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**Datasheet for the decision
of 10 May 2013**

Case Number: T 0843/10 - 3.3.03

Application Number: 01917559.5

Publication Number: 1209179

IPC: C08F297/06, C08F2/34,
C08F297/08

Language of the proceedings: EN

Title of invention:

PROCESSES FOR PRODUCING POLYOLEFIN COMPOSITION

Patent Proprietor:

Mitsui Chemicals, Inc.

Opponent:

THE DOW CHEMICAL COMPANY

Headword:

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step (no) - Improvement over the closest prior art
not shown - Obvious alternative

Decisions cited:

Catchword:



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

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Case Number: T 0843/10 - 3.3.03

**D E C I S I O N
of Technical Board of Appeal 3.3.03
of 10 May 2013**

Appellant: THE DOW CHEMICAL COMPANY
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
15 February 2010 concerning maintenance of the
European Patent No. 1209179 in amended form.**

Composition of the Board:

Chairwoman: B. ter Laan
Members: F. Rousseau
C. Brandt

Summary of Facts and Submissions

I. The appeal by the Opponents lies from the interlocutory decision of the Opposition Division posted on 15 February 2010 according to which European patent No. 1 209 179 (application No. 01 917 559.5) in amended form met the requirements of the EPC.

II. A notice of Opposition had been filed in which revocation of the patent in its entirety was requested on the ground, among others, of lack of inventive step (Article 100(a) EPC). The following documents were *inter alia* submitted in the opposition proceedings:

D1 EP-A-1 057 834

D2 US-A-5 744 551

D3 US-A-5 665 818

D4 US-A-5 352 749

D5 US-A-5 227 440

D6 Figures 1 and 2 submitted by the Opponents with letter of 3 December 2009 and

D7 "Polymer testing under process conditions: capillary rheometers", Modern Plastics, World Encyclopedia 2008, pages 130-131.

III. The impugned decision was based on the patent as amended according to the second auxiliary request submitted on 03 February 2010 during the oral proceedings, independent claim 1 of which read as follows:

"1. A method of producing a polyolefin composition comprising
copolymerizing ethylene and α -olefins having 5 to 8 carbon atoms using at least two gas phase fluidized bed

reactors in the presence of a transition metal compound catalyst,
wherein copolymerization of the reactor (sic) in a second or later stage is conducted in the presence of a copolymer produced in the previous stages, and is characterized by that
a saturated aliphatic hydrocarbon having 2 to 10 carbon atoms exists in each reactor in a concentration from 0.1 to 20 mol%,
wherein the saturated aliphatic hydrocarbon having 2 to 10 carbon atoms is introduced to a fluidized bed of each reactor and the ratio of a concentration (C_2) of the saturated aliphatic hydrocarbon in a reactor of a second stage to a concentration (C_1) of the saturated aliphatic hydrocarbon in a reactor of a first stage (C_2/C_1) is 0.13 or more,
and ethylene and an α -olefin having 5 to 8 carbon atoms are copolymerized in the presence of a metallocene-based supporting catalyst, to produce a linear low density polyethylene composition."

- IV. The Opposition Division held that the claims of the second auxiliary request satisfied the requirements of Articles 123, 84, 83 and 54 EPC, which was not disputed by the Opponents. As regards inventive step, any of Examples 5 and 6 of D3, which were directed to a process involving the copolymerization of ethylene in the presence of a metallocene catalyst in two fluidized bed reactors, represented the closest state of the art. In the processes of those examples the second reactor did not contain any saturated aliphatic hydrocarbon. Whereas the experimental data of D6 did not allow to draw any conclusion in respect of the effect of the present invention, the examples of the opposed patent demonstrated that compositions having a narrower molecular weight distribution could be obtained if a

saturated aliphatic hydrocarbon was present in both reactors in a specific amount and if the ratio C_2/C_1 was kept below (sic) 0.13. The prior art documents cited did not teach or suggest that the saturated aliphatic hydrocarbon concentration had any influence on the molecular weight distribution of the polymer composition obtained. An inventive step was therefore acknowledged.

- V. On 23 April 2010 the Opponents (Appellants) lodged an appeal against the above decision. The prescribed fee was paid on the same day. With the statement of grounds of the appeal filed on 25 June 2010, the Appellants provided *inter alia* additional explanations about test report D6. With a letter of 11 April 2012, the Appellants submitted an experimental report D9. Additional submissions were provided with letter of 10 April 2013.
- VI. The Patent Proprietors (Respondents) replied to the statement of grounds of the appeal by letter of 9 November 2010. Additional submissions were made with letter of 17 September 2012.
- VII. Oral proceedings were held on 10 May 2013, at the end of which the decision was announced.
- VIII. The arguments of the Appellants in so far as they are relevant for the present decision can in essence be summarised as follows :

- (a) The filing of test report D9 was in reaction to the Respondents' objection in respect of the probative value of D6, which objection had been reiterated despite the supplementary explanations provided in the statement of grounds of appeal.

The comparative tests of D9 were not easy to plan and undertake, which explained why D9 had been submitted well after the response to the statement setting out the grounds of appeal. D9 should therefore be admitted into the proceedings.

- (b) As regards inventive step, the closest prior art was represented by any of the processes disclosed in the examples of D1, Example 1 of D2 or Example 2 of D3, since the method now being claimed differed from those methods only in that a metallocene catalyst was employed instead of a Ziegler-Natta catalyst. The method disclosed in Example 6 of D3, in which a supported metallocene catalyst was used, was more remote, as it did not disclose the use of a saturated aliphatic hydrocarbon in the second reactor, nor its amount, nor a ratio C_2/C_1 of the concentrations of saturated aliphatic hydrocarbon in the two reactors of at least 0,13.
- (c) Nevertheless starting from Example 6 of document D3, the experimental results provided in the patent in suit were not suitable to show that the molecular weight distribution of the linear low density polyethylene (LLDPE) was narrowed when using a saturated aliphatic hydrocarbon in the second reactor. The patent in suit relied on the Non-Newtonian Index which was an extremely unusual parameter and did not, contrary to the melt flow ratio I_{21}/I_2 , provide any meaningful information regarding the molecular weight distribution. Moreover, no explanation had been provided rendering credible that the addition of isopentane in the second reactor of Example 6 of D3 would reduce the polydispersity of the LLDPE blend.

- (d) The experimental report D9, in particular runs 1 to 6 using a metallocene catalyst, demonstrated that no discernible effect on the molecular weight distribution of the LLDPE composition was obtained. In addition, the molecular weight distribution resulting from the claimed method depended heavily on the difference in molecular weight of the polymers produced in each of the reactors, which difference could be extremely important, as demonstrated by the melt indices defined in claim 2 of the present request. Hence, the patent in suit also covered the production of blends having a molecular weight distribution as broad as those disclosed in the closest prior art. Test report D6 was not further relied upon.

- (e) The problem solved by the claimed method vis-à-vis the process of Example 6 of document D3 was thus formulated as to provide an alternative process to produce LLDPE.

- (f) D3 taught in column 10, lines 39-40 that the two reactors connected in series could be run in the so-called condensing mode, which essentially meant that a saturated aliphatic hydrocarbon had to be used, as discussed in D4. Saturated aliphatic hydrocarbons were typically fed to increase dew point and gas heat capacity, their use in high concentrations being known to increase production rates beyond those obtained with the so-called dry-mode.

- (g) Consequently, the skilled person, who, starting from the method disclosed in Example 6 of D3, merely wanted to provide a further method for

producing, through gas-phase polymerization, an LLDPE that had suitable properties for producing films, following the explicit suggestion in D3, would have run the second gas phase reactor in the condensing mode. The idea of using an aliphatic saturated hydrocarbon, such as isopentane in the amounts defined in present claim 1, was furthermore suggested in claims 6 and 8 of D4. The claimed subject-matter, therefore, lacked an inventive step.

IX. The arguments of the Respondents as far as they are relevant for the present decision can in essence be summarised as follows :

- (a) No proper justification had been provided for the late filing of D9. Furthermore, the data presented were not based on measurements of the Non-Newtonian Index. They were based either on the melt flow rate, which method was not sensitive enough, or on the molecular weight distribution measured by GPC, the results of which varied widely. Moreover, hydrogen, which is a known agent for controlling the molecular weight of the polymer, had not been kept exactly at the same concentration for the experiments the Appellants wished to compare. The comparisons provided, therefore, did not allow any conclusion as to the effect of the C_2/C_1 ratio on the molecular weight distribution of the LLDPE and hence were not relevant for determining the problem solved over the closest prior art. Hence, D9 should not be admitted to the proceedings.
- (b) As the process of the invention concerned a polymerization process using at least two

reactors, the composition obtained with that process represented a polymer blend. The difference in molecular weight of the polymers produced in the first and the second reactor, as well as their relative proportions, had an influence on the molecular weight distribution of the resulting polymer composition. The patent in suit described for the first time that by adjusting the amount of saturated aliphatic acid hydrocarbon both in the first reactor (C_1) as well as in the second reactor (C_2) within the range of 0,1 to 20 mol% and by setting the ratio C_2/C_1 to a value of at least 0,13 while keeping the other polymer parameters constant, a polyolefin composition having a narrower molecular weight distribution could be produced.

- (c) The closest prior art was represented by the process disclosed in Example 6 of document D3, also using a metallocene catalyst. That the catalyst employed in Example 6 of D3 was implicitly disclosed to be supported, in view of its use in a gas phase reactor, was common general knowledge, as reflected in D5. The subject-matter of the patent in suit, therefore, differed from the process disclosed in Example 6 of D3 only by the use of a saturated hydrocarbon in the second gas phase reactor.
- (d) The problem solved starting from Example 6 of D3 was to provide a method that allowed the stable production with high productivity of an LLDPE composition having a narrower molecular weight distribution. This was shown by the comparative tests described in the patent in suit, based on the measurement of the Non-Newtonian Index, i.e.

the ratio of the shear speeds obtained at two specific shear stresses, which, as did the ratio of melt indices MI_{20}/MI_2 , represented an indicator for the molecular weight distribution of a polymer composition (as shown by D7). The comparison provided was fair, as the conditions known to have an influence on the molecular weight distribution had been kept constant. The reduction of the Non-Newtonian Index showed that the adjustment of the ratio C_2/C_1 to the claimed range represented a suitable means for reducing the molecular weight distribution of the LLDPE composition.

- (e) There was no evidence that that effect would not be obtained if a ratio C_2/C_1 as claimed were applied in the context of Example 6 of D3. Moreover, to provide a technical explanation of any effect justifying the existence of an inventive step was not a requirement for patentability.

- (f) D3 did not disclose a preferred range for the saturated aliphatic hydrocarbon in the second reactor and it was completely silent about the parameter C_2/C_1 . At the filing date of the patent in suit, the use of a saturated aliphatic hydrocarbon in the reactors was only known to increase the dew point of the reactor gas. None of the cited documents suggested that the presence of a saturated aliphatic hydrocarbon in the reactors had an effect on the properties, let alone on the molecular weight distribution, of the produced LLDPE. Hence the use of the claimed ratio C_2/C_1 with the aim of narrowing the molecular weight distribution of the LLDPE produced in Example 6 of D3, was not obvious to the skilled person.

(g) Even if the problem solved over the closest prior art was to provide a further method for producing, through gas-phase polymerization, an LLDPE that had suitable properties for producing films, the claimed solution would still not be obvious, as the skilled person would not find any motivation in the cited documents to employ a saturated aliphatic hydrocarbon in the second reactor. D1 in particular only disclosed the use of the condensing mode in the first reactor. Whereas the disclosure in D3 of using the condensing mode for both reactors might suggest the use of an inert solvent such as a saturated aliphatic hydrocarbon, D3 clearly taught, however, that the second reactor was not to be operated close to the dew point of the recycling gas.

(h) Hence, the claimed subject-matter involved an inventive step.

X. The Appellants requested that the decision under appeal be set aside and the patent be revoked.

XI. The Respondents requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. Lack of inventive step is the sole ground of opposition addressed by the Appellants in relation to the present request.

Closest state of the art

3. The closest prior art for the purpose of assessing inventive step is generally that which corresponds to a purpose or effect similar to that of the invention and requiring the minimum of structural and functional modifications (Case Law of the Boards of Appeal of the European Patent Office, 6th edition, 2010, I.D.3.1).
- 3.1 The patent in suit concerns a method of producing, through gas-phase polymerization, linear low density polyethylene (hereafter LLDPE) with a molecular weight distribution that is suitable for providing films having excellent moulding properties (see paragraphs [0004] to [0006] of the patent in suit). Such methods are described in D1, D2 and D3.
- 3.2 The examples of D1, example 1 of D2 and example 2 of D3 describe ethylene copolymerization reactions carried out in two fluidized bed reactors using a Ziegler-Natta catalyst in combination with a co-catalyst dissolved in isopentane, which is introduced both in the first and in the second reactor. Those examples do however not disclose that isopentane is used in the second reactor for a different purpose than dissolving the co-catalyst of the Ziegler-Natta catalyst system, with the consequence that isopentane is a feature inextricably associated with the use of the catalytic system in documents D1 to D3. Hence, replacing the catalytic system used in the Examples of D1, Example 1 of D2 and Example 2 of D3 by a metallocene catalyst would result in a process that does not contain isopentane in the second reactor, and therefore would not lead to the subject-matter now being claimed. In other words, starting from the processes described in the examples of D1, example 1 of D2 and example 2 of D3, the skilled

person would need to carry out two distinct measures in order to arrive at something falling within the ambit of present claim 1.

3.3 In Example 6 of D3 a polymerization method is described in which a metallocene-based catalyst is used in a two reactor fluidized bed system; hexane is added to the first reactor, but not to the second reactor. The Board accepts, as argued by the Respondents and agreed by the Appellants, that the catalyst used in Example 6 of D3 is a supported catalyst. It is therefore not disputed that the method according to present claim 1 differs from that disclosed in Example 6 of D3 solely by the use in the second reactor of a saturated aliphatic hydrocarbon. Starting from the process described in Example 6 of D3, it would only require the additional use of the saturated aliphatic hydrocarbon in the second reactor in order to arrive at the method now being claimed. Though the use of the saturated aliphatic hydrocarbon in the second reactor has been defined by two additional features, i.e. an amount of 0,1 to 20 mol% and a ratio of the concentrations of the saturated aliphatic hydrocarbon in the two reactors C_2/C_1 , that does not change the fact that the addition of the hydrocarbon in the second reactor constitutes a single distinguishing process step over that of Example 6 of D3. Accordingly, the Appellants' opinion that the claimed process is more remote from Example 6 of D3 than from the processes described in D1 and D2 and the other examples of D3, fails to convince.

3.4 Thus, the method described in Example 6 of D3 is considered a more appropriate starting point for assessing inventive step than the other examples proposed by the Appellants.

Problem solved over the closest prior art

4. In line with the definition of the problem solved by the patent in suit (paragraphs [0005] and [0006]), it was not disputed by the parties that the claimed subject-matter provided a method of producing, through gas-phase polymerization, LLDPE with a molecular weight distribution suitable for providing films. The parties, however, were divided as to whether starting from the method described in Example 6 of D3 it also solved the problem of providing an LLDPE having a narrower molecular weight distribution, the appellants relying on examples 1 to 6 of experimental report D9, while the respondents relied on the experimental data of the patent in suit.

5. *Relevance of the parameter Non-Newtonian Index*

5.1 According to paragraph [0168] of the patent in suit, the Non-Newtonian Index is a rheological measurement in which the ratio of the shear speeds of the molten polymer measured under two specific shear stress conditions, namely $2,4 \cdot 10^6$ dyn/cm² and $0,4 \cdot 10^6$ dyn/cm², is determined. Although the temperature of the measurement is indicated in the patent in suit as 100°C, it can be accepted that, as had been argued by the Respondents before the Opposition Division, a temperature of 190°C was actually meant, in view of the fact that LLDPE is not in the molten state at 100°C and also since a temperature of 190°C is normally used for determining rheological properties of LLDPE, such as the melt index under a load of 2,16 kg (I₂) according to ASTM D 1238.

5.2 Taking into consideration the common knowledge that LLDPE exhibits a non-Newtonian behaviour and that the melt index ratio I₂₁/I₂ is often used as a measure for

the broadness of the molecular weight distribution, it is credible that the ratio of the shear speeds of the molten polymer measured under two specific shear stress conditions designated as the Non-Newtonian Index in the patent in suit also correlates with the molecular weight distribution of LLDPE. This is in line with paragraph [0168] of the patent in suit and also indicated in D7 (page 2, third full paragraph). The Appellants' argument that the observed variations in the Non-Newtonian Index might be due to variations in branching is not supported by any evidence and can therefore not be taken into account.

5.3 The Appellants' argument that the Non-Newtonian Index was an extremely unusual parameter that did not provide any meaningful information regarding the molecular weight distribution of the LLDPE produced by the claimed method, therefore has to be disregarded.

6. *Analysis of the experimental results provided in the patent in suit*

6.1 Example 1 describes a process in which the C_2/C_1 ratio is 0,1 and the resulting LLDPE has a Non-Newtonian Index of 29,4. In examples 2 to 4 the C_2/C_1 ratios are 0,2, 1 and 2, and the Non-Newtonian Indices 25,4, 24,9 and 21,3, respectively. Examples 2 to 4 differ from Example 1 only in the use of a higher amount of isopentane in the second reactor. A comparison of those examples thus leads to the conclusion that increasing amounts of isopentane in the second reactor under the specific conditions of the examples lead to a reduced Non-Newtonian Index and hence to a narrowing of the molecular weight distribution of the LLDPE.

6.2 However, although Example 1 may serve as a reference example because the C_2/C_1 ratio is below 0,13, it does not represent the closest prior art. Whereas the examples of the patent in suit relate to a method with a ratio ("split") between the higher molecular weight polyethylene and the lower molecular weight polyethylene, produced respectively in the first and the second reactor, of 60:40, the method according to Example 6 of D3 uses a split of 80:20, i.e. produces a lower proportion of the lower molecular weight polyethylene. Moreover, the higher molecular weight portion of the polyethylene produced in the first reactor in Example 3 of D6 (melt flow index I_2 of 1,2) has a lower molecular weight than that produced in the comparative examples of the patent in suit (I_2 of 0,53).

6.3 Therefore, the question needs to be answered whether in the present case the narrowing of the molecular weight distribution observed in the context of the exemplified methods of the patent in suit would also be obtained in the context of the closest prior art. The Respondents argued that the effect was unexpected. However, in the absence of any indication of which feature, interacting with the other features of the claimed process, provides the effect shown in the specific context of the examples, there is no reason to expect that the same effect would be necessarily obtained in a different context, in particular that of the closest prior art. This is especially the case because the reference example (Example 1 of the patent in suit) and the closest prior art (Example 6 of D3) differ in at least two variables having an influence on the molecular weight distribution (see point 6.2 above).

6.4 Hence, the argument of the Respondents that also in the context of the closest prior art the use of a saturated

aliphatic hydrocarbon in the second reactor in the amount defined in present claim 1 would lead to a narrowing of the molecular weight distribution, is not supported by any evidence or by technical explanations that would render such an effect credible. Therefore, that argument cannot be taken into account when determining which problem is solved over the closest prior art.

7. *Experimental evidence D9 submitted by the Appellants*

7.1 The Appellants submitted experimental report D9 with their letter of 11 April 2012, i.e. more than twenty one months after filing the statement setting out the grounds for the appeal and seventeenth months after the rejoinder of the Respondents of 9 November 2010.

7.1.1 The purpose of D9 is to understand the effect of the ratio C_2/C_1 of the concentrations of saturated aliphatic hydrocarbon in the second and first reactors on the molecular weight distribution of the polyethylene composition produced in a 2-stage gas phase reaction system. The Board accepts that this kind of tests, involving equipment that is normally otherwise in use, are not simple to plan and undertake. Therefore, there is no reason to suppose that the delay in the filing of D9 amounts to a procedural abuse by the Appellants.

7.1.2 In examples 1 to 6 of D9 LLDPE is produced using a metallocene catalyst, in examples 7 to 9 a Ziegler-Natta catalyst is used. Therefore, examples 1 to 6 may be seen as a reaction to the Respondents' objection in respect of the probative value of D6 (submitted before the first instance) that had been raised despite the supplementary explanations provided in the statement of grounds of appeal. Therefore the submission of D9 by

the Appellants can be seen as a fair attempt to answer the Respondents' objection. Furthermore, the Respondents never indicated any intention to carry out counter-experiments and the Board considers more than one year to be sufficient time to study adequately the experimental results provided in D9.

- 7.1.3 In view of the above, experimental report D9 is admitted to the proceedings (Rule 13(1) RPBA).
- 7.2 As to the probative value of D9, the concentration of hydrogen was not kept at the same value. Hydrogen is a well-known molecular weight controlling agent for the type of polymerization reactions carrying out in D9 and hence has an influence on the molecular weight distribution of the resin. This was not contested by the Appellants. Because of the variations of the hydrogen concentration D9 is not suitable to demonstrate any (lack of) effect of the amount of isopentane in the second reactor on the molecular weight distribution of the LLDPE.
- 7.3 In view of the available evidence, it cannot be concluded that the amounts and the C_2/C_1 ratio of isopentane concentration in the two reactors results in any technical effect, in particular not in a narrowing of the molecular weight distribution of the LLDPE so produced.

Problem solved

8. In view of the above, the problem underlying the patent in suit can only be seen as to provide a further method for producing, by gas-phase polymerization, an LLDPE that has suitable properties (such as an appropriate molecular weight distribution) for producing films. In

view of the well-known suitability of LLDPE resins for film production, such as the LLDPE blends described in D3 which present a molecular weight distribution varying within a broad range, it is credible, and was not disputed, that the method proposed by the patent in suit effectively solves this technical problem.

Obviousness

9. It remains to be decided whether or not the skilled person, starting from Example 6 of D3 and wishing to solve the above defined problem, would have been guided by the available prior art to apply the additional measure defined in present claim 1, namely the use of a saturated aliphatic hydrocarbon having 2 to 10 carbon atoms in an amount of 0,1 to 20 mole % in the second reactor, the ratio of the concentrations of the saturated aliphatic hydrocarbon in the two reactors C_2/C_1 being at least 0,13.

9.1 According to D3 the two reactors used in the process of D3 can be run in the condensing mode (column 10, lines 39-40). Both D3 in said passage and D4 (column 2, line 34 to column 3, line 16) refer to the condensing mode as described in US patents 4 543 399 and 4 588 790.

9.2 D4 describes the polymerization of alpha-olefins in a gas-phase reactor having a fluidized bed and a fluidizing medium that serves to control the cooling capacity of said reactor. According to D4 the condensing mode means that a liquid phase is maintained in the recycle stream in order to control the cooling capacity of the reactor. This is also described in the context of the copolymerization of alpha-olefins in a gas phase reactor having a fluidized bed (claims 1 and 6 ; column 2, lines 46-49 and paragraph bridging

columns 2 and 3). As a means to conduct the condensing mode D4 indicates the use of condensable inert fluids such as saturated hydrocarbons containing from 2 to 8 carbon atoms, C₅ and C₆ saturated hydrocarbons being preferred (column 6, lines 14-42). Claim 8, which refers to claim 6, describes the use of from 1,5 to 20 mole % of isopentane, based on the amount of fluidizing medium.

9.3 The processes of both D3 and D4 yield LLDPE that is suitable for making film (D4: col. 14, 1.11-21; D3: col.2, 1.32-35), which was uncontested by the parties. Moreover, D3 states that "The reactors can be run in the condensing mode, if so desired." (col. 10, 1. 39-40). Therefore, the skilled person, who, starting from Example 6 of D3, merely wanted to provide a further method for producing, through gas-phase polymerization, an LLDPE that has suitable properties for producing films (such as an appropriate molecular weight distribution), would, by merely applying one of the possibilities within the framework of the disclosure of D3, have run the second gas phase reactor in the condensing mode, using a saturated aliphatic hydrocarbon having 2 to 8 carbon atoms, preferably 5 or 6 carbon atoms. Applying the concentration disclosed in claim 8 of D4 with the mere objective to put into practice the teaching provided by D3 does not entail any inventive activity. Moreover, the use of said concentration of isopentane in the second reactor (i.e. C₂), leads, in view of the concentration of isopentane C₁ used in the first reactor in Example 6 of D3 (6 mole %), to a ratio of C₂/C₁ of at least 0,13, as required by present Claim 1.

9.4 The Respondents' argument that D3 clearly taught that the second reactor was not to be operated close to the

dew point of the recycling gas, meaning that a saturated aliphatic hydrocarbon should not be used in the second reactor, cannot be followed. The passages of D3 referred to by the Respondents, according to which there is no dew point requirement in the second reactor (column 9, lines 14-15) and that a substantial increase in catalyst productivity in the second reactor is obtained, even though the second reactor is operated at a temperature far removed from the recycle gas dew point (column 4, lines 13-22), only say that the second reactor can be, but not necessarily must be, operated close to the dew point of the recycling gas. In that case, one of the options to achieve such result is, as taught for operating the first reactor of D3, precisely the use of an inert hydrocarbon such as isopentane or hexane (column 3, lines 28-38).

9.5 Consequently, the skilled person starting from Example 6 of D3 and wishing to solve the problem defined in point 8 above would have been guided by the available prior art to a method that falls within the ambit of Claim 1. Thus, present Claim 1 lacks an inventive step and is therefore not allowable (Article 56 EPC).

9.6 For the reasons indicated above, the patent has to be revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairwoman:



E. Goergmaier

B. ter Laan

Decision electronically authenticated