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**D E C I S I O N**  
**of 3 November 2005**

**Case Number:** T 0175/03 - 3.3.03

**Application Number:** 95933939.1

**Publication Number:** 0784637

**IPC:** C08F 10/00

**Language of the proceedings:** EN

**Title of invention:**

Process for polymerizing monomers in fluidized beds

**Patentee:**

ExxonMobil Chemical Patents Inc.

**Opponent:**

Basell Polyolefine GmbH

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 54(2), 54(3), 56, 83, 87(4), 100(a), 100(b), 123(2)

**Keyword:**

"Priority (acknowledged)"

"Amendments - allowability of disclaimer (yes)"

"Opposition ground - insufficiency of disclosure (no)"

"Novelty - prior European applications (main request: no;  
auxiliary request; yes)"

"Inventive step - problem and solution (auxiliary request:  
yes)"

**Decisions cited:**

G 0001/93, G 0002/98, G 0001/03, G 0002/03, T 0323/97,  
T 0507/99

**Catchword:**

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Case Number: T 0175/03 - 3.3.03

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.03  
of 3 November 2005

**Appellant:** Basell Polyolefine GmbH  
(Opponent) Intellectual Property  
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**Representative:** Wagner, Matthias  
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**Respondent:** ExxonMobil Chemical Patents Inc.  
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**Representative:** UEXKÜLL & STOLBERG  
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**Decision under appeal:** Interlocutory decision of the Opposition  
Division of the European Patent Office of  
19 November 2002 and posted 5 December 2002  
concerning maintenance of the European patent  
No. 0784637 in amended form.

**Composition of the Board:**

**Chairman:** R. Young  
**Members:** A. Däweritz  
H. Preglau

## Summary of Facts and Submissions

I. The grant of European patent No. 0 784 637 in respect of European patent application No. 95 933 939.1, based on International patent application No. PCT/US95/12241 (which had been published as WO-A-96/10590), filed on 26 September 1995 and claiming priority of 3 October 1994 of an earlier application in the USA (317153), was announced on 20 October 1999 (Bulletin 1999/42). The patent was granted with 11 claims.

Independent Claims 1 and 2 as granted read as follows:

"1. A process for polymerizing alpha-olefin(s) in a gas phase reactor having a fluidized bed and a fluidizing medium comprising a gas phase to produce a polymeric product wherein the fluidizing medium includes condensable fluids of saturated and unsaturated hydrocarbons and serves to control the cooling capacity of said reactor, the process comprising employing in the fluidizing medium a level of liquid entering the reactor which is between 18 and 50 weight percent based on the total weight of the fluidizing medium and maintaining the bulk density function (Z)

$$Z = \left[ \frac{(\rho_{bf} - \rho_g) / \rho_{bs}}{(\rho_s - \rho_g) / \rho_s} \right]$$

at a value equal to or greater than the calculated limit of the bulk density function in Table A herein, in which X and Y in Table A are calculated according to the following equations:

$$X = \text{LOG} \left[ \frac{d_p \rho_g U_o}{\mu} \right]$$

$$Y = \text{LOG} \left[ \frac{gd_p^3 \rho_g \rho_{bs} (\rho_s - \rho_g)}{\rho_s \mu^2} \right]$$

wherein  $\rho_{bf}$  is the fluidized bulk density,  $\rho_{bs}$  is the settled bulk density,  $\rho_g$  is the gas density, and  $\rho_s$  is the solid (resin) density and wherein  $d_p$  is weight average particle diameter,  $g$  is the gravity acceleration (9.805 m/sec<sup>2</sup>),  $U_o$  is the gas superficial velocity, and  $\mu$  is the gas viscosity.

2. A continuous process for increasing reactor productivity of a gas phase polymerization reactor having a fluidizing medium and fluidized bed, said process comprising passing a gaseous stream comprising monomer through a reaction zone in the presence of a catalyst to produce a polymeric product, withdrawing said polymeric product, withdrawing said fluidizing medium comprising unreacted monomer from said reaction zone, mixing said fluidizing medium with hydrocarbon and polymerizable monomer(s) to form a liquid and a gas phase, the process comprising employing in the fluidizing medium a level of liquid entering the reactor which is between 18 and 50 weight percent based on the total weight of the fluidizing medium, and recycling said fluidizing medium to said reactor, the process comprising:
  - a) introducing said hydrocarbon into said fluidizing medium to permit an increase in the cooling capacity of the fluidizing medium above at least 22 g/cal [sic] (40 Btu/lb);

- b) increasing the rate of withdrawal of polymer product to above at least 2441 kg/hr-m<sup>2</sup> (500 lb/hr-ft<sup>2</sup>);
- c) maintaining a bulk density function (Z) value

$$Z = \left[ \frac{(\rho_{bf} - \rho_g) / \rho_{bs}}{(\rho_s - \rho_g) / \rho_s} \right]$$

greater than or equal to the calculated limit of the bulk density function in Table A herein, in which X and Y in Table A are calculated according to the following equations:

$$X = \text{LOG} \left[ \frac{d_p \rho_g U_o}{\mu} \right]$$

$$Y = \text{LOG} \left[ \frac{g d_p^3 \rho_g \rho_{bs} (\rho_s - \rho_g)}{\rho_s \mu^2} \right]$$

wherein  $\rho_{bf}$  is the fluidized bulk density,  $\rho_{bs}$  is the settled bulk density,  $\rho_g$  is the gas density, and  $\rho_s$  is the solid (resin) density and wherein  $d_p$  is weight average particle diameter,  $g$  is the gravity acceleration (9.805 m/sec<sup>2</sup>),  $U_o$  is the gas superficial velocity, and  $\mu$  is the gas viscosity."

The dependent Claims 3 to 5 related to elaborations of the process of the above Claim 2, the remaining Claims 6 to 11 concerned elaborations of the processes according to either of the above Claims 1 or 2.

II. On 20 July 2000, a Notice of Opposition was filed in which revocation of the patent in its entirety was requested on the grounds of Article 100(a) EPC, because the subject-matter of the patent in suit was neither novel nor did it involve an inventive step (Articles 54

and 56 EPC). To this end, the Opponent relied on the following documents:

D1: WO-A-94/25 495,

D2: US-A-4 543 399,

D3: L. Reh, "Verbrennung in der Wirbelschicht", Chem. Ing. Tech., (40), 11, 1968, pages 509 to 515, and

D4: "Reh-Diagramme" I and II.

In the course of the opposition proceedings, the Patent Proprietor filed a new Main Request (with a letter dated 11 May 2001). In each of Claims 1 and 2 of the Main Request, a disclaimer had been introduced "in order to remove an overlap between the disclosure of a prior application, published as WO 94/25495 and cited as Document D1 by the opponent, and the processes as claimed in the present patent. D1 is an earlier application of the same proprietor, published after the priority date of the present patent." and "... a more general and refined description of the regime of stable operating conditions has been found which takes into account more parameters and makes accessible areas of the parameter space of operating conditions which were not included by the more approximative requirement  $\rho_{bf}/\rho_{bs} > 0.59$  of D1. Thus, the present patent extends the limits of the regime of processes having stable operating conditions even at high liquid contents to areas which are not disclosed in D1." (page 1, last paragraph and page 2, second paragraph of the letter).

The disclaimer "with the exception of the ratio  $\rho_{bf}/\rho_{bs}$  being greater than 0.59," was inserted (i) at the end of the first paragraph of Claim 1 after an added comma between "maintaining" and "the bulk density function (Z)" and (ii) in feature (c) of Claim 2 before the word "maintaining", respectively (cf. section I, above).

Furthermore, the remaining dependent claims of this request corresponded to Claims 2 to 9 and 11 as granted.

With a letter dated 10 September 2002, the Patent Proprietor additionally submitted an Auxiliary Request, wherein Claims 1 and 2 as granted were amended by incorporation of the feature of Claim 10 as granted (corresponding to Claim 13 as originally filed).

In reply to these amendments, the Opponent additionally raised an objection under Article 83 EPC on the basis of the argument, that, in the amended claims, a range would be claimed, which was not disclosed in manner sufficiently clear and complete for the invention to be carried out in this range by a person skilled in the art (Article 100(b) EPC). Moreover, the Auxiliary Request did not, in the Opponent's view, comply with Article 123(2) EPC (letter of 19 September 2002, items 2 and 1, respectively).

On 19 November 2002, oral proceedings were held before the Opposition Division with both parties attending.

III. In the interlocutory decision of the Opposition Division announced at the end of those oral proceedings, the patent in suit was found able to be maintained on the basis of the above Main Request, because the claims

and the description adapted thereto met the requirements of the EPC.

In particular, the decision under appeal held that there was no explicit, unambiguous disclosure of the entirety of features defined in Claims 1 and 2 in any one of the cited documents.

Therefore, novelty was acknowledged namely with regard to D1, because "Claims 1 and 2 have been amended by the introduction of the disclaimer '**with the exception of the ratio  $\rho_{bf}/\rho_{bs}$  being greater than 0.59**' in order to establish novelty over the intermediate document D1 which teaches said ratio to be greater than 0.59 for having stable reactor working conditions". Considering the finding that D1 was a document in the sense of Article 54(3) EPC, the disclaimer was held to be allowable with regard to established jurisprudence and, consequently, not to contravene Article 123(2) EPC.

The objection of insufficiency of the disclosure on the basis of Article 100(b) EPC was rejected, because it was based, according to the decision under appeal, on assumptions and speculation, and because no suitable evidence in support of this objection had been filed by the Opponent.

Whilst it had been agreed by both parties that D2 related to the polymerisation of olefins in a fluidised bed reactor being operated in the condensed mode, there was, according to the decision under appeal, a dispute between them of whether D3 would have been considered by the skilled person.



The opinion of the Patent Proprietor, that the selection of information from the D3/D4 could only be done with hindsight, was accepted by the Opposition Division who, furthermore, found that D3 did not provide any information dealing with the polymerisation in fluidised bed reactors operated in the condensed mode and the improvement obtainable therewith. Nor did the skilled person receive any incentive for selecting the region of operating modes defined by the bulk density function Z as defined in Claims 1 and 2 of the patent in suit. The diagrams of D3 and D4 represented a very general disclosure having no bearing on the maintenance of the bulk density function, and D3 did not contain any information directing the skilled reader towards a selection of a specific region of the function Z.

Consequently, the presence of an inventive step was also acknowledged.

IV. On 4 February 2003, a Notice of Appeal was filed by the Opponent/Appellant against this decision. The prescribed fee was paid on the same date. The Statement of Grounds of Appeal was received on 11 April 2003, wherein the Appellant maintained all its previous objections, ie those of lack of novelty, of lack of inventive step and of insufficiency of disclosure.

(1) Thus, the objection of lack of novelty with regard to D1 was further pursued, in particular, on the basis of the argument that, in view of decisions G 2/98 (OJ EPO 2001, 413), T 323/97 (OJ EPO 2002, 476) and T 507/99 (OJ EPO 2003, 225), a disclaimer, in general, would not comply with Article 123(2) EPC.

Moreover, a disclaimer had allegedly only been accepted previously in those exceptional cases, wherein the subject-matter of a piece of the state of the art according to Article 54(3) EPC had not been known to the applicant when drafting its own application. In those circumstances, the disclaimer had been allowed even without a basis therefor in the application text, because there had been no other possibility for the applicant to delimit its application from the state of the art according to Article 54(3) EPC. In the present case, however, there was, in the Appellant's view, no need for such an exception, because the Respondent had known its own older European patent application D1.

(2) With regard to the objection of insufficient disclosure, the Appellant asserted that, in this case, the onus of proof for sufficiency would be on the Respondent, because it was the limitation of the claims during the opposition proceedings, due to which the requirement of Article 83 EPC was no longer met. Thus, the examples in the patent in suit would not, to a sufficient extent, provide support for the subject-matter of the amended claims. In particular in view of the uncertainty of the two parameters  $\rho_{bf}$  and  $\rho_{bs}$  and, hence, the accuracy of value of the  $\rho_{bf}/\rho_{bs}$  ratio depending thereon, it was, according to the Appellant, uncertain that the values of this ratio as presented in the tables of the patent in suit always fulfilled, in fact, the range required in the claims (eg the reactor productivity mentioned in Claim 2 of the patent in suit).

(3) Apart from the above question of principle relating to the admissibility of the disclaimer (this section: item 1, above), the Appellant took also the view that the disclaimer did not delimit the claimed subject-matter from the disclosure of D1, since as shown in Table 2 of D1 and apart from Z, the examples of the patent in suit and of D1 were identical. Despite the fact that Z was missing from D1, the reactions conditions would, however, be known, because a Z value of 0.54, as shown in that Table 2 mentioned above, would automatically indicate that other physical parameters would comply with the range of the claims.

No comments were given by the Appellant on the initially raised objection of lack of novelty with respect to D2.

(4) Regarding inventive step, the Appellant based its arguments, on the one hand, on D1, which it considered as being the closest prior art, because it considered the disclaimer to contravene G 2/98, above, and the priority to be lost (Statement of Grounds of Appeal: page 2, paragraph (c) and page 6, paragraph 3), or, on the other hand, on D2. In both cases, the technical problem was seen in the finding of criteria for the stable operation of a polymerisation reactor with the recycling of a fluid-gas mixture (in condensed mode), by which the failure rate could be reduced whilst maintaining high reactor productivity.

In the Appellant's view, a person skilled in chemical engineering, in particular in the stable operation of fluidised bed reactors, would take general literature about fluidised bed reactors, such as D3, into account.

In principle, there would be no difference between different processes carried out in fluidised beds, regardless of the exact way in which the process parameters were considered. In particular, the approximation  $Z \approx \rho_{bf}/\rho_{bs}$  of the Z equation (section I, above) would be valid, because the gas density  $p_g$  could be neglected in comparison with  $\rho_{bf}$  and  $\rho_{bs}$ .

- V. In a letter dated 14 August 2003, the Respondent contested the arguments of the Appellant and supported the decision under appeal. In particular, it disputed the arguments concerning the admissibility of the disclaimer and referred to a number of decisions and to the cases G 1/03 and G 2/03, then pending before the Enlarged Board of Appeal. Therefore, it requested that this case be stayed until those cases have been decided. Furthermore, it pointed out that "the EPC does not require that the description should contain a certain minimal number of examples or examples covering the whole range claimed. To the contrary, an application may be filed without any example provided that the invention is disclosed sufficiently clear and complete for it to be carried out by a person skilled in the art.", and it took the view that this latter requirement was fulfilled.

With regard to inventive step, it argued along the lines of the decision under appeal (section III, above) and, furthermore, that D2 would teach away from the claimed processes, because it recommended to stay away from high liquid contents in order to avoid instabilities. Nor would D3 provide any information or guidance which would, in combination with D2, lead the skilled person in an obvious manner to the claimed

subject-matter. Neither D3 nor D4 would have anything to do with fluidised bed processes having high liquid contents in the recycle stream. The Appellant had not, in the Respondent's opinion, even attempted to show how and why the skilled person should have identified and selected the process conditions as defined in the claims under consideration from D4 and how they should have been applied to the processes as in D2.

VI. In a communication to both parties, dated 1 August 2005 and issued together with a summons to oral proceedings, the Respondent was invited to file certified copies of the latter two of the three U.S. patent applications mentioned below, (i) because, in both independent claims as amended (section II, above), the disclaimer had been inserted in order to overcome an objection of lack of novelty with regard to D1 (filing date: 26 April 1993; publication date: 10 November 1994), (ii) because of the fact that U.S. Patent Application Serial No. ("USSN") 08/317 153 of 3 October 1994, the priority of which had been claimed in the present case (section I, above), was a continuation-in-part application ("CIP") of USSN 08/053 067, filed on 26 April 1993, which in turn had been a CIP of USSN 07/854 041, filed on 19 March 1992, and (iii) because of the requirements for the acknowledgement of a previous application as the first filing of the claimed subject-matter for the purpose of determining priority as defined in Article 87(4) EPC.

VII. These certified copies were filed with a letter dated 14 September 2005. Additionally, the Respondent pointed out that, like D1, those previous applications taught to operate the processes at issue by maintaining the

$\rho_{bf}/\rho_{bs}$  ratio above a certain threshold, namely 0.59, to ensure safe and stable operating conditions. However, none of these previous patent applications had defined the regime of stable operating conditions by employing a Z function as defined, for the first time, in USSN 08/317 153 and in the claims under consideration.

VIII. Oral proceedings were held on 3 November 2005 in the absence of the Appellant who, by letter dated 5 October 2005, had withdrawn its request for oral proceedings and had simultaneously informed the Board that it would not attend the oral proceedings if they were nevertheless held. The essentials of these proceedings and the additional relevant arguments of the Respondent can be summarised as follows:

(1) At the beginning, the Board made some preliminary remarks concerning its provisional view:

"D1 does not refer to the X and Y parameters nor to the Z Function. It mentions, however, that the levels of condensed liquid may be well above 15%, 20% or even 25%, whilst nevertheless avoiding significant levels of chunking or sheeting resulting from fluidized bed disruption (page 6, line 35 to page 6, line 2).

Moreover, in its letter dated 11 May 2001, the Patent Proprietor stated: 'a disclaimer has been introduced into claims 1 and 2 in order to remove an overlap between the disclosure of a prior application, published as WO 94/25495 and cited as Document D1 by the opponent, and the processes as claimed in the present patent'. In other words, the disclaimer had

already then been considered necessary in order to meet the novelty objection raised by the opponent.

Apart from the fact that a comma has been used in the disclaimer instead of a decimal point, the disclaimer refers to a ratio of the fluidized to the settled bulk density 'being greater than 0.59'.

However, mention is repeatedly made in D1, namely on page 24, at lines 3 to 4 and 24, and in Tables 1 and 2, of a  $\rho_{bf}/\rho_{bs}$  ratio of 'at least 0.59'. In the tables this value is disclosed in combination with the individual values of the fluidised and settled bulk densities, on the basis of which the value had been calculated, namely 17.8 lb/ft<sup>3</sup> and 30.2 lb/ft<sup>3</sup>. Reference can be made eg to Table 1 in the column relating to reaction time of 13 hours. Their quotient is '0.589', which is in line with the respective ratio as defined in both Claims 9 and 13.

Each of these claims refers to a ratio of 'over 17.8 to 30.2', which thus includes the value of 0.59 or at least one value even below this limit. Reference can be made in this context to the Respondent's letter dated 14 August 2003, page 2, end of the first complete paragraph.

Hence, despite the presence of the present disclaimer in Claims 1 and 2, the novelty objection has apparently not been met."

(2) Whilst, in the oral proceedings, it was conceded by the Respondent that the examples of D1 and those in the patent in suit described the same experiments, the

party argued that Example 1 of the patent in suit nevertheless contained further information, not yet known from D1, in the form of the Z function which required the monitoring of further parameters. These findings had turned out to be essential for maintaining the stability of the system, when further developing the techniques of "gas fluidized bed polymerisation" using condensed liquid in the recycled gas flow. Due to the monitoring of these additional parameters, more room was provided which allowed further to expand the area of process conditions in which this type of condensed mode gas phase polymerisation could still be carried out in stable conditions. It was, however, accepted by the Respondent that it was necessary to exclude the area covered by the older application D1, which had been confined by the previous limit of  $\rho_{bf}/\rho_{bs}$ , and that the examples of D1 included values of this ratio equal to or even below 0.59.

In particular, the Respondent pointed out that no mention was made in D1 of the X and Y parameters, the Z function, the recycle gas density and viscosity and the particle diameter. In other words, D1 did not provide the additional information that any one of these additional parameters would play an essential role for the stability of the reaction system.

(3) In order to meet the objection of lack of novelty, the Respondent filed a new set of claims to form the basis of an Auxiliary Request. This set differed from the Main Request (section II, above) only by the new wording of the disclaimer in its independent Claims 1 and 2, the amended parts of which read as follows:



"1. A process for polymerizing alpha-olefin(s) in a gas phase reactor ... and maintaining, with the exception of the ratio  $\rho_{bf}/\rho_{bs}$  being equal to or greater than 0,587, the bulk density function (Z) ..."

"2. ...

c) with the exception of the ratio  $\rho_{bf}/\rho_{bs}$  being equal to or greater than 0,587, maintaining a bulk density function (Z) value ..."

(4) With regard to the question of sufficiency of disclosure, the Respondent argued that the patent specification as a whole (including the second run of Example 1) had shown that the reaction system could be successfully run on the edge of the claims now limited by the new disclaimer. The specification would contain all the information necessary to achieve such stable conditions, namely, it referred to all parameters which had to be monitored, whilst no proof to the contrary had been provided by the Appellant. Moreover, the EPC would not require the presence of examples, as could be seen, in particular, from the German wording of Rule 27(1)(e) EPC. Nor had the Respondent received any indication during the written proceedings that further examples might be necessary. Otherwise it would have provided such additional evidence.

(5) With regard to the second objection of lack of novelty on the basis of D2, the Respondent argued that this document did not provide any information as to how to obtain stable reaction conditions with high liquid contents in the recycle stream. Although mention was

made of quite high quantities of condensed liquid in the two-phase recycle stream, which should not, as a general rule, exceed "about 20 weight percent, provided that the velocity of the stream was high enough to keep the liquid phase in suspension in the gas and to support the fluidised bed within the reactor" (column 4, lines 13 to 21), the examples in the document were far from achieving such high contents. Rather, they referred only to 4.2 to 11.5 weight percent.

(6) Concerning inventive step, the Respondent argued that, in respect of the deficiencies of the process of D2, as already mentioned above with regard to novelty, neither D2 nor D3 and D4 provided any incentive to combine their teachings. Thus, D3/D4 did not deal with the problems of gas phase polymerisation, but only with combustion, ie a completely different subject-matter.

Moreover, the Respondent presented a calculation to show that the approximation of  $Z \approx \rho_{bf}/\rho_{bs}$  was not correct (section IV, above, last paragraph). Instead, for  $\rho_{bf}/\rho_{bs}$  ratios close to 0.59 (as shown in Table 2 in the patent in suit), the relation would, in a first approximation, rather read  $Z \approx (\rho_{bf}/\rho_{bs}) \cdot [1 - (\rho_g/\rho_{bf})]$ , because the term  $(\rho_g/\rho_{bf})$  could not be neglected.

IX. The Appellant had requested in writing that the decision under appeal be set aside and that the patent in suit be revoked in its entirety, whereas the Respondent requested that the appeal be dismissed (Main Request) or, in the alternative, that the decision be set aside and that the patent be maintained on the basis of Claims 1 to 10 of the Auxiliary Request, filed during the oral proceedings (section VIII, above).

## Reasons for the Decision

1. The appeal is admissible.
2. *Priority*
  - 2.1 According to Article 87(4) EPC, "A subsequent application for the same subject-matter as a previous first application and filed in or in respect of the same State shall be considered as the first application for the purposes of determining priority, provided that, at the date of filing the subsequent application, the previous application has been withdrawn, abandoned or refused, without being open to public inspection and without leaving any rights outstanding, and has not served as a basis for claiming a right of priority. The previous application may not thereafter serve as a basis for claiming a right of priority."
  - 2.2 The subject-matter claimed in the patent in suit as granted is founded essentially on Claims 25 to 50 and page 15, line 20 to page 20, line 9 of USSN 08/317 153. Since these embodiments had no antecedent in the previous U.S. applications, the requirements of Article 87(4) EPC are met (cf. section VI, above).
  - 2.3 In G 2/98 (above) dealing with the requirements for claiming priority of the "same invention", the Enlarged Board of Appeal also referred in No. 10 of the Reasons for the Decision to G 1/93 (OJ EPO 1994, 541) and stated that this earlier decision dealt with a legal

situation completely different from the one considered in G 2/98.

- 2.4 In G 1/93 (above, No. 16 of the Reasons), the Enlarged Board of Appeal had held that the addition of an undisclosed feature limiting the scope of protection would not be contrary to Article 123(2) EPC if it merely excluded protection of part of the subject-matter of the claimed invention as covered by the application as filed without providing a technical contribution to the subject-matter of the claimed invention (ie a disclaimer). In G 1/03 (OJ EPO 2004, 413), the Enlarged Board of Appeal gave a definition of the term "disclaimer" and confirmed the above view (No. 2 of the Reasons). Additionally, it was pointed out in this decision that such a disclaimer does not change the identity of the invention within the meaning of Article 87(1) EPC and that G 2/98 (above) cannot be invoked as an authority against allowing a disclaimer limiting the claimed subject-matter without affecting the technical teaching in the application (Nos. 2.1.2 and 4 of the Reasons).

In the Board's view, both forms of the undisclosed feature (ie the disclaimers excluding certain  $\rho_{bf}/\rho_{bs}$  ratios) inserted in the independent claims of the Main and the Auxiliary request, respectively, comply with the definition of a disclaimer in these G-decisions.

Consequently, the validity of the priority claimed for the patent in suit is acknowledged.

3. *Admissibility of the disclaimer*

In the Statement of Grounds of Appeal, the Appellant maintained, however, its objection to the admissibility of a disclaimer, in general, for the purpose of delimiting a claimed subject-matter from the disclosure of an older European patent application, here D1, on the basis of (i) Decisions G 2/98, T 323/97 and T 507/99 (all mentioned above) and (ii) the fact that D1 had been known to the Patent Proprietor when drafting the initial application text, from which the patent in suit was derived (section IV, above).

3.1 In the meantime, Decisions G 1/03 (above) and G 2/03 (OJ EPO 2004, 448) have, however, been issued, according to which, in consideration of both of its previous decisions G 1/93 and G 2/98, both referred to above,

"A disclaimer may be allowable in order to:

- restore novelty by delimiting a claim against state of the art under Article 54(3) and (4) EPC; ..." (G 1/03: Order, No. 2.1 and Reasons for the Decision, Nos. 2 to 2.1.3), and

"A disclaimer should not remove more than necessary either to restore novelty ..." (No. 2.2 of the Order).

3.2 In consideration of the effective date of D1 and the validity of the priority claimed in the patent in suit, Document D1 is acknowledged as being a piece of prior art in the sense of Article 54(3) and (4) EPC (sections VI and 2 to 2.4, above).

3.3 In view of the above rulings of the Enlarged Board of Appeal and the above legal framework concerning D1 (sections 3.1 and 3.2, above), the arguments of the Appellant raised with regard to aspect (i) as mentioned in section 3, above, are not, therefore, appropriate.

3.4 According to Article 54(2) EPC, "The state of the art shall be held to comprise everything *made available to the public* by means of a written or oral description, ... before the date of filing of the European patent application.", and Article 54(3) EPC, "Additionally, the content of European patent applications as filed, of which the dates of filing are prior to the date referred to in paragraph 2 and which were *published ... on or after that date*, shall be considered as comprised in the state of the art." (emphasis added by the Board).

Since D1 was *published*, ie *made available to the public*, only after the valid priority date of the patent in suit (cf. Article 89 EPC) or, in other words, since on the priority date of the patent in suit, the contents of D1 had only been *internal* state of the art, not available to the public, the arguments of the Appellant concerning aspect (ii) in section 3 (above) are not convincing either.

3.5 Rather, the subject-matter of an older, but not pre-published European patent application can, in view of the wording of Article 54 EPC, quoted above, and of the above rulings of the Enlarged Board of Appeal, be excluded from the subject-matter of the claims of the patent in suit by means of a disclaimer. This is in principle, as shown above, valid for the delimitation of the claimed subject-matter from D1.

*Main Request*

4. *Novelty*

Novelty has been disputed in the opposition on the basis of D1 and D2, respectively.

4.1 The disclaimer excludes a process as defined in either Claim 1 or 2 of the patent in suit, wherein the ratio of the fluidized bulk density to the settled bulk density exceeds a value of 0.59. Therefore, the Respondent took the view - disputed by the Appellant (Statement of Grounds of Appeal: page 5, second complete paragraph) - that the subject-matter of D1 (as specified in its Claim 1) was no longer encompassed by the claims of the patent in suit, and that, consequently, the requirements of Article 54 EPC were fulfilled by the subject-matter of the patent in suit. Such a prior claim approach (see G 1/03, No. 2.1.1 of the Reasons) is, however, not applicable in proceedings according to the EPC. Rather, the whole content of the older application must be taken into account.

4.1.1 Whilst not disputing that the examples of D1 and those in the patent in suit described the same experiments, the Respondent argued that Example 1 of the patent in suit disclosed further parameters, which had not been disclosed in D1 (section VIII, above, item 2). These additional parameters (ie the X and Y parameters, the Z Function, the recycle gas density and viscosity and the particle diameter) had, however, turned out in the further development of the techniques of "gas fluidized bed polymerisation" to be essential for the maintaining

the stability of such as system when using condensed liquid in the recycled gas flow. It was, thus, found, according to the Respondent that, due to the monitoring of these additional parameters and applying the Z-function as defined in Claims 1 and 2 of the patent in suit, the area of process conditions, in which this type of condensed mode gas phase polymerisation could still be carried out in stable conditions, could be expanded beyond the previous limit of  $\rho_{bf}/\rho_{bs}$  as defined in D1.

4.1.2 In its letter dated 14 August 2003, the Respondent had stated: "This stable regime is, according to D1, defined by the requirement  $\rho_{bf}/\rho_{bs} > 0.59$  (see e.g. claims 9 and 13  $\rho_{bf}/\rho_{bs} > 17.8/30.2 = 0.59$ , or page 24, line 24)". As admitted by the Respondent in the oral proceedings, the same values  $\rho_{bf} = 17.8$  and  $\rho_{bs} = 30.2$  can be found in Table 1 of the patent in suit. Moreover, in both Tables 2 of D1 and the patent in suit, respectively, similar values are contained in the column representing the status of the reaction after 11 h at a liquid content in the recycle gas of 24.3 wt.-% (see D1, Table 2:  $\rho_{bf}/\rho_{bs} = 17.1/29.1 = 0.59$ ).

4.1.3 The Board has, therefore, come to the conclusion that neither of Claims 1 and 2 of the Main Request, excluding only  $\rho_{bf}/\rho_{bs} > 0.59$ , has been delimited in an appropriate manner from the disclosure of D1.

Consequently, the Main Request must be refused for the reason of lack of novelty with regard to D1.



*Auxiliary Request*

5. *Article 123(2) and (3) EPC*

This request differs from the wording of the Main Request only with regard to "the ratio  $\rho_{bf}/\rho_{bs}$  being equal to or greater than 0.587", inserted in the disclaimer to exclude the ratio mentioned above in section 4.1.2 with regard to Table 2.

The Board is satisfied that - on the basis of the measured values disclosed in D1 - this disclaimer complies with the items 2.1 and 2.2 of the Order of G 1/03 (see section 3.1, above).

Moreover, this amendment of the disclaimer further limits each of Claims 1 and 2 in comparison to the respective claims as granted.

Therefore, this request complies with Article 123(2) and (3) EPC.

6. *Novelty*

- 6.1 In view of the discussion concerning novelty in the context of the Main Request during the oral proceedings (section VIII, above, item 3), an Auxiliary Request has been filed by the Respondent, wherein Claims 1 and 2 have further been limited to exclude those embodiments of D1 which had anticipated the claimed subject-matter of the Main Request (see sections 4 to 4.1.3, above), ie a  $\rho_{bf}/\rho_{bs}$ -ratio of 17.1/29.1 at a liquid content in the recycle gas of 24.3 % by weight.

Additionally, the independent claims of the patent in suit require certain relations between the result of the Z function and the X and Y parameters to be met, none of which had been published in the cited art.

In view of these facts, the Board is satisfied that the subject-matter of the Claims 1 and 2 of the Auxiliary Request is novel with regard to D1.

- 6.2 The original novelty objection on the basis of D2 (Notice of Opposition: page 3, first complete paragraph) had apparently not been pursued further after the issue of a communication annexed to the summons (dated 22 June 2001), wherein the Opposition Division had indicated that it would presumably acknowledge novelty over D2 (item 1 of the annex).

Moreover, the Respondent pointed out that D2 did not disclose a condensed mode gas phase polymerisation of olefins with high liquid contents in the recycle stream in stable reaction conditions (section VIII, item 5, above).

Therefore, novelty of the claimed subject-matter vis-à-vis this document is also acknowledged.

- 6.3 In view of these facts, the Board is satisfied that the requirements of Article 54 EPC are met by the independent claims of the Auxiliary Request.

By the same token, this finding is also valid for the elaborations in the dependent Claims 3 to 10.

7. *Article 100(b) EPC*

7.1 Insufficiency of disclosure had not been a ground for opposition on which the Opponent had initially relied during the opposition period according to Article 99(1) EPC. This objection was rather raised only in reply to the filing of new claims containing the first version of the disclaimer (see section II, above). In other words, the objection of alleged insufficiency of disclosure can only be linked to the insertion of the disclaimer into the independent claims. This was confirmed by the Appellant in its Statement of Grounds of Appeal (item 2 on pages 2 and 3).

Whilst accepting that the onus of proof of insufficiency of disclosure is, in general, on the Opponent who asserts this deficiency of an opposed patent, the Appellant argued, that the burden to prove that the claimed subject-matter was disclosed in a clear and complete manner for it to be carried out by a skilled person would be shifted to the Patent Proprietor, when the claims had been limited during the opposition proceedings to an extent, that Article 83 EPC was no longer complied with. Since the claims now under consideration had not been examined in the grant procedure with respect to this requirement for grant, the Patent Proprietor could not rely on the assumption of validity of the granted patent (Statement of Grounds of Appeal: paragraph bridging pages 2 and 3).

7.2 In this context, the following aspects have to be considered: (i) the way by which the limitation of the claims has been effected, (ii) the effect caused by this limitation and (iii) the evidence for the

allegation of insufficiency of disclosure in view of the information provided by the patent in suit.

7.2.1 With regard to the above first aspect, it is evident that the present claims were amended by insertion of an admissible and allowable disclaimer (see sections 3 to 3.5, 5 and 6.1, above).

7.2.2 With regard to the second aspect, Decision G 1/03 (above) must be taken into consideration. In No. 2.1.1 of the Reasons, therein, it was held that Article 54(3) EPC has the effect that, if two applications have been filed for the same invention, the right to the patent belongs to the first applicant. "... if there is an overlap and the second application contains subject-matter not covered by the first application, the novelty-destroying effect of the earlier application does not apply to the whole of the second application."

It then goes on in No. 2.1.3: "... it may be concluded from the foregoing (point 2.1.1) that the purpose of a disclaimer excluding a conflicting application is merely to take account of the fact that different applicants are entitled to patent in respect of different aspects of inventive subject-matter *and not to change of technical teaching*. The disclaimer splits the invention as a whole in two parts: in respect of the identical part, it preserves the rights of the first applicant; for the rest, disclosed for the first time in the later application, it attributes the right to the second applicant. This approach restricts the effects of Article 54(3) EPC to resolving the problem of double patenting." (emphasis added by this Board).

And in Nos. 2.5 to 2.5.3 of the Reasons, G 1/03 makes it clear that a disclaimer cannot serve to exclude non-working embodiments from a claimed subject-matter, which is clearly not the case here.

Moreover, "In defining the situations in which a disclaimer may be allowed in order to overcome an objection as indicated in points 2.1, 2.2 and 2.4, care has to be taken to make sure *that the reason justifying a disclaimer is not related to the teaching of the invention.*" (emphasis added by this Board; G 1/03: No. 2.6 of the Reasons; the "points 2.1, 2.2 and 2.4", mentioned above, relate to conflicting applications, accidental anticipation by a pre-published prior art and exceptions to patentability, respectively).

Having regard to these rulings, the Board takes the view, that the disclaimer in both independent claims must not and, in view of the wording of the amended claims, does not change the teaching of the patent in suit, but only removes the overlap of D1 and the patent in suit (section 7.2, above: aspect (ii)). In other words, the disclaimer must not and does not provide "a technical contribution to the subject-matter of the claimed invention" (as stated in No. 16 of the Reasons in G 1/93, above).

- 7.2.3 With regard to the third aspect in section 7.2, above, it is evident that the subject-matter as granted had been supported by experimental data, the results of which had not caused doubts by the Opponent. Nor had the subject-matter of the patent in suit as granted as a whole given rise to an objection under Article 100(b) EPC.

The only obstacle for maintaining any one of the experiments in the patent in suit as valid examples for the subject-matter within the scope of its claims had been the previous overlap with D1 now removed by the disclaimer. Consequently, the experimental data displayed in Table 2 of the patent in suit, which had represented the subject-matter of the granted version of the claims, but are now excluded from the scope of the claims, do not represent a "comparative example" within the normal meaning of this term, ie they do not belong to an experiment which is to demonstrate improvements/advantages over the prior art achieved by the (limited) subject-matter of the claims. However small it is, it is one difference between the claimed subject-matter and the disclosure of the older document, here D1, which has been the required criterion for novelty, the difference being inserted in this case by the negative feature in the form of a disclaimer.

According to Rule 27(1)(e) EPC, the description shall: "... describe in detail at least one way of carrying out the invention claimed using examples where appropriate and referring to the drawings, if any". This Rule does not, however, in particular its German wording ("dies soll, wo es angebracht ist, durch Beispiele ... geschehen") state an absolute and indispensable requirement for the compliance with Article 83 EPC. Rather the specification as a whole has to fulfil the requirement of this Article.

In view of these findings and those discussed in section 7.2.2, above, which require that the teaching of the invention at issue must not be affected by the

disclaimer, and the fact that Example 1 reaches directly to the limits of the amended independent claims (cf. the penultimate paragraph above), the Board takes the view that the absence of experimental results in the remaining part of the claimed subject-matter after insertion of the disclaimer does not itself amount to a demonstration that the claimed subject-matter as amended has not been disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. Rather, the description as a whole, on the one hand, provides ample information about the features and parameters which play a role in the operation of the claimed process and are, therefore, to be monitored. It also explains the results affected by these features and parameters. Nor, on the other hand, has information been made available by the Appellant/Opponent which would demonstrate the opposite, ie that the claimed processes as defined in the independent claims could not be carried out.

7.3 Consequently, the Board is satisfied that the requirements of Article 83 EPC are met and the objection under Article 100(b) EPC must, therefore, fail.

## 8. *Problem and solution*

8.1 The patent in suit concerns a process for polymerising  $\alpha$ -olefins in a gas phase reactor having a fluidised bed and a fluidising medium (continuously) passed through the fluidised bed in particular reaction conditions, whereby the fluidising medium comprises a gas phase and condensable fluids of saturated and unsaturated

hydrocarbons (patent in suit: Claim 1 and paragraph [0004]).

- 8.2 Such a process has been known from D2, which document was considered in the decision under appeal as the closest prior art, as agreed by both parties (item II.5 of the decision under appeal; section IV, above item 4; section V, above).

It has been common to both processes that the cooling of the polymerisation reactor could be improved with respect to the previous conventional operation of such processes by operating the fluidised bed polymerisation in "condensed mode", ie by injecting the fluidising medium as a mixture of gaseous and liquid components, so that the latter are vaporised in the fluidised bed (patent in suit: paragraphs [0005], [0006] and [0009], where reference is made to D2; D2: Claim 1, column 1, lines 31 to 47; column 3, lines 17 to 54).

A primary limitation for the success of the condensed fluidised bed mode, as described in D2, has been the requirement that a gas-to-liquid ratio be maintained at a level sufficient to keep the liquid phase of the two-phase fluid mixture in an entrained or suspended condition until the liquid is vaporised (D2: column 4, lines 4 to 12). Whilst it is said in the next paragraph of the description of D2 that "the quantity of condensed liquid contained in the gas phase should not exceed about 20 weight percent and preferably should not exceed about 10 weight percent, provided always that the velocity of the two-phase recycle stream is high enough to keep the liquid phase in suspension in the gas and to support the fluidised bed within the



reactor.", the only data in support of the claimed subject-matter and of the above statements relate to liquid contents in the recycle gas stream in the range of from 1.2 (Example 2) to 11.5 weight percent (Example 7). There is no indication that the latter limit might be crossed without impairing the stability of the fluidised bed.

This, however, supports the argument of the Respondent that the document does not provide any teaching of how to achieve stable conditions with high liquid contents in the recycle gas stream in the range as required in the present claims.

- 8.3 The technical problem to be solved with respect to D2 may, thus, be seen in the provision of an improved process for polymerising  $\alpha$ -olefins in a gas phase fluidised bed in stable operating conditions and of a method of determining such conditions, which allow to run the polymerisation process with low risk of malfunction whilst at the same time to obtain high reactor productivities and/or to avoid any constriction in the overall plant capacity due to the reactor productivity (patent in suit: paragraphs [0019] and [0020]).
- 8.4 This problem is solved by the processes of independent Claims 1 and 2, respectively (section VIII, above, item 3, in conjunction with section I, above) by monitoring conditions in the reactor which are indicative of an onset of a failure condition and controlling the composition of the fluidising medium in response to the onset of failure to avoid the

occurrence of the failure condition (patent in suit: paragraph [0027]).

With regard to the experimental data in the patent in suit, namely those of Example 1 and Tables 1 and 2, though excluded from the scope of the present claims by the disclaimer, but reaching to the limits of these claims, the Board takes the view, on the basis of the rulings of the Enlarged Board of Appeal (sections 7.2.2 and 7.2.3, above), that it has been demonstrated in the patent in suit, that, in following the requirements in the claims, the condensed mode fluidised bed polymerisation process can be stably operated with high cooling rates and improved high space time yields (cf. the preparation of an ethylene-butene-1 copolymer in Example 7 of D2 in comparison to the preparation of a similar copolymer from the same comonomers in Example 1, Table 2, of the patent in suit).

Therefore, the Board is satisfied that the above relevant technical problem is effectively solved by the claimed subject-matter.

9. *Inventive step*

It remains to be decided whether the solution found was obvious to a person skilled in the art.

- 9.1 As pointed out by the Respondent (section VIII, items 5 and 6), D2 provides no teaching as to how stable polymerisation conditions could be achieved, when maintaining, in the fluidising medium, liquid contents of between 18 and 50 % by weight, based on the total of the fluidising medium (cf. section 8.2, above). It does

not, therefore, provide an incentive to solve the relevant problem (section 8.3, above).

9.2 Document D3 deals with the technical problems occurring in combustion processes in fluidised beds (cf. D3: Table 1, referring to examples of such processes, and page 510, at the bottom of the left column referring in No. 2 to the introduction of liquid fuel into a solid bed, which itself does not burn). The document never and nowhere considers a system wherein additional solid particles will be created in the fluidised bed and wherein these particles will then grow, let alone wherein these solid polymer particles are formed by polymerisation of gaseous  $\alpha$ -olefins fed to the fluidised bed. Hence, this document provides no incentive to modify the process of D2.

9.3 Nor is the Board in a position to derive from the diagrams filed as D4, irrespective of the presence or absence of the markings by the Opponent, in general, that, in order to solve the above relevant technical problem, the process of D2 should be modified by applying reaction conditions as defined in the independent claims of the Auxiliary Request. The markings in the second of these diagrams were evidently inserted in the knowledge of the patent in suit.

9.4 In summary, the Board fully concurs with the findings of the Opposition Division in No. II.5 of the decision under appeal, dealing with the question of inventive step.

Consequently, the Board acknowledges that the claimed subject-matter is based on an inventive step.

10. By the same token, this conclusion is also valid for the elaborations in the dependent Claims 3 to 10.

## **Order**

### **For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The Main Request is refused.
3. The case is remitted to the first instance with the order to maintain the patent on the basis of the Auxiliary Request (Claims 1 to 10) filed during the oral proceedings and after any necessary consequential amendment of the description.

The Registrar:

The Chairman:

E. Görgmaier

R. Young