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Datasheet for the decision of 22 July 2009

Case Number: T 0465/07 - 3.3.03

Application Number: 98300343.5

Publication Number: 0855411

IPC: C08F 10/00

Language of the proceedings: EN

Title of invention:
Gas Phase polymerization process

Patentee:
INEOS EUROPE LIMITED, et al

Opponent:
Univation Technologies, LLC
Borealis Technology OY

Headword:
-

Relevant legal provisions:
EPC Art. 84, 100(b), 100(c), 114(2), 123(2)
EPC R. 103(1)
RPBA Art. 12(1), 13(1)

Relevant legal provisions (EPC 1973):
EPC R. 67

Keyword:
"Opposition grounds - extension of subject matter (main and first auxiliary requests: yes)"
"Opposition grounds - insufficiency of disclosure (second auxiliary request: yes)"

Decisions cited:
T 0331/87, T 0172/99, T 1205/06

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0465/07 **-** 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 22 July 2009

Appellant: (Patent Proprietor)
INEOS EUROPE LIMITED
Hawkslease
Chapel Lane
Lyndhurst
Hampshire SO43 7FG (GB)

Representative:
Preece, Michael
Compass Patents LLP
120 Bridge Road
Chertsey
Surrey KT16 8LA (GB)

Respondents: (Opponent 01)
Univation Technologies, LLC
5555 San Felipe, Suite 1950
Houston, Texas 77056 (US)

Representative:
Denness, James Edward
Abel & Imray
20 Red Lion Street
London WC1R 4PQ (GB)

(Opponent 02)
Borealis Technology OY
P.O. Box 330
FI-06101 Porvoo (FI)

Representative:
Kador, Ulrich
Kador & Partner
Corneliusstraße 15
D-80469 München (DE)

Decision under appeal:
Decision of the Opposition Division of the European Patent Office of 6 December 2006 posted 23 January 2007 revoking European patent No. 0855411 pursuant to Article 102(1) EPC 1973.

Composition of the Board:

Chairman: R. Young
Members: A. Däweritz
C.-P. Brandt

Summary of Facts and Submissions

I. The grant of European patent No. 0 855 411 in respect of European patent application No. 98 300 343.5, filed on 19 January 1998 and claiming the priority of 24 January 1997 of an earlier application filed in France (9700971), was announced on 21 May 2003 (Bulletin 2003/21). The patent was granted with five claims, including the following independent claims:

1. Process for gas phase polymerization in a fluidized-bed reactor consisting of a first volume which is a cylinder with a vertical axis of height H, above which is mounted a second volume, commonly called a disengagement vessel, adjoining the first volume, the enclosure (wall) of which also consists of at least one surface of revolution generated by the rotation, about the same vertical axis known as axis of revolution, of a rectilinear and/or curved segment, **characterized in that** the height of the fluidized bed (h) is greater than 1.05 x H.

4. Process for continuous gas phase polymerization of olefin(s) in a reactor containing a fluidized and optionally mechanically stirred bed, consisting of a cylinder with a vertical side wall and of a desurging or disengagement chamber (3) mounted above the said cylinder, at an absolute pressure higher than the atmospheric pressure, by continuous or intermittent introduction of a catalyst into the reactor, continuous introduction of olefin(s) into a reaction gas mixture passing through the reactor in an upward stream, removal of the heat of polymerization by cooling the recycled reaction gas mixture, draining the polymer manufactured, a process **characterized in that** the height of the fluidized bed (h) is greater than 1.05 x H.

The remaining claims were all dependent.

In this decision, any reference to passages in the patent in suit as granted will be given underlined in squared brackets, eg [Claim 1] or [0001]. References in ***underlined italics*** concern passages in the application as originally filed, eg ***page 1, lines 5 to 10***. "EPC" refers to the revised text of the EPC 2000, the previous version is identified as "EPC 1973".

II. [Claims 1 and 4] were formulated with reference to ***Claims 1 and 4 to 6***, respectively, reading as follows:

1. Process for gas phase polymerization in a fluidized-bed reactor consisting of a first volume, the enclosure (wall) of which consists of at least one surface of revolution generated by the rotation, about a vertical axis known as axis of revolution, of a rectilinear and/or curved segment, above which is mounted a second volume, commonly called a disengagement vessel, adjoining the first volume, the enclosure (wall) of which also consists of at least one surface of revolution generated by the rotation, about the same vertical axis known as axis of revolution, of a rectilinear and/or curved segment, characterized in that the fluidized bed occupies at least all of the first volume of the reactor.

4. Process according to one of the preceding claims, in which the first volume of the polymerization reactor is a cylinder with a vertical axis of height H.

5. Process according to Claim 4, in which the height of the fluidized bed (h) is greater than the height H of the the reactor [*sic*], preferably greater than 1.05 x H and in particular greater than 1.1 x H.

6. Process for continuous gas phase polymerization of olefin(s) in a reactor containing a fluidized and optionally mechanically stirred bed, consisting of a cylinder with a vertical side wall and of a desurging or disengagement chamber (3) mounted above the said cylinder, at an absolute pressure higher than the atmospheric pressure, by continuous or intermittent introduction of a catalyst into the reactor, continuous introduction of olefin(s) into a reaction gas mixture passing cooling the recycled reaction gas mixture, draining the polymer manufactured, a process characterized in that the fluidized bed occupies at least all of the cylinder with a vertical side wall of the reactor.

III. On 20 February 2004, Opponent O-01 filed an opposition invoking Articles 100(a), 100(b) and 100(c) EPC 1973. Opponent O-02 filed an opposition on 23 February 2004 with reference to Articles 99 and 100 EPC 1973; more particularly, O-02 invoked Articles 100(a), 100(b), 100(c), 83, 123(2), 52(1), 54 and/or 56 EPC 1973. Both Opponents requested that the patent in suit be revoked in its entirety.

(1) Both Opponents raised the objections of lack of novelty and lack of inventive step and, furthermore, asserted that the subject-matter of the patent in suit extended beyond the content of the application as filed and that the patent in suit did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

(2) As these appeal proceedings focused in the end on the last two issues, it is not necessary to refer to all the documents cited by the Opponents only with regard to the asserted lack of novelty and lack of inventive step or to the arguments provided by the parties with regard to these issues. From amongst the twenty-seven documents cited by the parties during the opposition proceedings, only the following documents played a role in these appeal proceedings:

D3: EP-A-0 241 947 (O-01: D3; O-02: D6),

D6: US-A-5 436 304 (O-01: D6; O-02: D12),
D10: US-A-5 453 471 (O-01: D10)
D16: US-A-4 588 790 (≡ D19; O-02: D5 & D9)
D17: US-A-4 543 399 (O-02: D7)
D18: US-A-4 877 587 (O-02: D8)
D19: US-A-4 588 790 (see D16, above)
D20: US-A-4 933 149 (O-02: D10)
D21: US-A-5 096 868 (O-02: D11)
D25: WO-A-02/35 206 (Proprietor: 23.10.2006), having a priority date of 27.10.2000

(3) With respect to the objection under Article 100(c) EPC 1973, O-01 argued (point 6.0 of its Notice of Opposition/"NoOp") that ***Claim 1*** had required the fluidised bed to occupy at least all of the first volume of the reactor. This requirement was no longer contained in [Claim 1], which therefore revealed a combination of features not originally disclosed.

(4) O-02 argued that [Claim 1] violated Article 123(2) EPC 1973 in that it did not require a greater cross section of the disengagement vessel than that of the first volume, as required in the description as filed. Moreover, [Claim 4] had also been amended to fulfil the requirement $h > 1.05 \times H$ without, however, containing a definition of H. Hence, the person skilled in the art was faced with subject-matter not previously disclosed (NoOp of O-02, points 1.1 to 1.6).

(5) With regard to the insufficiency objection under Article 100(b) EPC 1973, O-01 argued that the definition of the second volume appeared to extend to reactors in which the cross-sectional area of this volume was the same or was smaller than the cross-sectional area of the first volume, whereby the claimed subject-matter according to the latter elaboration would apparently not work.

Moreover, as had been known from the prior art, the *"control of gas velocity, composition and temperature of the fluidised bed are crucial to maintaining the stability of the bed. However, the Patent gives no hint of this and appears to suggest that the bed height can be raised independently of those other variables. If the skilled person follows the directions in the Patent to raise the bed height and the bed becomes unstable, what is he or she to do? The Patent does not give any guidance in that situation and is therefore insufficient."* Moreover, O-01 argued with regard to the change of the bed height that *"Unless the Proprietor changed another variable in the process practised in Example 3, as compared to Examples 1 and 2, it is not apparent how one would get less fouling in the recycle lines and heat exchangers under conditions otherwise the same as in Examples 1 and 2."* (NoOp of O-01, points 5.2 to 5.4).

(6) O-02 argued in this respect that, during the polymerisation process, the reaction gas mixture rose through the fluidised bed and the unreacted gas mixture left the top of the fluidised-bed reactor to be recycled for further use. However, polymer became entrained in the gas and could be carried into the recycling portion of the gas stream. Moreover, bubbles formed within the fluidised bed, which were known to accelerate the entrainment of particles out of the reactor. Whilst it was claimed in the patent in suit that this problem was overcome, because the bubbles were limited and/or reduced in size when they entered the disengagement vessel (second volume) and the air [*sic*] decelerated due to an increase in volume of this vessel compared to the reaction section, no limitations were placed on the size of the second volume,

especially with reference to the height of the cylinder of the first volume. In fact, as the size of the second volume was not limited, the fluidised bed could reach the top of the second volume or, due to the speed of the gas passing through the fluidised bed, particles would be lost from the reactor even if the fluidised bed did not reach the very top of the second volume, but merely came close. Accordingly, the claims clearly covered embodiments which did not work and should therefore be revoked.

In other words, since the wording of [Claims 1 and 4] included a disengagement vessel being cylindrical in shape like the first volume and having the same diameter, the reactor might be in effect only one cylinder, which rendered the characterising feature of the claims ($h > 1.05 \times H$) completely meaningless (NoOp of O-02, points 2 to 2.6).

(7) In a reply dated 13 September 2004, the Opponents' above arguments were disputed by the Patent Proprietor, who additionally submitted a Declaration (previously filed in the USA) of one of its employees, Frédéric Morterol, explaining the purpose of the disengagement zone of a fluidised-bed polymerisation reactor.

(8) In a letter dated 22 September 2006, O-01 submitted a Declaration of Mr Ping Cai, PhD (dated 21 August 2006) dealing with a fluctuation of the level of the fluidised bed (h) of 3 to 5 ft (≈0.9 to 1.5 m) due to the bubbles forming in and escaping from the fluidised bed during the normal operation of the polymerisation reaction in a typical gas-phase polymerisation reactor having a cylindrical section with a height of about 40 to 50 ft. with a conical section above of further about 20 ft. The declarant further pointed out that the

height of the freeboard (ie the space above the bed level) had to be taller than the TDH (the transport disengagement height) in order to minimise the polymer-particle carryover into the recycle line.

(9) In a letter dated 6 October 2006, Opponent O-02 submitted additional comments to the two issues of Articles 100(b) and 100(c)/123(2) EPC 1973. Thus, O-02 set out that there was a discrepancy (leading to a violation of Article 123(2) EPC 1973) between the definition of height H of the first volume in [Claim 1], reading "***which is a cylinder with a vertical axis of height H***" and the height H as defined on ***page 4, lines 27/28***, according to which "***H therefore represents the length of the vertical side wall of the cylinder rising above the base of the fluidized bed***" and stated "***The common understanding of the height of a cylinder is the height between the bottom and top of the cylinder.***" (point 1.2 of the letter).

Having regard to the fact that the height (h) of the fluidised bed was the only essential feature of the claim, it was therefore decisive that this feature was sufficiently disclosed, which included the disclosure of how it was to be determined and measured. However, the person skilled in the art was left without any guidance of how to perform this, because the height of the fluidised bed could be measured at any point of an extended zone ranging from the point, where the average density of the bed started to decrease due to the inhomogeneity of the particles in size and weight, to the point, where the last particles were carried up, but there was a complete lack of disclosure in this respect (points 2.2 and 2.3 of the letter).

(10) The questions concerning the size and form of the disengagement vessel (second volume) and the accuracy of the measurement of the fluid-bed height were further disputed controversially by the Patent Proprietor in its letter dated 6 October 2006 (who replaced, at the same time, its Main Request) and by O-01 in its letter dated 10 November 2006.

(11) On 6 December 2006, oral proceedings were held before the Opposition Division, in the course of which two Auxiliary Requests were submitted by the Patent Proprietor. The proceedings focused on the requirements of Articles 84, 123(2) and 123(3) EPC 1973 and the grounds for opposition according to Articles 100(b) and 100(c) EPC 1973.

(12) The above new Main Request and the first Auxiliary Request played no role in these appeal proceedings. The second Auxiliary Request (Claims 1 to 5) differed from the set of claims as granted only by the wording of its Claims 1 and 4.

Claim 1 had been amended to read:

1. Process for gas phase polymerization in a fluidized-bed reactor consisting of a first volume which is a cylinder with a vertical axis of height H, above which is mounted a second volume, which is a disengagement vessel, adjoining the first volume, the enclosure (wall) of which also consists of at least one surface of revolution generated by the rotation, about the same vertical axis known as axis of revolution, of a rectilinear and/or curved segment, characterized in that the height of the fluidized bed (h) is greater than 1.05 × H, where H is the length of the vertical side wall of the cylinder rising above the base of the fluidised bed, a base which coincides with a fluidisation grid.

Claim 4 had been amended by addition of the following definition to the end of [Claim 4] only (cf. section I, above):

", where H is the length of the vertical side wall of the cylinder rising above the base of the fluidised bed, a base which coincides with a fluidisation grid."

IV. At the end of the oral proceedings, the Opposition Division held that the Main Request (section III(10), above) contravened the requirements of Articles 123(2) and 123(3) EPC, and that the first Auxiliary Request did not comply with the requirements of Articles 84 and 123(2) EPC. Neither request was further pursued by the Patent Proprietor, so that there is no need here to consider them further.

(1) Whilst the requirements according to Articles 84, 123(2) and 123(3) EPC 1973 were held to be met by the amended claims of the second Auxiliary Request, the Opposition Division came to the conclusion that the patent in suit according to this request was *"defective on the grounds provided by Article 100(b) EPC, so prejudicing the maintenance of the patent in suit"*, which was, consequently, revoked in the decision announced at the end of the hearing and issued in writing on 23 January 2007.

(2) More particularly, in the reasons given in the final decision of the Opposition Division in Nos. 9.2 to 9.5, it was stated that in normal industrial use the first volume of a fluidised-bed reactor was a cylinder with a height H of about 20 m. This implied that the fluidised bed had, according to the second Auxiliary Request, a height h of at least about 21 m. In order to carry out the claimed invention in this case, it was required that a person skilled in the art must have been enabled to determine the height h of the bed within a tolerance of measurement being far below 1 m.

(3) According to the Declaration of Dr Ping Cai, the variation of height of the fluidised bed was, in the normal industrial use, in the magnitude of 0.9 to 1.5 m, as confirmed by the paragraph bridging pages 1/2 of D25

(section III(8), above). "*The Proprietor did not contest this point of the declaration of Dr. Ping Cai*". Moreover, "*EP-B-0 855 411 does not mention a specific method for measuring the height of the fluidized bed h within the relevant level of accuracy.*" (Nos. 9.3 and 9.4 of the reasons). For these reasons, the patent as amended in the second Auxiliary Request was found defective on the grounds provided by Article 100(b) EPC 1973, so prejudicing the maintenance of the patent.

V. In a letter dated 5 February 2007, the Patent Proprietor requested that the minutes of the above oral proceedings be corrected, in particular with respect to "*important detail of the discussion of the relevance of document D25 by the Proprietor during the Oral Proceedings*" which had, in the Patent Proprietor's view, been omitted. More particularly, the Patent Proprietor had disputed the magnitude of the variations "*as alleged by Dr Cai (this was in fact the main reason for the submission of D25)*" and argued that the omitted facts from the minutes were directly relevant to the subsequent Reasons for the Decision. Thus, "*The Example of D25 (...) measures an oscillation of only +/-0.45m*".

In a brief Communication dated 16 February 2007, the Opposition Division informed the Patent Proprietor that it could neither confirm nor exclude that particular points, as asserted by him, were missing from the minutes.

In a letter dated 20 March 2007, O-01 presented its view of the discussion relevant to this request. It argued that "*In operation of a fluidised bed polymerisation reactor, the bed level fluctuates rapidly and it is very difficult to measure the instantaneous (or*

dynamic) bed height. It is not clear from the Patent whether the bed height referred to in the Patent is an instantaneous bed height or a bed height which is averaged over time to eliminate the fluctuations". Moreover, the limits of ±0.45 m, referred to by the Patent Proprietor with reference to the single example of D25, were less than the fluctuation mentioned in other parts of D25 mentioning the bursting of bubbles of 0.05 to 4 m in diameter (D25, passage bridging pages 1/2). Even a variation of ±0.45 m was significant in the context of [Claim 1]. In O-01's opinion, the main points were that D25 confirmed that the bursting of bubbles of up to 4 m in diameter caused fluctuations in the bed level and that "*the Patent does not mention any method for measuring the height of the bed level and those points are accurately reflected in points 9.3 to 9.4 of the reasons for the decision.*"

VI. On 21 March 2007, the Patent Proprietor filed a Notice of Appeal with concomitant payment of the required fee.

VII. The Statement of Grounds of Appeal (SGA) was received on 21 May 2007 and further supplemented by a letter of the Appellant dated 30 May 2007 including clean copies of the Main Request corresponding to the previous second Auxiliary Request as considered by the Opposition Division (section III(12), above).

(1) The Appellant argued, that the decision under appeal had not reasonably taken into account the arguments actually presented by the Patent Proprietor to the, in its view, wrong statements in Dr Cai's Declaration, on which the decision under appeal had strongly relied. Therefore, the Appellant requested that the appeal fee be refunded.

(2) In its arguments to the bed height question, the Appellant asserted that the normal fluctuations in the height of a fluidised bed were significantly lower than as claimed in Dr Cai's Declaration (which had provided no evidence) and that the skilled person was more than capable of measuring the height of a fluidised bed to an accuracy required in order to carry out the claimed invention "*(... significantly below 1m)*" (SGA, page 2, paragraph 5). Whilst, as O-01 and D25 had noted, it was difficult to measure the instantaneous bed height which in many aspects was irrelevant, it was conventional in the art to report the bed height without fluctuations rather than the instantaneous bed height and the skilled person knew how to report bed height to a high degree of accuracy, as was clearly evidenced both by the general disclosure of D25 and the other cited art.

After having referred to D25, page 2, lines 2 to 3, according to which "*bubbles of from 0.05 to 4 metres in diameter may form in a fluidised bed the 'depending on the reactor's size and operating conditions'*", the Appellant did not dispute "*that bubbles may form in the bed or that fluctuations on the surface of the bed can occur due to the bubbles breaking the surface, but this is not the same as teaching of a fluctuation in bed height of +/-0.9 to 1.5 m as claimed by Dr Cai*" (SGA, page 3, paragraphs 6 and 7).

With regard to a bubble size of 4 m in diameter the Appellant stated that this was clearly at the upper extreme of bubbles that could form. The range actually covered by D25 covered nearly two orders of magnitude, "*and it will clearly require very specific reactor dimensions and reaction conditions to approach the extremes of this range. In fact, the bubble sizes in*

typical commercial polymerization reactors under typical operating conditions are believed to be much smaller than 4 metres."

(3) In support of these arguments, the Appellant submitted the following table (as copied from page 4 of the SGA, "*fludised*" [*sic*]). From these references, it would be clear that the skilled person was able to measure, control and report the height of a fluidised bed to a great deal of accuracy.

Document	Reference	Disclosure
D3	p.15, paragraph 2	"the fludised bed is maintained at essentially a constant height" *i.e. the skilled person is capable of measuring bed height and knows how to control bed height to a sufficient accuracy to maintain it constant.*
	Examples	Bed Height of 11.3m in Examples 1, 1a and 2, and 11 .4m in Example 2a *i.e. height is measured to an accuracy of 0. 1m.*
D6	Examples	Bed height increase observed and reacted to. *i.e. the skilled person can not only measure changes in bed height but also knows how to control it*.
	Examples	Bed height measured to values of 0.1 ft e.g. Table 1, 43.4 ft, 43.3 ft, 43.5 ft over first three measurements, Table 2 etc. *i.e. height is measured to an accuracy of 0.1ft.*
D10	Col.7, l 23-26	"the fludised bed is maintained at essentially a constant height"
	Examples	Bed height of 7.0ft *i.e. height is measured to an accuracy of 0.1ft.*
D16	Col. 14, l. 44-47	"the fludised bed is maintained at essentially a constant height"
	Examples	*Bed height measured to nearest foot.*
D17	Col. 8, l 43-46	"the fludised bed is maintained at essentially a constant height"
	Examples	Bed Height of 37ft in Examples 1, 1a and 2, and 37.5 ft in Example 2a *i.e. height is measured to an accuracy of 0.5 ft.*
D18	Examples	Bed height of 39.0 ft. 11.9m *i.e. height is measured to an accuracy of 0.1 ft.*
D19	Col. 14, l 44-47	"the fludised bed is maintained at essentially a constant height"
	Examples	Bed Height of 37ft in Examples *i.e. height is measured to nearest foot.*
D20	Examples	Bed height of 39.0 ft *i.e. height is measured to an accuracy of 0.1 ft.*
D21	Col. 12, l 26-30	"the fludised bed is maintained at essentially a constant height"

Moreover, none of the references felt the requirement to explain to the person skilled in the art how to measure bed height at all, let alone to such accuracy.

This would be a perfectly normal part of the knowledge of the person skilled in the art. In fact, a typical bed height measurement would be made as eg described in D28: US-A-4 593 477.

VIII. In its rejoinder dated 4 October 2007, Respondent I/ O-01 reiterated the objections of lack of clarity, added matter, extension of protection and insufficiency, and referred to its previous arguments at the beginning and during the opposition in support of its objections of lack of novelty and of lack of inventive step.

(1) With regard to the objection under Article 123(2) EPC 1973, the Respondent maintained its view that the height H of the axis of the cylindrical reactor was different from the length of the vertical side wall of the cylinder rising above the base of the fluidised bed coinciding with the fluidisation grid, because the cylinder would, according to Fig. 2, extend below the fluidisation grid (4), so that the vertical axis of the cylinder would be longer than its side wall above the grid. This would, furthermore, refer to processes which had not been encompassed by [Claims 1 and 4] and imply according to the heading of paragraphs 4.0 and 4.1 of the rejoinder, a violation of Article 123(3) EPC 1973.

(2) As regards the issue of (in)sufficiency of disclosure, the Respondent disputed the arguments of the Appellant concerning Dr Cai's Declaration and the disclosure of D25. In particular, it disputed the assertion that the skilled person reading the patent in suit would not attempt to measure the true bed level at a given moment in the reactor, but would instead adopt a measurement technique which gave an average bed level over time. However, paragraphs [0009] and [0012] would

in fact indicate that the patent in suit related in some way to the problems caused by the bursting of bubbles within the polymerisation reactor. Moreover, the Appellant's arguments were not supported by the patent in suit, which failed to give any guidance as to which bed height was referred to in the claims (paragraphs 5.4 and 5.5 of the rejoinder). Nor had the Appellant given any indication of what it believed the scale of "*normal fluctuations*" was.

(3) With regard to the bed heights mentioned in the Appellant's table (section VII(3), above), Respondent I pointed out that in those documents the bed height had been an incidental factor which was not critical to the main themes of those documents. The lack of detailed description of the measurement technique of the bed height was therefore entirely natural and understandable for those documents. By contrast, the measurement of the bed height was a crucial requirement for working the claimed subject-matter and the total lack of teaching relating to this measurement presented a serious obstacle to the skilled person to accurately reproduce the claimed subject-matter (paragraph 5.13).

(4) In paragraph 5.15 of the rejoinder, the Respondent argued that "*The Patent also lacks sufficiency because independent claims 1 and 4 do not in any way define the relative dimensions of the first and second volumes, that is, of the cylindrical section and the disengagement vessel. ... if the disengagement vessel is relatively large, (that is, significantly taller than the transport disengagement height), it is quite obvious ... that the bed can be raised some way into the disengagement vessel without causing any increased carryover of entrained fines into the recycle line.*

Conversely, if the disengagement vessel is relatively small, for example of a size which is entirely filled with the fluidised bed when the bed level is the greater than 1.05 x H, the process will clearly suffer from unacceptable carryover. To the extent that the Patent does not disclose how such a process could be operated it is insufficient.". In paragraph 5.16, it pointed out that "*Another way of looking at the grounds for insufficiency mentioned in paragraph 5.15 above is to consider the technical contribution provided by the Patent. The Patent does not provide any new general principal or understanding relating to the operation of the fluidised bed polymerisation reactors. There is no new information regarding the degree of carryover experienced in different bed levels and different reactor geometries. The teaching of the Patent is confined to the reactor geometry shown in the Figures and having the dimensions described in the Examples. ... However, the Proprietor has deliberately chosen not to confine the scope of protection to reactors of that geometry and has deliberately sought to encompass all sizes and shapes of fluidised bed reactor. The protection claimed therefore greatly exceeds any technical contribution provided.*".

IX. Besides a short reference to its arguments submitted during the opposition proceedings to novelty and inventive step, Respondent II/O-02, also raised, in its rejoinder dated 4 December 2007, objections under Articles 84 and 123(3) EPC 1973 on the basis that the first definition of height H on the basis of the length of the vertical axis of the cylinder meant something different from the length of the side wall of the cylinder rising above the base of the fluidised bed, a base coinciding with a fluidisation grid.

(1) In order further to clarify its arguments concerning the second of these objections, the Respondent additionally filed three drawings, wherein the third drawing depicted a variation of the cylinder in which the lower end of the fluidised bed was shown in at some distance above the lower end of the cylindrical side wall, which presented in the Respondent's opinion an "***aliud***" vis-à-vis the second drawing showing the coincidence of the lower ends of the fluidised bed and of the cylindrical side wall (and containing a reference to the situation in [Claim 1]). The first drawing referred to a cylinder completely filled by the fluidised bed (referring, according to its heading, to the situation in ***Claim 1***).

(2) With respect to the insufficiency objection, the Respondent disputed the Appellant's arguments to the measurement of the bed level of the fluidised bed, to D25 and to Dr Cai's Declaration, and quoted the full wording of those statements in the general descriptions of eg D3, D10, D16, D17 and D21,

"***Under a given set of operating conditions, the fluidised*** [instead of "***fluidized***" as in the cited documents] ***bed is maintained at essentially a constant height by withdrawing a portion of the bed as product at the rate of formation of the particulate polymer product.***",

which had been referred to by the Appellant in its table shown in section VII(3), above. The Respondent pointed to the fluctuations caused by an intermittent withdrawal of polymer product, which was carried out, according to its presentation, in practically all prior art processes and added also to the fluctuation of the

bed level. Furthermore, the Respondent referred to the withdrawal of some polymer from the bed by particle entrainment in the fluidisation gas flow.

Therefore, according to the Respondent, the above quotations from the cited documents in the Appellant's above table did not support that the bed level had been stable and fluctuation had been low. By contrast, these documents would rather support Dr Cai's statements, namely that intense fluctuation of the bed level also occurred in the cited prior art as eg evidenced in D25 or Example 1 of D6, where a change of the bed fluidisation had occurred resulting in an increase of the bed height and wherein the formation of hot spots and agglomerates had necessitated a reactor shut-down.

The Respondent, furthermore, addressed the question of the different types of bed level values, ie of whether they were time-averaged over an undisclosed time period or instantaneous values, which remained unanswered by the patent in suit.

X. On 7 May 2009, the parties were summoned to oral proceedings on 22 July 2009.

XI. With a further letter dated 22 June 2009, the Appellant refiled a clean copy of its Main Request (sections VII and III(12), above) and, additionally, submitted two Auxiliary Requests. Moreover, the Appellant filed

D29: Declaration by Andy Bell, dated 18 June 2009, and

D30: Perry's Chemical Engineers' Handbook, 7th Edition, International editions 1998, McGraw-Hill New York, 1997, pages 17-13 to 17-15.

(1) The first Auxiliary Request differed from the Main Request only in that the definition of the cylinder height H added to the characterising part of Claim 1 of

the Main Request had been transferred to the preamble of Claim 1 of this request directly following the term "*vertical axis of height H*". This made a further rewording of the preamble necessary by replacing "*above which is*" by "*above the first volume there being*".

(2) The second Auxiliary Request comprised only two claims, Claim 1 being an amended version of [Claim 4], followed by [Claim 5]. These claims read as follows:

1. Process for continuous gas phase polymerization of olefin(s) in a reactor containing a fluidized and optionally mechanically stirred bed, consisting of a cylinder with a vertical side wall and of a desurging or disengagement chamber (3) mounted above the said cylinder, at an absolute pressure higher than the atmospheric pressure, by continuous or intermittent introduction of a catalyst into the reactor, continuous introduction of olefin(s) into a reaction gas mixture passing through the reactor in an upward stream, removal of the heat of polymerisation by cooling the recycled reaction gas mixture, draining the polymer manufactured, a process characterized in that the fluidised bed occupies at least all of the cylinder with a vertical side wall of the reactor and that the height of the fluidized bed (h) is greater than 1.05 x H, where H is the length of the vertical side wall of the cylinder rising above the base of the fluidised bed.

2. Process according to Claim 1, in which polymerization takes place with a polymer output rate higher than 50 kg/h/m^3, preferably higher than 60 kg/h/m^3, more preferably higher than 70 kg/h/m^3.

(3) Furthermore, the Appellant confirmed its previous arguments and saw them confirmed by D30 and by the additional Declaration D29 of Mr Bell, which was to show the average bed height being controlled during the operation of a commercial polymerisation process over a period of about two days.

XII. In a further letter dated 2 July 2009, Respondent I argued that, apart from the two ways in which the height H was defined in Claim 1 of the Main Request, the wording was not clear as highlighted by a further document

D31: US-A-5 082 634.

This document related to a specific apparatus for the polymerisation of olefins using a fluidised bed and its industrial use. The fluidisation grid in the reactor had the form of truncated cones, so that the height of the vertical side wall of the cylinder rising above the fluidisation grid was different from the length of the vertical axis of the cylinder.

XIII. The same argument on the basis of this document was also provided by Respondent II in a further letter dated 13 July 2009. In this letter, Respondent II reiterated, furthermore, all its objections and requested the case should be remitted to the first instance if the appeal was allowed. Moreover, it requested that D31 be admitted to these proceedings, whereas D28 (section VII(3), above), Mr Bell's Declaration dated 18 June 2009 (D29), and the copies from Perry's Chemical Engineers' Handbook (D30) (section XI, above) should not be admitted.

XIV. The oral proceedings were held on 22 July 2009. In view of the decision under appeal and of the requests put forward by the parties, the Board informed the parties of its preliminary provisional intention to limit its considerations in the present appeal to the issues other than novelty and inventive step, which meant, in particular, to the issue of Article 100(b) EPC, and to consider the Main Request and the two Auxiliary Requests one after the other. Then the Respondents were given the floor for substantiating their request concerning the admission of the documents cited in the written appeal proceedings.

(1) Both Respondents requested that D29 and D30 not be admitted, whereas D31 should be considered in the proceedings. Respondent II additionally repeated its

request not to admit D28. The Board suggested to deal at this moment only with the (non)admissibility of D31.

(2) There followed a controversial discussion about the meaning of "height H". Both Respondents maintained their view that [Claim 1] had contained no reference to a fluidisation grid, but that the disclosure in [0006] made clear that the first volume of the polymerisation reactor extended beyond a cylinder, thus showing that there was a difference, as in D31, between the length of the side wall of the cylinder referred to in [0015] and the length of its vertical axis. The lower starting point of height H played, however, an important role in Claim 1 of the Main Request and constituted a serious problem of lack of clarity for Claim 1, in particular, since the claim was silent about the site of the grid in the cylinder and its form (contrary to D31).

(3) Whilst, according to Respondent I, the claims referred to a notional rather than to a real cylinder, the Appellant argued that a cylinder by definition had a flat base, so that the length H could only be the same, irrespective of whether it was measured at the side wall or the vertical axis of the cylinder. Moreover, the claims referred to one single parameter H, which could not, therefore, be split to have different meanings. In [0015]/***page 4, lines 26 to 28***, the height H was clearly defined for a cylinder with a vertical axis to represent the length of the vertical side wall of the cylinder rising above the base of the fluidised bed. Moreover, the Appellant criticised that a single piece of prior art had randomly be selected to interpret the claims of the patent in suit.

(4) After the end of this discussion followed by deliberation of the Board, the parties were informed that D31 would not be introduced into the proceedings.

(5) The next topic dealt with concerned objections under Articles 100(c), 123(2) and 123(3) EPC.

Respondent I pointed out that neither of Claims 1 and 4 or of [Claims 1 and 4], respectively, contained the mandatory feature of ***Claims 1 and 6*** requiring that the fluidised bed occupied at least all of the first volume of the reactor. This feature had also been disclosed on ***page 3, lines 33 to 34*** and ***page 6, lines 33 to 35*** as being essential for the two processes claimed.

(6) Moreover, Respondent I argued that operative Claim 1 gave a new definition of the height H, which could be shorter than the initial definition in ***Claim 4***.

(7) Respondent II referred again to the question concerning the lower end of the fluidised bed as raised in its rejoinder with regard to three drawings, which question would render the definition of the cylinder completely unclear (section IX(1), above).

(8) Since both the initial and the granted versions of the independent claims had defined the fluidised-bed reactor as consisting of two volumes without mentioning a fluidisation grid, the Respondents saw Article 123(2) EPC being violated by the new wording of Claim 1.

Furthermore, the above initial requirement of at least the complete occupation of the first vessel by the fluidised bed being deleted, Claim 1 would additionally contravene Article 123(3) EPC, because the fluidisation grid could have any form, so that, depending on which

point of the reactor was taken as the lower starting point of H, the present wording of the claims could extend beyond the content of the application as filed.

Respondent II exemplified this argument by referring to a fluidisation grid having a conical form with the apex pointing downwards. This included, in its view, three alternatives of the lower starting point of H, ie (1) at the central axis (= the lowest starting point), (2) at the side wall of the cylinder (= the highest starting point) or (3) at a point in the middle between these two extremes. Two of these possibilities (ie alternatives (1) and (3)) provided free space below the fluidisation grid and, therefore, this elaboration of the claimed subject-matter did not, in the Respondent's view, meet the initially mandatory requirement of complete occupation of the cylinder by the fluidised bed, no longer present in Claims 1 and 4.

(9) Moreover, Respondent II raised a still further objection on the basis that the subject-matter of operative Claim 4 had originally been disclosed completely separately from the process of ***Claim 1***. To this end it referred to ***line 25*** of ***page 6*** clearly concerning "***Another subject of the present invention***", and put emphasis on "***Another subject***". On this basis, it took the view that features disclosed in the description preceding this line could not be used further to define this other subject. Hence, the application as filed provided, in its opinion, no clear and unambiguous disclosure forming a proper basis for an amendment of the process defined in ***Claim 6***, as claimed in Claim 4. Therefore, Claim 4 would not comply with Article 123(2) EPC.

(10) Respondent I summarised the points made by the Respondents: Claim 1 referred to a third element of the reactor, ie the fluidisation grid (despite the use of "consisting of" in the initial claim), the claim encompassed two different definitions of the height H, which were affected by the form of the grid, and the claims no longer required the first volume to be completely occupied by the fluidised bed.

(11) The Appellant disputed these arguments of the Respondents by stating that the definition of H had never been changed (which was disputed by Respondent I by reference to the passage bridging pages 5 and 6 of the minutes of the oral proceedings before the Opposition Division). It argued furthermore that the new formulation used in the claims ("***the height of the fluidized bed (h) is greater than 1.05 × H***") inherently included the initial requirement of the cylinder being at least completely filled by the fluidised bed. Therefore, it was of the opinion that the deletion of the phrase "***the fluidized bed occupies at least all of the first volume of the reactor***" had become redundant.

Furthermore, it argued that ***page 6, line 25*** had clearly referred to "***the present invention***" and ***lines 29 to 31 of page 4*** provided the basis for the amended definition of "***the present invention***", ie the height (h) of the fluidised bed being preferably greater than 1.05 × H, for both independent claims, ie for Claims 1 and 4.

Moreover, Figures 1 and 2 and the detailed description of the apparatus used in the [examples] on ***page 9, lines 19 to 32***/[0032] and [0033] showed in its opinion that there was no empty room below the fluidisation grid. Moreover, the definition given on ***page 6, lines 4 to 19***/[0023] made it clear that the fluidised-bed

reactor included only the cylinder and the disengagement vessel between the dome (2) and the fluidisation grid (4), the space below the grid belonged to the additional entry chamber (9), so that the objections, discussed before, should fail.

(12) After the termination of the above discussion about the objections under
Articles 100(c), 123(2) and 123(3) EPC against the Main Request, the parties were given the floor to provide any additional arguments with regard to the first Auxiliary Request.

(13) This induced a short discussion about the question of whether the presence of installations within the first volume such as thermoelements or pressure measuring devices, which were, according to the technical expert of the Appellant, always present in such reactors, would affect the issue concerning the occupation requirement deleted from the claims, ie whether such installations could be regarded as being "free volumes". Respondent II, by contrast, pointed out that, according to the application as filed, nothing could be present inside the first volume and that the content of the initial application could not be interpreted otherwise.

(14) After termination of this discussion and subsequent deliberation of the Board, the parties were informed of the decision that the Main Request and the first Auxiliary Request had to be refused.

(15) With regard to the second Auxiliary Request and the requirements of Articles 84 and 123 EPC, the parties essentially relied on their arguments already brought forward with regard to the Main Request.

The main argument raised by Respondent II concerned the separate disclosure of the process of ***Claim 6***, which in its opinion, did not allow to amend that claim by features disclosed only in the passages of the description preceding ***page 6, line 25*** in the context of the first process of ***Claim 1***. This concerned eg the reference to the fluidisation grid. In summary, Respondent II stated that it had not heard where the combination of features as claimed was to be found.

By contrast, the Appellant maintained its position that the wording of the operative Claim 1 was clearly based on the original disclosure and pointed out that the initial requirement of complete occupation of the cylinder by the fluidised bed was present in Claim 1.

In addition, it requested to be allowed to file a further request, but refrained from filing such a request after having been informed that, in view of the late stage and the state of the proceedings, the Board would not be inclined to admit such a late request.

(16) Then the Appellant was given the floor to present its case as to the objection under Article 100(b) EPC.

(17) The Appellant reiterated its arguments concerning the question of whether the fluidised bed height could accurately be measured and disputed the reasons given in Nos. 9.2 to 9.5 of the decision under appeal. In particular, it referred to the table submitted with its SGA quoting various cited documents according to which the fluidised bed was maintained at essentially a constant height (section VII(3), above). This showed, in its opinion, that the person skilled in the art knew how to carry out these measurements and how to control the fluidised bed height with the required accuracy,

despite its normal fluctuation caused by the formation of bubbles, as confirmed by paragraphs 2 and 3 of Dr Cai's Declaration. In other words, the person skilled in the art could carry out the claimed process and could run the process at a specific average fluidised bed level.

Indications that the fluidised bed height meant an average level could, according to the Appellant, be derived from [0009] and from the [examples], as described eg in [0037], where reference was not made to ranges but to specific values and accurate height measurements. Support for these arguments could additionally be found in D28, D29 and D30, which confirmed that the person skilled in the art knew how to control the bed height.

(18) The mentioning of these documents induced a short discussion on their respective admissibility, namely that of D29 and D30, which had not, unlike D28, been cited in the SGA in accordance with Article 12(1) RPBA.

Document D28 was, according to the Appellant, to show an appropriate means for the measurement and control of the height of a fluidised bed. Document D29 showed the graph of the actual average height measurements of a commercial polymerisation of ethylene carried out in a fluidised bed reactor and confirmed, in the Appellant's opinion, that the reference to the fluidised bed height, as eg quoted in the table submitted with the SGA (section VII(3), above), would have been understood by the skilled person as referring to time-averaged values. D30, in particular its page 17-13, would again demonstrate that the skilled person was familiar with the measurement of the bed height. As a reference book, D30 was, according to case law, more relevant than a

single publication or patent. In any case, they had been cited only to show that the person skilled in the art had known how to measure the bed height.

According to Respondent I, D29 should at least have been filed earlier. However, since it did not provide any details concerning the conditions of the polymerisation or the apparatus used therefor, it could not, in any case, be interpreted properly. Moreover, the trace of the bed height in the diagram was scattered showing a lot of sharp and of broader peaks ranging significantly up and down from the asserted average value within a range of variation of between 19 and 19.8 m, ie a range being about the same as in Dr Cai's Declaration. As regards D30, the Respondent referred to its publication date of 1997, so that it could not be assumed that it had been available before the priority date of the patent in suit. Furthermore, the document referred to noisy pressure-drop signals indicating the bed density from which a nominal bed height could be derived only by calculation, which according to Respondent II was not precise. The form of the signal depended, furthermore, on the averaging time. With increasing this time, the noise of the signal would be reduced or even made to disappear completely. Moreover, the patent in suit was, in any case, silent in this respect.

Furthermore, the Respondents referred to [0014], indicating that it was not necessary to keep the fluidised bed level at a level as defined in the claim.

In the Respondents' opinion, D30 was not relevant.

Respondent II referred furthermore to [0034] and [0035] demonstrating that a significant number of parameters

affecting the bed level and defining the apparatus and the conditions in which it was used had to be provided in order get a safe basis for the determination of the bed height. Apart from the [examples], these data were not, however, available.

(19) After deliberation, the Board announced that D28 was admitted for consideration, whereas D29 and D30 were not admitted into the proceedings.

(20) Thereafter the parties continued to discuss controversially the question of the meaning of the fluidised bed height (instantaneous, nominal, real, intermittent or time-averaged) and its measurement.

(21) The Respondents pointed out that the patent in suit gave no indication of how the bed height was measured or was to be measured. This would not have been a problem, if there had been only one such method, which was not, however, the case. Nor did the patent in suit indicate which type of bed height (as mentioned above) was meant. They denied that [0009] would indicate that it was an average bed height (furthermore, since no indication was given in the patent in suit concerning the averaging time), and they argued that [0014], addressed before (section XIV(18), above), would rather point in the other direction away from assuming that it related to an average. The measuring of pressure differences within the reactor (as in D28 submitted by the Appellant) would rather provide a nominal bed height. Moreover, they drew the attention to the fact that the surface of a fluidised bed was not static but changed. Thus, reference was made even in the patent in suit itself, to the problems arising from the formation of bubbles and their coalescence at the upper part of the fluidised bed ([column 2, lines 45 to 53]).

The Respondents pointed furthermore again to the fact that the patent in suit, in general, and Claim 1, in particular, were completely silent about the size and shape of the disengagement vessel (and the freeboard), which had an important if not decisive influence on the success or failure of the claimed process (cf. sections III(5), III(6), III(10) and VIII(4), above). A gas phase polymerisation in fluidised bed conditions was, according to Respondent II, a complex system depending on various parameters of the apparatus and on the process conditions, as could be seen from the general description of the [examples], none of which, except for a minimum bed height, was defined in the claims. The scope of the claims was, thus, much broader than was justified by the technical contribution of the teaching, and the claims clearly encompassed non-workable embodiments resulting in huge amounts of polymer carried over into the recycling system.

The Respondents additionally addressed the fluctuation of the bed level due to the intermittent withdrawal of product from the reactor as addressed in some documents (eg D20 and D21) and referred to by the Appellant in its SGA (cf. the table, section VII(3), above) which would fluctuate in such commercial polymerisation processes usually by ±0.6 m from the average value.

(22) On the other hand, the Appellant argued that the person skilled in the art was aware of the technique of how to determine the bed level and that [0014] did not relate to fluctuations of the bed level due to the formation and bursting of bubbles, but to conscious decisions concerning the filling height of the reactor.

(23) The Board then addressed the facts that, due to the absence of any limitations concerning size and shape of the reactor (except for the cylindrical form of the first volume) and of any reaction conditions (which, except for the minimum bed height h, were only mentioned for the specific embodiment of the examples in [0033] to [0036]), eg the recycle gas speed affecting the entrainment of particles, the claims encompassed any sizes and shapes of the disengagement vessel, even to the extent that it might be similar to a chimney having the same diameter as the cylindrical first volume of the reactor. In reply thereto, the Appellant referred to [0006], [0008] and [0017], from where it would be clear that the second volume would have a broader diameter than the first vessel and that, for commercial reasons, the size and shape of the second volume would be similar to those hitherto used in the reactors for this type of polymerisation. Moreover, with regard to the process conditions the Appellant argued that the person skilled in the art would know the conditions for making a certain product.

(24) When the parties indicated that they did not intend further comments on this issue, the request of the Appellant for refund of the appeal fee was addressed by the Board. The Appellant maintained this request because of the wording used in paragraph 9.3 of the decision under appeal (sections IV(3)and VII(1), above).

XV. The debate was then closed and the oral proceedings were interrupted for deliberation of the Board on the following requests of the parties:

The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the Main Request, or, in the alternative, on

the basis of the first Auxiliary Request, or on the basis of the second Auxiliary Request, all as filed with the letter dated 22 June 2009, and that the appeal fee be reimbursed.

The Respondents requested that the appeal be dismissed. Respondent II (O-02) further requested to remit the case to the first instance for the examination of novelty and inventive step in the event that the appeal would be allowed.

Reasons for the Decision

1. The appeal is admissible.

Procedural questions

2. Article 12(1) of the Rules of Procedure of the Boards of Appeal (RPBA) concerning the basis of the appeal proceedings reads as follows:

> (1) Appeal proceedings shall be based on
>
> (a) the notice of appeal and statement of grounds of appeal filed pursuant to Article 108 EPC;
>
> (b) in cases where there is more than one party, any written reply of the other party or parties to be filed within four months of notification of the grounds of appeal;
>
> (c) any communication sent by the Board and any answer thereto filed pursuant to directions of the Board.

The requirements of this Article are clearly fulfilled by D28 (section VII(3), above), but not by the further submitted documents D29, D30 and D31 (sections XI and XII, above). Therefore, after having heard the parties as to this point and as to the relevance of D29, D30 and D31, the Board exercised its discretion according to Article 114(2) EPC and Article 13(1) RPBA, decided not to admit the late-filed documents D29, D30 and D31 and informed the parties accordingly (sections XIV(1) to XIV(4) and XIV(17) to XIV(19), above).

Main Request

3. The first question regarding the allowability of the Main Request concerns the "formal" requirements of the EPC, ie the question of whether the requirements of Article 84, 100(c), 123(2) and 123(3) EPC are met.

3.1 Starting point of the opposition/appeal proceedings had been the granted version of the patent in suit, wherein in [Claim 1], the initial definition of the first volume in ***Claim 1*** had been replaced by the definition from ***Claim 5*** and, in [Claim 4], a clerical error which had been present in ***Claim 6*** ("***... a reaction mixture passing cooling the recycled gas mixture, ...***") had been corrected on the basis of ***page 6, lines 31 and 32*** (cf. sections I and II, above).

3.2 Furthermore, the process of each of ***Claim 1 and 6*** had been characterised by one single feature (section II, above), requiring in ***Claim 1*** "***that the fluidized bed occupies at least all of the first volume of the reactor***" and in ***Claim 6*** "***that the fluidized bed occupies at least all of the cylinder with a vertical side wall of the reactor***", respectively. Neither of [Claims 1 and 4] (section I, above), derived from these claims during the examination proceedings, contained this feature anymore, but referred instead to the height of the fluidized bed (h) being greater than 1.05 × H.

3.3 This finding is also valid for the corresponding independent Claims 1 and 4 of the operative Main Request (section VII in conjunction with section III(12), above). Moreover, the only amendment distinguishing the characterising second part of each of these claims of the operative Main Request from

[Claims 1 and 4], respectively, consists in the addition of a definition of the height H ("*where H is the length of the vertical side wall of the cylinder rising above the base of the fluidised bed, a base which coincides with a fluidisation grid*").

3.4 Moreover, Claim 1 of the Main Request differs from [Claim 1] in that the expression "*commonly called a disengagement vessel*" has been replaced by "*which is a disengagement vessel*". This amendment was not objected to by the Opponents/Respondents, nor has the Board any reason to object to this modification.

3.5 The amendments in the characterising part of [Claim 1] and of Claim 1 of the Main Request, however, gave rise to objections of lack of clarity by the Opponents/ Respondents, who asserted that each of these two versions of the claim contained two definitions of the height H, relating to different sizes of H (sections IX, IX(1), XII and XIV(2), above). This interpretation was, however, disputed by the Appellant, who argued that a cylinder had a flat base (section XIV(3), above) so that the length of the axis of the cylinder (ie the first volume in the operative Claim 1) and the length of its side wall had the same value.

3.6 In the passage from *page 2, line 29 to page 3, line 6*, a usual apparatus for the gas phase polymerisation of olefin(s) had been described, including a fluidised-bed reactor (as shown in *Fig. 1*), wherein "*In principle, the fluidized bed could occupy all of the cylindrical part of the reactor, a part which rises over a height H from the base of the fluidized bed, which generally coincides with the fluidization grid (4)*", which definition of H was also applied to the claimed process (*page 3, line 35*).

3.6.1 From ***page 3, line 25*** onwards, "***the present invention***" was described including the reference to "***the height H of the polymerization reactor***" as mentioned above (***page 3, line 35***), and on ***page 4, line 23 et seq.***, the description stated: "***As indicated above, the height H of the polymerization reactor is defined as being the distance separating the base of the fluidized bed, a base which generally coincides with the fluidization grid, and the junction between the first volume or lower volume and the second volume called a disengagement vessel. In the preferred case of the cylinder with a vertical axis, H therefore represents the length of the vertical side wall of the cylinder rising above the base of the fluidized bed.***

According to a preferred embodiment of the present invention the height of the fluidized bed (h) is greater than the height H of the reactor, preferably greater than 1.05 x H ...".

3.6.2 On ***page 6, lines 4 to 19***, an explanation was given with reference to ***Figure 2*** diagrammatically illustrating a plant for gas phase polymerisation of olefin(s) according to the claimed invention. The apparatus shown included

(i) a fluidised-bed reactor (1) with a dome and a base comprising a fluidisation grid and consisting of a cylinder above which is mounted a desurging or disengagement chamber (3)
(ii) an entry chamber (9) for a reaction gas mixture, situated below the grid (4) and communicating with the cylindrical part of the reactor (1) through the grid (4), and
(iii) an outer conduit (5) for circulation of the reaction gas mixture.

3.6.3 On ***page 6, line 25***, reference was made to "***another subject of the present invention***" describing the process of ***Claim 6***.

In this connection, it is clear from the phrase on ***page 6, line 25*** "***Another subject of the present invention ...***" that the remarks following are to be understood in the context "***of the present invention***", ie both the generalities preceding and those succeeding are part of a whole disclosure "***of the present invention***", and the definitions of h and H are therefore equally applicable in the context of the process according to ***Claim 6*** and Claim 4, respectively.

3.6.4 The Board in this connection sees no inescapable contradiction between the concept, on the one hand, of the height H of the cylinder above the base of the fluidised bed at ***page 2, line 29 to page 3, line 6*** (section 3.6, above) and, on the other hand, of the height H representing the length of the vertical side wall of the cylinder rising above the base of the fluidised bed at ***page 4, line 23 et seq.***, further illustrated by ***Figure 2*** and the explanations thereof (sections 3.6.1 and 3.6.2, above). In this connection, the position or shape of any grid is irrelevant, since neither definition requires the presence of a grid.

3.7 Furthermore, in view of the definition of the reactor in operative Claim 1 (sections III(12) and VII, above) and of the explanation of the apparatus of ***Figure 2*** (section 3.6.2, above), clearly distinguishing between (i) the cylindrical fluidised-bed reactor (1) and (ii) the entry chamber (9) for the reaction gas mixture, the Respondents' argument (sections VIII(1) and IX(1), above) is not convincing, that the cylinder might

extend below the fluidisation grid and that the scope of the cylinder in Claim 1 would, therefore, be completely unclear (section XIV(7), above).

3.8 In view of these definitions and explanations concerning the apparatus and "*the present invention*", the Board is satisfied that the above amendments in Claims 1 and 4 carried out after grant of the patent in suit comply with Article 84 EPC.

3.9 Moreover, the Board sees no reason not to accept the Appellant's argument that the subject-matter of *Claim 6* could be amended on the basis of further particulars of "*the present invention*" on *page 4* (see sections 3.6.1 and 3.6.3, above).

3.10 However, the Board does not accept the Appellant's view that the replacement of the initial formulations in *Claims 1 and 6* ("*that the fluidized bed occupies at least all of the first volume of the reactor*" and "*that the fluidized bed occupies at least all of the cylinder with a vertical side wall of the reactor*", respectively) by the formulation "*that the height of the fluidized bed (h) is greater than 1.05 x H*" complied with the requirement of Article 123(2) EPC.

3.10.1 For determining whether an amendment does or does not extend beyond the content of the application as filed, it is necessary, according to established jurisprudence of the Boards of Appeal, to examine if the overall change in the content of the application or patent originating from this amendment results in the person skilled in the art being presented with information which is not directly and unambiguously derivable from that previously presented by the application as filed, even when account is taken of matter which is implicit

to a person skilled in the art in what has expressly been mentioned. However, amendments requested by the Applicant/Patent Proprietor should not be allowed if there was the slightest doubt that the amended application or patent could be construed differently to its unamended version. This clearly means that a rigorous standard, ie one equivalent to "***beyond reasonable doubt***", is the right one to be applied.

3.10.2 In the present case, the initial wording of ***Claim 1*** required the use of a fluidised-bed reactor consisting of two volumes. The first volume of the reactor had only been defined in terms of its external wall: "***the enclosure (wall) of which consists of at least one surface of revolution generated by the rotation, about a vertical axis known as axis of revolution, of a rectilinear and/or curved segment***" (section II, above, and ***page 2/lines 18 to 21***/[column 2, lines 4 to 9]). Moreover, in its characterising part, ***Claim 1*** had required that the fluidised bed occupied at least all of that first volume (section II, above).

During the examination procedure, the form of the first volume was redefined and the second requirement "that the fluidized bed occupies at least all of the first volume of the reactor" disappeared from ***Claim 1*** (sections 3.1 and 3.2, above). Instead, [Claim 1] referred to "a cylinder with a vertical axis of height H" and required "***that the height of the fluidized bed (h) is greater than 1.05 x H***". The definition of the second volume, mounted above the first volume, remained unchanged.

3.10.3 Neither the original wording in the preamble of ***Claim 1***, nor the amended wording of the definition of the first volume in the preamble of [Claim 1] contained a

statement concerning or excluding any installations inside the first volume (cf. eg D1).

3.10.4 However, whilst the characterising part of ***Claim 1*** unequivocally required that "***the fluidized bed occupied at least all of the first volume***", which, in other words, excluded that anything other than the fluidised bed could occupy any parts of the first volume, the wording of [Claim 1] did not, but referred only to the height of the fluidized bed (h). Likewise, the corresponding requirement (cf. ***Claim 6***, section II, above) was not contained in [Claim 4].

3.10.5 These findings are also valid for each of Claims 1 and 4 of the operative Main Request.

3.10.6 Having regard to the above amendments, the Board takes the view that the findings of the Board in Decision T 331/87 (OJ EPO 1991, 22) are also valid for and applicable to the present case. No. 6 of the reasons for that decision (also forming the basis for its Headnote) read as follows:

"*It is the view of the Board that the replacement or removal of a feature from a claim may not violate Article 123(2) EPC provided the skilled person would directly and unambiguously recognise that (1) the feature was not explained as essential in the disclosure, (2) it is not, as such, indispensable for the function of the invention in the light of the technical problem it serves to solve, and (3) the replacement or removal requires no real modification of other features to compensate for the change (following the decision in Case T 260/85, OJ EPO 1989, 105). ...*"

3.10.7 The requirement that "***the fluidized bed occupies at least all of the first volume of the reactor***" in ***Claim 1*** and "that the fluidized occupies at least all of the cylinder ..." in ***Claim 6***, respectively,

(i) was consistently presented in the ***application*** as an essential feature in ***each independent claim*** and

furthermore on ***page 3, lines 33 to 34*** and ***page 6, lines 33 to 34***, respectively;

(ii) appears to be indispensible for the function of the claimed process(es) in the sense of being essential for solving the technical problem, which requires "over-filling" of the first (cylindrical) volume of the reactor and would, thus, be fully consistent with the fluidised bed occupying at least all of the first volume; and

(iii) its deletion raises the question of compensatory amendments of other parts of the disclosure, to take account of the question of whether anything else apart from the fluidised bed could occupy parts of the "***first volume***".

It is especially this need to clarify the disclosure relating to the occupation of the "***first volume***" consequent upon the deletion of the referenced feature, which indicates that the specification as amended is not consistent with the same specification before amendment (cf. the Opponents'/Respondents' arguments relating to the filling degree of the reactor, which are equally applicable to the Main and the first Auxiliary Request; sections III(6) (2nd paragraph), IX(2), XIV(13), 3.10.1 and 3.10.3, above).

3.10.8 In the Board's view, the Appellant has not been able to provide a convincing argument, which would have invalidated these findings.

3.10.9 Consequently, the Board has come to the conclusion that the ground for opposition according to Article 100(c) EPC prejudices the maintenance of the Main Request. It is therefore refused.

First Auxiliary Request

4. Having regard to the only difference between the claims of the Main Request and those of the first Auxiliary Request, residing in the amendment as explained in section XI(1) (above), the above findings concerning the Main Request are also valid for the first Auxiliary Request which must, therefore, also be refused.

Second Auxiliary Request

5. The subject-matter claimed in the second Auxiliary Request has been restricted to the second process as initially claimed in ***Claims 6 and 7*** and as described specifically on from ***page 6, line 25*** to ***page 7, line 1***.

5.1 Contrary to the two above higher-ranking requests, the above feature deleted from their Claims 1 and 4 has been maintained in Claim 1 of the second Auxiliary Request. Therefore, the Board is satisfied that the second Auxiliary Request complies with the "formal" requirements, as identified in section 3, above, for the facts and findings concerning the amendments of Claim 4 of the Main Request as given in sections 3.1, 3.3, 3.6.1, 3.6.3, 3.8 and 3.9, above.

5.2 Therefore, the objection of insufficiency of disclosure has to be investigated, which has formed the central thread through the whole of these opposition and appeal proceedings, on the basis of the different arguments provided by both Opponents/Respondents and by the Patent Proprietor/Appellant in this respect during the opposition proceedings (sections III(5) to III(10) and V, above) and the appeal proceedings (sections VII(2), VII(3), VIII(2) to VIII(4), IX(2), XIV(17), XIV(20) to XIV(23), above).

5.3 The Opponents had based their objection concerning this ground for opposition with regard to the height of the fluidised bed on arguments concerning ***inter alia*** the fluctuation of this height and the size of bubbles, which may form in the fluidised bed (cf. Dr Cai's Declaration referred to in section III(8), above). These arguments had been accepted by the Opposition Division, which held in its decision with reference to D25 (and the bubble diameters of up to 4 m mentioned therein) that the patent in suit did not disclose a specific method for measuring the height of the fluidised bed within the relevant level of accuracy, ie within a tolerance of measurement being far below 1 m (section IV(2) and IV(3), above).

5.3.1 Whilst acknowledging in the course of the written and oral proceedings, that fluctuations of the fluidised bed height were a normal phenomenon occurring during the polymerisation process due to the formation of bubbles, the Appellant was of the opinion that a bubble size of 4 m would "***require very specific reactor dimensions and reaction conditions***" (SGA, page 3, third last paragraph; cf. the above sections VII(2) and XIV(17)), whereas the "***normal fluctuations***" would be far smaller. On this basis, the Appellant disputed the above reasons for the decision under appeal with regard to a number of documents which allegedly disclosed that the person skilled in the art knew how to hold the height of a fluidised bed constant and would also be able to measure the height of the fluidised bed with the appropriate accuracy (sections VII(2) and VII(3), above). Moreover, it was, according to the Appellant, conventional to report the bed height without fluctuations, ie as a time-averaged bed height, as could be derived from the specification, rather than

the instantaneous or dynamic bed height as alleged by the Respondents/Opponents (cf. sections V and XIV(17), above).

These assertions concerning the meaning of the "***height of the fluidised bed (h)***" in the patent in suit remained disputed between the parties, particularly because the patent in suit did not, according to the Respondents, indicate which type of bed height was meant, let alone provide any information concerning the averaging time, which would be indispensible for the meaningfulness of a given average bed height h of the fluidised bed (sections V, last paragraph, XIV(20) and XIV(21), above).

Moreover, even those documents as referred to in the first paragraph, above, on which the Appellant relied to show that the fluidised bed height h could be held "constant", confirm only, what had also been stated in their examples (cf. the quotations in the table shown in section VII(3), above), that the bed level had been maintained constant "***Under a given set of operating conditions***". This point had also been made by Respondent II (section IX(2), above).

5.3.2 The Appellant referred furthermore to D28 in order to support its position (section XIV(18), above). This gives rise, however, to the question of whether the disclosure of the patent in suit can be supplemented by further documents not mentioned in the specification, for the purpose of compliance with the requirement of sufficiency of disclosure (Article 83 EPC) and to knock the bottom out of an objection under Article 100(b) EPC, respectively.

However, the answer to this question can, in the Board's view, only be given "*on the basis of the content of the application as originally filed. Further information cannot be relied upon to heal any deficiencies in the original disclosure ... Any addition to or modification of the original disclosure in this respect would result in further information which was not unambiguously derivable from the application as originally filed, would add subject-matter which extended beyond the content of the of the application as filed and would give an unwarranted advantage to the patentee by obtaining patent protection for something he had not properly disclosed on the date of filing contrary to Article 123(2) EPC.*" (T 172/99 of 7 March 2002, not published in OJ EPO, No. 4.5.9 of the reasons). Consequently, document D28 cannot provide any additional teaching which could remedy any deficiency of the original disclosure of the patent in suit.

5.3.3 Moreover, as already indicated at the oral proceedings (section XIV(23), above), the Board is of the opinion, in view of the wording of the operative claims, that the crucial point concerning the issue of sufficiency of disclosure is not focused on, let alone confined to the questions of accuracy of measurement of the bed height h, of whether this height h could be or was indeed held constant or of whether the bed surface fluctuated more or less in a given experiment, although these questions were, as shown above, disputed at length during these opposition and appeal proceedings and formed one basis for the decision under appeal (cf. eg sections III(8), III(9), IV(2), IV(3), V, VII(2), VII(3), VIII(2), VIII(3), IX(2), XIV(17) and XIV(20) to XIV(22), above).

5.4 Rather, the Board takes the view that the crucial point for the assessment of whether the claimed process has been sufficiently disclosed concerns the question of whether the present patent specification as a whole, but in agreement with Claim 1, provides a complete

technical concept fit for generalisation. This would require, in the present case, firstly, that all the features necessary for the process to be carried out successfully have been defined in clear terms (cf. sections III(5), III(6) and VIII(4), above) and, secondly, that it is evident, namely in the [examples], in which way specific operating conditions must match with the reality of a given reactor in order to achieve the aims of the patent in suit, directed to the reduction of entrainment of polymer particles out of the reactor and to the improvement of the polymer output, whilst reliably preventing changes of the bed fluidisation which may necessitate a reactor shutdown (cf. [0030] and section IX(2), above).

5.5 Claim 1 defines the reactor to be used in the claimed process as consisting of (i) a cylinder having a vertical side wall, whereby the length of the side wall rising above the base of the fluidised bed is H, and (ii) a disengagement vessel mounted above the cylinder.

Furthermore, the claimed process concerns a continuous gas phase polymerisation of olefin(s) carried out in the above reactor containing a fluidised bed at an absolute pressure higher than atmospheric pressure, with continuous or intermittent introduction of a catalyst into the reactor, continuous introduction of olefin(s) into a reaction mixture passing through the reactor in an upward stream, removal of the heat of polymerisation by cooling the recycled reaction gas mixture and draining the polymer manufactured.

The process is characterised in that the fluidised bed occupies at least all of the cylinder and that the height h of the fluidised bed is greater than 1.05 × H.

5.5.1 It is thus evident that, in Claim 1 (section XI(2), above), the apparatus used is defined neither in respect of the dimensions or size of the cylindrical part of the reactor, nor in respect of the shape or the size of the disengagement vessel. Nor do Claim 2 or the description disclose any further mandatory features of the apparatus used, let alone any further mandatory limiting features of the cylinder or of the disengagement vessel.

5.5.2 Moreover, the wording of neither of the operative claims (section XI(2), above) includes an upper limit of the bed height h or defines at all pressure and temperature ranges in the reactor. Nor do the claims contain any definitions of the rates of the catalyst feed or of the draining of the polymer manufactured, let alone of the maximum transport disengagement height (TDH) and the minimum height of the freeboard (sections III(8) and XIV(20), above). Both the TDH and the freeboard clearly depend on the apparent density of the fluidised powder and on the upward speed of the conveyed reaction gas mixture, on the height of the fluidised bed and on the size and shape of the disengagement vessel.

5.5.3 The dependency of the properties of the fluidised bed on the reaction/operating conditions had already been addressed in the NoOp of O-01, wherein specific reference had been made in the context of the stability of the fluidised bed to the "***control of gas velocity, composition and temperature of the fluidised bed***", (section III(5), above). Furthermore, the Opponent had argued in this connection that "***the Patent ... appears to suggest that the bed height can be raised*** [beyond

the minimum height of >1.05 × H as defined in Claim 1] *independently of those other variables*".

5.5.4 One problem of gas phase polymerisations in fluidised bed is the entrainment of polymer particles from the reactor as such, as mentioned in particular in [column 2, lines 45 to 53] of [0009], wherein reference is made to the acceleration of such entrainment by the bursting of reaction gas bubbles when they reach the upper part of the fluidised bed. The solution to this problem, which is a prerequisite to achieve the other aim, ie the increase of the polymer output (as referred to in [0030]), depends on the operating conditions (cf. section 5.5.2, above) which are, of course, closely related to the circumstances in which the reaction is to be carried out, namely the geometry of the plant used therefor. This not only concerns the lower part of the reactor containing the fluidised bed, but also the size and the shape of the disengagement vessel forming the upper part of the reactor and the need to provide sufficient freeboard in the disengagement vessel, reaching further above the TDH (cf. sections III(8) and 5.5.2, above), namely because of the requirement to avoid carryover of polymer particles to the recycle line and the heat exchanger for the recycled reaction gas mixture and the fouling problems resulting therefrom.

It is true that it is stated in [0012], that "*the present invention does not lead in any way to excessive entrainment of polymer particles out of the reactor*", presumably because "*the particles undergo a deceleration when they reach the disengagement vessel and ... the bubbles are limited and/or reduced in size when they enter the disengagement vessel*". Moreover,

[0030] teaches, that the particle entrainment out of the reactor (ie carryover into the recycle line) could be reduced by virtue of the new process so that "*it is now possible to work with upward speeds of the reaction gas mixture which are higher than those which were employed previously.*" ([column 7, line 54 to column 8, line 2]). However, these assumptions and explanations of the "*Applicant Company*" are not reflected in the wording of the claims.

5.5.5 Thus, as already mentioned in sections 5.5.1 to 5.5.3, above, both claims are completely silent about the dimensions or size of the cylinder, the shape and size of the disengagement vessel and the velocity of the upward reaction gas stream. This means, however, that neither claim (section XI(2), above) contains any feature related to the TDH or the freeboard.

These facts and findings formed already the basis of the detailed comments of Respondent I in its rejoinder (section VIII(4), above) on the interrelations between the relevant operating and apparatus parameters and the objects to be achieved by the claimed process. In particular, the Respondent had pointed out that "*independent claims 1 and 4 do not in any way define the relative dimensions of the first and second volumes, that is, of the cylindrical section and the disengagement vessel. ... if the disengagement vessel is relatively small, for example of a size which is entirely filled with the fluidised bed when the bed level is the greater than 1.05 x H, the process will clearly suffer from unacceptable carryover. To the extent that the Patent does not disclose how such a process could be operated it is insufficient. ... The Patent does not provide any new general principal or*

understanding relating to the operation of the fluidised bed polymerisation reactors. There is no new information regarding the degree of carryover experienced in different bed levels and different reactor geometries. ... the Proprietor ... has deliberately sought to encompass all sizes and shapes of fluidised bed reactor. The protection claimed therefore greatly exceeds any technical contribution provided.".

5.5.6 Nevertheless, it has even been promised in [0030] (cf. section 5.5.4, above), that the output of polymers and the upward speed of the reaction gas mixture could be increased (which automatically causes an upward expansion of the fluidised bed), despite the known problems in fluidised bed processes due to the formation of bubbles in the fluidised beds and their bursting at the surface thereof as addressed in [column 2, lines 45 to 53] and despite the absence of any limitations in the claims providing for a minimum freeboard.

In other words, the claims do not disclose at all the essentials of the complex gas phase polymerisation system in a fluidised bed reactor (section XIV(21), above). Rather, the claims do not even exclude the "*very specific reactor dimensions and reaction conditions*" required "*to approach the extremes of*" the range of bubble sizes of from 0.05 to 4 m, in particular "*the upper extreme*" of bubbles of 4 m in diameter (SGA, page 3, second half; section VII(2), above). Therefore, these findings invalidate the Appellant's own arguments concerning the fluidised bed height (the type of which is not evident from the specification, cf. sections XIV(20) and 5.3.1, above,

penultimate paragraph), its measurement, the accuracy of its measurement and the alleged ability of the skilled person to hold the bed height constant in any conditions (section 5.3.1, above, last paragraph).

5.6 In the rejoinder of Respondent I, reference was, furthermore, made to the specific "*... reactor geometry shown in the Figures and having the dimensions described in the Examples.*" (section VIII(4), above). This gives rise to the second question (referred to in section 5.4, above) of whether it is evident, namely in the [examples], in which way specific operating conditions must match with the reality of a given reactor.

5.6.1 Particular details concerning the size and shape of the relevant parts of the reactor beyond the schematic drawing in [Fig. 2] and its explanation in generic terms in [0023] are provided only in [0032] to [0035], enumerating important details of process variables and reactor parameters as applied and used, respectively, in all three [examples] (cf. the second aspect in section 5.4, above) for the gas phase copolymerisation of a particular monomer mixture in the fluidised bed.

5.6.2 These three [examples] were carried out in an apparatus according to [Figure 2] which is described in [0033] in terms of the internal diameter (5 m), the height H (20 m) and the volume of its cylinder (393 m^3) and, moreover, the height and total volume of its disengagement vessel, the height Lp corresponding to the largest orthogonal section of the disengagement vessel, the diameter of this vessel at this height Lp and, finally, the volumes of this vessel above and below this height Lp.

The [examples] differed from each other only in their respective bed heights (Example C1: 17 m; Example 2: 20 m; Example 3: 23 m) and in their respective corresponding fluidised bed volumes (which in the given circumstances are directly proportional to the bed height h), whereas all other operating conditions were identical. Thus, the absolute pressure, the upward gas speed, the temperature and the composition of the reaction gas mixture ([0035]) passing through the fluidised bed of a certain apparent density ([0034]) as provided in [0035] were common to each of [Examples C1, 2 and 3].

5.6.3 Nevertheless, only [Example 3] complied with the subject-matter of the presently operative claims, whereas [Examples C1 and 2] were comparative examples. This shows however, that even the knowledge of all the given details mentioned in section 5.6.2, above, does not necessarily lead to success.

Thus, in each of these [examples], the polymerisation process had, at its individual given bed height h of 17, 20 and 23 m, respectively, apparently reached a steady state and provided a copolymer with the desired properties as defined in [0034] (cf. [0037]/[0038], [0041]/[0042] and [0045]/[0046], respectively). Each of these polymerisations was then modified in only one feature, which, therefore, must have caused the different final results of these [examples], ie the failures in [Examples C1 and 2] and the success in [Example 3]. This single modification and its purpose were equally explained in each example in the following terms: "*The polymer output is next increased progressively by changing from ... to ... tonnes/hour over a period of 8 hours while the fluidized bed volume*

and hence this fluidized bed height of ... m are kept constant." ([0039], [0044] and [0048], respectively)

5.6.4 As already mentioned in section 5.5.3, above, Opponent O-01 had, in its NoOp, already addressed, on the one hand, the well-known dependency of the properties of the fluidised bed on the reaction/operating conditions and, on the other hand, the inconsistency between this dependency and the seeming independence of the bed height h from the other variables as apparently suggested in the patent in suit. This led the Opponent to the conclusion that the patent in suit did not provide the skilled person with any guidance of how to resolve these problems/this inconsistency (section III(5), above).

5.6.5 In view of the above facts and findings, the Board cannot refute the Opponent's conclusion, which is rather confirmed by the results of [Examples C1 and 2].

Thus, both [comparative examples] show that even the modification of an operational desideratum, in this case the desired polymer output, by changing some operating condition(s) (other than the bed height h), which is/are not, however, mentioned in Claim 1, prevented the initially successful polymerisation to the desired product as defined in [0034] from being continued with success. It is noteworthy in this context, that the claims do not even require that the bed height must not be increased when modifying any of the reaction conditions in order to increase the polymer output (cf. sections 5.5.2 and 5.5.6, above).

Each of these results clearly demonstrates that even where all the surrounding conditions necessary to establish a satisfactory fluidised bed had been

correctly adjusted in a particular case (cf. [0037]/[0038], [0041]/[0042], respectively, cf. section 5.6.3, above), divergence in one aspect from these appropriate operating conditions resulted not only in a failure to achieve the declared aims of the patent in suit (as claimed in Claim 2), namely to increase the output without leading to excessive entrainment of particles out of the reactor or to other disadvantages such as the appearance of hot spots and fouling or the appearance of agglomerates, but led to conditions necessitating in the worst case a reactor shutdown.

5.7 With regard to the scope of the claims in comparison with the teaching which could be carried out with a reasonable expectation of success and which, in the present case, does not even extend to the general description of all three "*Examples*" in [column 8, lines 6 to 47] (see sections 5.6.1 to 5.6.5, above), the situation of the skilled reader is similar to the circumstances dealt with in T 1205/06 of 29 January 2009 (not published in the OJ EPO), as set out in particular in Nos. 2.3 to 2.9 of the reason for that decision.

5.7.1 In that case, the first issue concerned the question of whether the extent of the monopoly, as defined by the claims, corresponded to the technical contribution of the patent in suit to the art or whether the claims extended to subject-matter, which, after reading the description, was still not at the disposal of the person skilled in the art.

The patent underlying that case aimed at the provision of polymer products having particular properties defined in the claims in terms of two parameters, which

had, however, been achieved in only one half of the examples disclosed in that specification.

"*Furthermore, given that all compositions exemplified in the patent in suit are relatively complex - each contains at least eight components - and that the nature of the modifications upon which success or failure seems to depend is relatively inconspicuous, coupled with the complete absence of any general guidance in this respect in the description of the patent itself, ... the subject-matter ... can only be considered as a matter of chance, because, instead of providing a practical technical teaching, it is evident that it would be necessary for the skilled person to establish with considerable trial and error how to realise the combination of properties as defined in (Claim 1)*" (No. 2.7, 2nd paragraph of the reasons in T 1205/06).

In that case, the Board stated furthermore that "*It does not see, in the specification of the patent in suit, a technical concept fit for generalisation, which would make available to the skilled person the host of variants encompassed by the respective functional definition of (Claim 1). Rather, the specification offers only the invitation to perform a research programme (...) in order to find out which combinations of which ingredients (...) would meet the requirements of (Claim 1) and would provide a product having properties as set out .... In other words, the patent specification (description and claims) does not place all the information necessary for achieving the desired product at the disposal of the skilled person (...; cf. T 435/91 ..., in particular No. 2.2.1 of the reasons)...*" (No. 2.8 of the reasons in T 1205/06).

5.7.2 Although the present case does not relate to products as the patent underlying that decision and the patent in suit contains a set of reactor dimensions and operating conditions for carrying out three "Examples", one of which was successful in the sense of the aims to be achieved by the polymerisation as claimed in the two claims of the present request, whilst the other two examples failed, as shown above, the Board takes the view that the findings in that case are also applicable to the present one, because, as in that case, it would have been indispensible in the patent in suit to

provide, in a clear and complete manner, a combination of mandatory features in the claims, which would reliably have allowed to achieve the desired goal.

5.7.3 Instead, as shown above in detail, the skilled reader is left alone and without guidance in the present case to find out by himself/herself in undue experimentation all the limits concerning both the polymerisation plant and the operating conditions for that plant, which limits must not be exceeded without preventing the claimed process from being carried out (as shown in the comparative examples) with a reasonable expectation of success.

5.7.4 In view of the failure in the specification to provide essential definitions and limitations of the claimed process, the Board concurs, therefore, with the opinion expressed by Respondent I/O-01 (sections VIII(4) and III(5), above) (i) that "***the Proprietor has deliberately chosen not to confine the scope of protection to reactors of that geometry*** [as used in Figure 2 of the patent in suit] ***and has deliberately sought to encompass all sizes and shapes of fluidised bed reactor.***" and (ii) that the skilled person is left alone with problems concerning the stability of the fluidised bed when trying to practise the process as claimed (section III(5), above). By contrast, it cannot accept the Appellant's arguments that it would be sufficient for the person skilled in the art to rely on [0006], [0008] and [0017] for deriving the information (i) that the second volume should have a broader diameter, (ii) that, for commercial reasons, the size and shape of the second volume would be similar to those hitherto used in the reactors for this type of polymerisation (section XIV(23), above) and (iii) that

the person skilled in the art would know the conditions for making a certain product (cf. the second paragraph of section 5.6.5, above).

5.7.5 However, the patent in suit does not teach this. Instead, its Claim 1 relates to an olefin polymerisation process, in general, to be carried out in any process conditions (except for the requirement for the presence of a fluidised bed) in a reactor consisting of a cylinder of any size having a disengagement vessel of any size and shape mounted above the cylinder (with no limitation to specific ratios of the dimensions of the disengagement vessel to those of the cylinder). The only requirements to be fulfilled by the process relate to the fluidised bed occupying at least all of the cylinder and exceeding a minimum height of 1.05 times the length of vertical side wall of the cylinder. In other words, the claim encompasses all embodiments exceeding this minimum height of the fluidized bed without even providing any information about the ***maximum*** bed level which must not be exceeded, because it would reliably cause failure (in the sense of [column 2, lines 45 to 50]; cf. section 5.5.2, above).

Claim 2 relates to a desired minimum polymer output rate without providing any further reactor particulars or polymerisation variables telling the person skilled in the art how to achieve this goal (section XI(2), above).

5.7.6 In view of the above, the operative claims clearly encompass elaborations of the process, which cannot be successful in respect of the aims to be fulfilled by the claimed process as mentioned in section 5.5.4 (above) or must even definitely fail, because of the

possibilities that the surface of the fluidised bed can come near to the top of the second volume/disengagement vessel or can even reach the top of the second volume, so that not enough freeboard or even no freeboard at all is left in the disengagement vessel, which is, however, indispensible for avoiding carryover of polymer particles from the reactor and to increase the polymer output (cf. sections III(6) and III(8), above).

5.8 The Board has not heard any convincing argument, which would have refuted the above arguments or the comments provided by the Respondents. Therefore, the Board takes the view that the patent in suit in accordance with the second Auxiliary Request does not sufficiently deal with the complicated relations (i) between different parameters concerning the apparatus to be used, (ii) between different operating conditions and (iii) between apparatus parameters and operating conditions. Nor do the claims and the specification as a whole provide in clear terms the necessary information as to all the limitations for reliably operating the process as claimed with success by controlling the single parameter specified in Claim 1, namely an upwardly mobile fluidised bed height, and for avoiding, at the same time, the deficiencies of entrainment of polymer particles out of the reactor, their carryover into the recycling lines, compressor and heat exchanger and, hence, the fouling of these parts of the plant. The knowledge of these limitations is, however, necessary for attaining the promise of the patent in suit (cf. [0030].

5.9 Thus, the person skilled in the art is, in the Board's view, rather invited to find the above limitations

himself/herself by trial and error in undue experimentation (section 5.7.3, above).

5.10 In other words, similar to the situation in T 1205/06, as quoted above, the present specification offers only the invitation to perform an extensive research programme in order to find out which combinations of features would set the person skilled in the art in a position to achieve the goals of the patent in suit.

5.11 In view of the above facts, arguments and findings the Board has, therefore, come to the conclusion that the patent specification does not place all the information necessary for achieving the desired result at the disposal of the skilled person, which means that it does not meet the requirements of Article 83 EPC, or in other words, the ground for opposition according to Article 100(b) EPC prejudices the maintenance of the patent in suit.

6. In view of this conclusion, the appeal must fail.

7. According to Rule 67 EPC 1973, "*The reimbursement of appeal fees shall be ordered ... where the Board of Appeal deems an appeal to be allowable, if such reimbursement is equitable by reason of a substantial procedural violation.*" .

The gist of this text was maintained in Rule 103(1)(a) EPC.

7.1 The Appellant argued in its SGA (cf. section VII(1), above), that the decision under appeal had not reasonably taken into account the arguments actually presented by the Patent Proprietor to the statements in Dr Cai's Declaration.

7.2 However, the Board cannot recognise, in particular when taking into account the comments of the Patent Proprietor and of O-01 in their respective letters of

5 February and 20 March 2007 (section V, above), that the assessment in Nos. 9.3 and 9.4 of the reasons of the decision under appeal by the Opposition Division (section IV(3), above) amounted to a substantial procedural violation.

7.3 Even if correct that the Patent Proprietor had contested Dr Cai's Declaration at the oral proceedings before the Opposition Division, it is evident, that the finding of the Opposition Division was based on considerations (those set out in Nos. 9.3 and 9.4 of the reasons for the decision under appeal), on which the Appellant and the Opponent had had an opportunity to comment and which would in any case have led to a negative finding on sufficiency.

7.4 In this connection, the request for reimbursement of the appeal fee must fail, because the appeal has not been successful.

Order

For these reasons it is decided that:

1. The appeal is dismissed.

2. The request for the reimbursement of the appeal fee is refused.

The Registrar: The Chairman:

E. Görgmaier R. Young