples in the patent specification provided a direct comparison of the claimed subject-matter with the closest prior art. These examples clearly demonstrated a surprising technical effect due to the use of polypropylene and a nucleating agent, namely an improvement in flattening of pipes.

(f) The chairman pointed out that the claims of the third auxiliary request were identical to the claims of the second auxiliary request as far as they referred to a homopolymer of 1-butene for component (A). Thus, the same situation as with the first auxiliary request arose. The respondent stated that it had no further submissions on the third auxiliary request but requested an interruption of the oral proceedings for drafting a further auxiliary request which included further specifications for the nucleating agent from the description. This was opposed by the appellant in view of the likelihood of further complications arising out of the amendments. After deliberation, the board decided not to interrupt the oral proceedings for further claim drafting.

IX. The Appellant requested that the decision under appeal be set aside and the patent be revoked in its entirety.

The Respondent requested that the decision under appeal be set aside and the patent be maintained on the basis of

- the main request (Claims 1 to 9) or, in the alternative,
- the first auxiliary request (Claims 1 to 9), or
- the second auxiliary request (Claims 1 to 8), or
- the third auxiliary request (Claims 1 to 8),

all requests filed with the letter dated 18 June 2007.

Reasons for the Decision

1. The appeal is admissible.

2. *Procedural matter*

Document D11 had not been admitted by the opposition division into the proceedings because of its late filing and insufficient relevance. Nevertheless, the appellant re-filed D11 with the statement of grounds of appeal in order to further demonstrate the role of polypropylene as a nucleating agent in poly-1-butene resins.

The status of polypropylene as a nucleating is indeed a key issue to the present case. Furthermore, D11 was submitted at the earliest possible stage in appeal, namely with the statement of grounds of appeal, giving the respondent ample time to deal with that document. Consequently, the board decided to admit D11 into the proceedings in accordance with Article 114(1) EPC and Article 12(4) RPBA (OJ EPO 2007, 536).

Main request

3. *Amendments (main request)*

Claims 1-9 of the main request are identical to those of the first auxiliary request allowed by the opposition division (point III, above), except that the unit for the melt flow rate given in Claim 1 for polypropylene resin (B) has been amended by replacing

"g/min" by "g/10 min". Basis for this amendment can be found at page 15, lines 19-22 of the application as filed. In fact, this modification was introduced inadvertently during the opposition proceedings and had passed unnoticed.

Since, furthermore, Claim 1 of the main request is merely a combination of the subject-matter of granted Claims 1 and 3 (and Claims 1 and 3 as filed, respectively) and Claims 2-9 are based on granted Claims 2 and 4-10, no objections under Articles 123 or 84 EPC arise against the claims of the main request. Nor has the respondent advanced any objection in this connection.

4. The appeal has been made on the sole grounds that the subject-matter as claimed in the main request lacks inventive step.

5. *Inventive step (main request)*

5.1 The claimed subject-matter relates to a poly-1-butene resin composition and uses thereof, for example, pipes for fluid transportation, such as water or hot water supply pipes, and joints for pipes. It is an object of the patent in suit to provide a poly-1-butene resin composition which is capable of shortening the curing time normally associated with poly-1-butene resins and thereby shortening the moulding cycle without deteriorating creep resistance at high temperature and flexibility, ie having excellent productivity, and capable of producing a pipe having excellent wind-up properties after extrusion moulding (paragraph [0007] of the patent specification).

5.2 During the opposition proceedings, D6 was considered to be the closest prior art by the opponent, the proprietor and the opposition division. In fact, both the appellant and the respondent still regarded D6 as the closest prior art in the appeal proceedings.

5.2.1 D6 relates to a poly-1-butene resin composition being excellent in impact resistance, creep resistance and high speed mouldability, and to products, eg pipes, moulded from this composition (page 2, lines 3-5, Claim 11). The poly-1-butene resin composition (Claim 1) substantially comprises:

(A) 60 to 95 weight parts of a poly-1-butene resin (A) having
(i) a melt flow rate of 0.01 to 5 g/10 min,
(ii) a ratio (Mw/Mn) of 6 or less, and
(iii) an isotactic value of 93% or more, and
(B) 40 to 5 weight parts of a poly-1-butene resin (B) having
(i) a 20 times or more as large melt flow rate as that of the poly-1-butene resin (A),
(ii) a ratio (Mw/Mn) of 6 or less, and
(iii) an isotactic value of 93% or more.

It is preferred that the resin composition further contains a nucleating agent in addition to the poly-1-butene resins (A) and (B) in an amount of 0.01 to 2 weight parts, preferably in the range of 0.05 to 0.5 weight parts per 100 weight parts in total of (A) and (B) (page 4, lines 44-46). The addition of a nucleating agent is preferred, since in that case the solidification speed of the molten resin extruded from

the die at the time of pipe moulding becomes faster and more stabilized high speed mouldability is obtained. This measure promotes the speed of crystal transition peculiar to poly-1-butene resins even after the solidification and moreover there is an effect in the enhancement of the rigidity (page 4, lines 36-40). In particular, Claim 9 of D6 is directed to a composition substantially comprising:

(1) 100 weight parts of the resin composition of Claim 1,
(2) 0.01 to 2 weight parts of a nucleating agent, and
(3) 0 to 20 weight parts of a thermoplastic polymer other than a poly-1-butene resin.

Examples of the nucleating agent (2) are polyethylene resins, polyethylene waxes, ethylenebisstearoamide (EBSA) and polypropylene resins (page 4, lines 41-42), whereby only EBSA and polyethylene are used in the examples of D6.

5.2.2 It is immediately evident from the above analysis that poly-1-butene resins (A) and (B) of D6 basically correspond to poly-1-butene resins (a1) and (a2) of present Claim 1, a fact which has not been disputed by the respondent. Furthermore, it is apparent that D6 encompasses the possibility of adding polypropylene as a nucleating agent in order to increase the speed of crystal transition but it does neither specify the melt flow rate of the polypropylene nor is the addition of polypropylene exemplified in D6.

5.2.3 Hence, D6 not only has most of the technical features in common with the claimed subject-matter, it also

discloses technical effects (ie shortening of the moulding cycle) and intended use most similar to the claimed subject-matter. Consequently, D6, and in particular the composition disclosed in Claim 9 of D6, is regarded, in accordance with the parties, as the closest prior art.

5.3 The next step in the "problem and solution approach" is the formulation of the objective technical problem based on an assessment of the technical effects provided by the claimed invention over the closest prior art.

In this connection, it is conspicuous to the board that D6 suggests the addition of a nucleating agent, *inter alia* polypropylene, in order to increase the speed of crystal transition of poly-1-butene and thereby shortening the moulding cycle for products moulded from this resin. Although the patent in suit does not present polypropylene as a nucleating agent, it is likewise an object of the patent in suit to reduce the curing time of poly-1-butene resins by the addition of polypropylene (paragraph [0007] of the patent specification). It is even stated in paragraph [0087] of the patent specification that the ½ crystal transition time is a measure of the curing time of the pipe after moulding. Thus, the decisive question in the present case is as to whether or not the addition of polypropylene to the poly-1-butene resin provides a different technical effect in comparison with the other nucleating agents mentioned in D6.

5.3.1 The compositions of Comparative Examples 1-4 of Table 2 of the patent specification contain poly-1-butene

resins corresponding to components (a1) and (a2) of Claim 1 of the main request and a small amount of nucleating agent, namely 0.2 parts by weight of high density polyethylene (HDPE; Comparative Examples 1-3) or 0.05 parts by weight of EBSA (Comparative Example 4). Comparative Examples 1-4 can therefore be considered to represent compositions according to the closest prior art. A fair comparison between the compositions according to the closest prior art and the claimed invention would require a repetition of Comparative Examples 1-4 where HDPE and EBSA would be substituted by the equivalent amount of polypropylene. Only in such a case it would be possible to assign an occurring technical effect to the use of polypropylene. In the present case, however, the examples according to the invention use **in addition** to 0.2 parts by weight of HDPE (Examples 1-3, 5) or 0.05 parts by weight of EBSA (Example 4) a rather large amount of polypropylene, namely 4.76 parts by weight. Thus, it is not clear whether the reduced curing time (expressed in terms of ½ crystal transition time) or the improved "flatness of pipes" is due to the addition of polypropylene or simply due to the fact that in total a much larger amount of nucleating agent is used in Examples 1-5 (polypropylene is, as pointed out above, also a nucleating agent).

5.3.2 Since the technical effect is not clearly attributable to the use of polypropylene, it cannot be relied upon for defining the objective technical problem. Thus, the objective technical problem solved by the claimed subject-matter vis-à-vis the closest prior art can only be seen in the provision of further poly-1-butene resin compositions capable of shortening the curing time, ie

providing alternatives to the compositions exemplified in D6.

5.4 Starting from D6 as the closest prior art and trying to solve the posed problem, the person skilled in the art would of course consider the other not exemplified nucleating agents of D6 and therefore inevitably arrive at polypropylene as a possible nucleating agent for reducing the curing time of the poly-1-butene resins. Finding out the appropriate melt flow rate for polypropylene and the appropriate amount cannot contribute to inventive step, especially since, firstly, the melt flow rate indicated in Claim 1 covers, as pointed out by the appellant, an extremely broad range of conventional polypropylene, and, secondly, the preferred amount for a nucleating agent disclosed in D6 clearly falls within the range indicated in Claim 1 of the main request. Consequently, the subject-matter of Claim 1 of the main request is obvious from D6 alone.

5.5 The respondent argued that the data of Table 2 in the patent specification illustrated that the presence of polypropylene led to an improvement in flattening of pipes when wound on to a drum. Therefore, the objective technical problem had to be defined as the flattening of pipes when wound on to a drum. None of the cited documents, including D6, recognised this problem. Accordingly, none of the documents presented any solution to this problem. Therefore, the opposition division correctly cited T 2/83 (*supra*) where it was held that the discovery of an unrecognised problem may give rise to patentable subject-matter in spite of the fact that the claimed solution is retrospectively trivial and in itself obvious.

However, the board cannot accept the respondent's line of argumentation for the following reasons:

5.5.1 It is common general knowledge that poly-1-butene resins generally have the problem that when poly-1-butene resins are moulded the properties of the resulting moulded products, such as pipes or pipe joints, vary slowly and a curing time of several days to ten-odd days is necessary by the time the products exhibit stable properties. This is apparent from D6 (page 4, lines 36-40) and D11 (page 2, first paragraph) and is even acknowledged in paragraph [0003] of the patent specification. In other words, the properties of moulded products from poly-1-butene resins show some kind of evolution before they reach their final stage.

5.5.2 Flatness of pipes referred to by the respondent appears to be nothing more than a particular manifestation of the more general curing problem inherent to poly-1-butene resins. Consequently, it is obvious to the skilled person that winding a pipe on to a drum too early, ie at a time where the moulded product has not yet developed its final stable properties, must have some negative effects on the pipe. At least the patent in suit does not prove that there is another reason for the flatness of pipes than the curing time. Moreover, the data in Table 2 of the patent specification show that an improvement in flatness of pipes comes along with a shortening of the curing time expressed in terms of the ½ crystal transition time. Thus, it is not credible that flatness of pipes is an unrecognised or indeed hidden problem in the sense of T 2/83.

But even if flatness of pipes were to be acknowledged as a technical problem in the present case, the person skilled in the art would as a first precautionary measure link flatness of pipes to an insufficient curing time of the moulded product. An advantageous effect relating to flatness of pipes could therefore be expected as a result from improving the curing time, namely the addition of a curing agent. How to improve the curing time is, however, already known from D6. Hence, the skilled person is in an inevitable "one-way-street" situation where the additional provision of a yet unsuspected "bonus" or side effect, which may be interpreted as a solution to a yet unknown problem, is not necessarily decisive for patentability (see T 2/83 (supra), paragraph 6 of the reasons). Therefore, the respondent's argumentation based on an unrecognized problem cannot succeed in the present case.

5.6 In summary, the subject-matter of Claim 1 of the main request is not based on an inventive step in view of D6.

6. *First auxiliary request*

6.1 The claims of the first auxiliary request are derived from those of the main request with the further limitation that the optional α-olefin comonomer of component (A) is propylene with the consequence that the poly-1-butene resins (a1) and (a2) are each a homopolymer of 1-butene or a copolymer of 1-butene and propylene. This amendment is based on page 5, line 24 of the application as originally filed where propylene is explicitly listed as an example of the α-olefins. No objections under Articles 123 and 84 EPC arise against the amendment.

6.2 It is conspicuous to the board that the subject-matter of the claims of the first auxiliary request is identical to the subject-matter of the claims of the main request as far as components (a1) and (a2) concern 1-butene homopolymers. Since D6 describes and exemplifies 1-butene homopolymers for the components equivalent to (a1) and (a2) of the present claims, all the arguments given for the main request equally apply to the claims of the first auxiliary request as far as components (a1) and (a2) concern 1-butene homopolymers. Consequently, to that extent, the subject-matter of Claim 1 of the first auxiliary request is also not based on an inventive step and the first auxiliary request as a whole has to be refused.

7. *Second auxiliary request*

7.1 The claims of the second auxiliary request are derived from those of the main request, but contain the further limitation to Claim 1 that the composition contains a nucleating agent. This is the subject-matter of Claim 5 as filed and Claim 5 as granted, respectively. Thus, no objection under Article 123 EPC arises against the amendment in Claim 1 of the second auxiliary request.

7.2 Since Claim 1 of the second auxiliary request is merely the assemblage of granted Claim 1 and dependent granted Claim 5 comprising no factual amendment, the claim is not open to objections under Article 84 EPC (eg T 381/02 of 26 August 2004 (not published in the OJ EPO, points 2.3.2 to 2.3.5 of the reasons)).

7.3 However, it is conspicuous to the board that Claim 1 of the second auxiliary request defines component (B) by its chemical structure whereas the nucleating agent is defined merely by its function. Since a polypropylene acts as a nucleating agent in poly-1-butene resins (as known eg from D6 and D11), Claim 1 of the second auxiliary request provides no real further distinction over the prior art. In other words, every poly-1-butene composition containing polypropylene inherently comprises also a nucleating agent. Thus, the amendment is not suitable to overcome the objections raised against Claim 1 of the main request.

7.4 But even if one would assume, in favour of the respondent, that Claim 1 of the second auxiliary request has to be interpreted as comprising polypropylene and a further nucleating agent different from polypropylene, such a claim can still not overcome the inventive step objection raised against Claim 1 of the main request. A poly-1-butene resin comprising polypropylene resin and a nucleating agent being different from polypropylene is, in view of the inherent function of polypropylene, nothing else than a poly-1-butene resin comprising two nucleating agents. The structure of the examples in the patent in suit is not such as to demonstrate any surprising technical effect attributable to the use of propylene and a further nucleating agent. As already mentioned above, Examples 1-5 and Comparative Examples 1-4 merely show that a large amount of two nucleating agents (polypropylene and other nucleating agent) provides better results than a small amount of one nucleating agent (other than polypropylene). It is not clear whether the improvement in curing time (expressed in

terms of ½ crystal transition time) or flatness of pipes is due to the specific combination of propylene with another nucleating agent or merely to the fact that more nucleating agent (in total) is used in Examples 1-5. The fact that a larger amount of nucleating agent provides a more reduced curing time than a small amount of nucleating agent appears, however, self evident and cannot contribute to inventive step.

7.5 In summary, also the subject-matter of Claim 1 of the second auxiliary request is not based on an inventive step. Consequently, the second auxiliary request has to be refused.

8. *Third auxiliary request*

8.1 The claims of the third auxiliary request are derived from those of the first auxiliary request, but contain the further limitation to Claim 1 that the composition contains a nucleating agent. The claims of the third auxiliary request therefore incorporate the limitations of both the first and second auxiliary request. Basis of the amendments are therefore as mentioned above in respect of each of the requests. Thus, the amendments comply with Article 123 EPC.

8.2 It is conspicuous to the board that the constellation between the third auxiliary request and the second auxiliary request is the same as the constellation between the first auxiliary request and the main request. Specifically, the subject-matter of Claim 1 of the third auxiliary request is identical to the subject-matter of Claim 1 of the second auxiliary

request in so far as components (a1) and (a2) concern a homopolymer of 1-butene. Thus, the embodiment of Claim 1 of the third auxiliary request directed to a homopolymer of 1-butene is, for the same reasons as given for Claim 1 of the second auxiliary request, not based on an inventive step.

Consequently, the third auxiliary request has to be refused.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

E. Görgmaier R. Young