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**Datasheet for the decision
of 13 September 2011**

Case Number: T 0999/07 - 3.3.07

Application Number: 96938142.5

Publication Number: 0861122

IPC: B01J 37/18

Language of the proceedings: EN

Title of invention:

Hydrocarbon synthesis process comprising a catalyst activation and rejuvenation process

Patent Proprietors:

Shell Internationale Research Maatschappij B.V.

Opponents:

ExxonMobil Research and Engineering Company

Headword:

-

Relevant legal provisions:

EPC Art. 123(2)

RPBA Art. 13(3)

Relevant legal provisions (EPC 1973):

-

Keyword:

"Admissibility of late filed requests (no)"

"Amendments - added subject-matter (yes)"

Decisions cited:

G 0006/95

Catchword:

-



Case Number: T 0999/07 - 3.3.07

D E C I S I O N
of the Technical Board of Appeal 3.3.07
of 13 September 2011

Appellants: Shell Internationale Research Maatschappij
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Representative: -

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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 17 April 2007
revoking European patent No. 0861122 pursuant
to Article 102(1) EPC 1973.

Composition of the Board:

Chairman: J. Riolo
Members: D. Semino
D. Keeling

Summary of Facts and Submissions

I. The appeal of the patent proprietors (appellants) lies against the decision of the opposition division announced at the oral proceedings on 21 March 2007 to revoke European Patent 0 861 122. The granted patent comprised 9 claims, independent claim 1 reading as follows:

"1. A hydrocarbon synthesis process which comprises activating or rejuvenating a hydrocarbon synthesis catalyst in the presence of a hydrocarbon liquid by contacting the catalyst with a hydrogen-containing gas at a hydrogen partial pressure of at least 15 bar abs., and, subsequently, contacting the catalyst with a mixture of hydrogen and carbon monoxide at hydrocarbon synthesis reaction conditions."

II. A notice of opposition was filed against the granted patent requesting revocation of the patent in its entirety on the grounds of lack of novelty, lack of inventive step and extension beyond the content of the application as filed, in accordance with Article 100(a) and (c) EPC. The opposition was *inter alia* supported by the following documents:

D4: EP-A-0 590 882

D5: EP-A-0 589 692.

III. The decision of the opposition division was based on the claims as granted as main request and on three auxiliary requests. In all auxiliary requests two independent claims had been introduced including either activation of a "fresh" hydrocarbon synthesis catalyst

or rejuvenation of a "spent" catalyst. In addition, the independent claims of the second auxiliary requests included further process steps related to a specific temperature and pressure program and the ones of the third auxiliary request comprised a limitation of the hydrogen partial pressure range (30 to 200 bar abs.) and the presence of a cobalt compound in the catalyst.

IV. The decision of the opposition division can be summarised as follows:

- (a) The process of claim 1 as granted was not novel with respect to the disclosure of several prior art documents, including D4.
- (b) The amendments in the first auxiliary request were clear, but claim 1 according to the first auxiliary request still lacked novelty over D4.
- (c) The introduction of the term "actual reduction" in the independent claims of the second auxiliary request led to lack of clarity.
- (d) The processes of the independent claims of the third auxiliary request were not novel with respect to the disclosure of D5 and D4, respectively.

V. The patent proprietors (appellants) appealed that decision. With the statement setting out the grounds of appeal they maintained the patent as granted as main request "for procedural reasons" and submitted two sets of claims as first and second auxiliary request. Claim 1 according to the auxiliary requests read as

follows (amendments with respect to claim 1 as granted are in bold, deletions in strikethrough):

First auxiliary request

"1. A hydrocarbon synthesis process **operating with an ebullating or slurry catalyst bed**, which process comprises activating ~~or rejuvenating~~ a **fresh** hydrocarbon synthesis catalyst **that is kept dispersed** in ~~the presence of~~ a hydrocarbon liquid by

- **heating the dispersed catalyst to an initial temperature in the range from 150 to 180 °C during which the partial hydrogen pressure is lower than the partial hydrogen pressure at which the actual reduction is carried out, and in a subsequent step**
- contacting the **dispersed** catalyst with a hydrogen-containing gas at a hydrogen partial pressure of at least 15 bar abs. **during which step the temperature is kept in the range from 200 to 350 °C, and,** subsequently,
- contacting the catalyst with a mixture of hydrogen and carbon monoxide at hydrocarbon synthesis reaction conditions."

Second auxiliary request

"1. A hydrocarbon synthesis process **operating with an ebullating or slurry catalyst bed**, which process comprises activating ~~or rejuvenating~~ a **fresh** hydrocarbon synthesis catalyst **that is kept dispersed** in ~~the presence of~~ a hydrocarbon liquid by

- **heating the dispersed catalyst to an initial temperature in the range from 150 to 180 °C in the**

presence of an inert gas like nitrogen, and in a subsequent step

- contacting the **dispersed** catalyst with a hydrogen-containing gas at a hydrogen partial pressure of at least 15 bar abs., and subsequently,
- **increasing the temperature incrementally or continuously at a rate in the range from 0.1 to 10°C/min to a temperature in the range from 240 to 320 °C,**
- **keeping the temperature in the range from 240 to 320 °C for at least 0.25 hours,**
- **optionally in a subsequent step replacing the hydrogen-containing gas by an inert gas such as nitrogen and, subsequently,**
- contacting the catalyst with a mixture of hydrogen and carbon monoxide at hydrocarbon synthesis reaction conditions."

The auxiliary requests contained a second independent claim including a rejuvenation step instead of an activation step.

In the statement setting out the grounds of appeal the appellants gave a basis for the amendments made in the auxiliary requests, addressed the clarity of the term "actual reduction" in the first auxiliary request and discussed novelty and inventive step with respect to documents D4 and D5, pointing out that those documents did not disclose the claimed changes in temperature and hydrogen partial pressure.

- VI. In the reply to the statement setting out the grounds of appeal the opponents (respondents) made no comments with regard to the main request and objected to the

first auxiliary request under Articles 84 and 123(2) EPC, under Rule 57(a) EPC 1973 (Rule 80 EPC 2000) and for lack of novelty and lack of inventive step. The same objections (apart from the clarity argument) were repeated for the second auxiliary request.

VII. In a communication sent in preparation to oral proceedings the Board summarised the objections of the respondents. No new objection was raised by the Board. In the communication it was indicated that, if the parties wished to file further submissions, "this should be done by 12 August 2011 at the latest".

VIII. With letter dated 4 August 2011 the appellants filed two further sets of claims as new main request and new second auxiliary request. Claim 1 according to the new main request and the new second auxiliary request read as follows (amendments with respect to claim 1 as granted are in bold, deletions in strikethrough):

New main request

"1. A hydrocarbon synthesis process, **which operates with an ebullating or slurry catalyst bed whereby the catalyst is kept dispersed in a hydrocarbon liquid,** which comprises activating or rejuvenating a hydrocarbon synthesis catalyst **comprising cobalt oxide** ~~in the presence of a~~ **that is kept dispersed in the** hydrocarbon liquid by contacting the catalyst with a hydrogen-containing gas at a hydrogen partial pressure ~~of at least 15 bar abs.~~ **in the range from 50 to 60 bar abs.** and, subsequently, contacting the catalyst with a mixture of hydrogen and carbon monoxide at hydrocarbon synthesis reaction conditions."

New second auxiliary request

"1. A hydrocarbon synthesis process, which operates with an ebullating or slurry catalyst bed whereby the catalyst is kept dispersed in a hydrocarbon liquid, which comprises activating or rejuvenating a hydrocarbon synthesis catalyst comprising cobalt oxide ~~in the presence of a~~ that is kept dispersed in the hydrocarbon liquid by

- first heating the catalyst dispersed in the hydrocarbon liquid to an initial temperature in the range from 150 to 180 °C in the presence of an inert gas like nitrogen;
- once this initial temperature is reached, contacting the catalyst with a hydrogen-containing gas at a hydrogen partial pressure ~~of at least 15 bar abs.~~ in the range from 50 to 60 bar abs.;
- increasing the temperature incrementally (step-wise) or continuously at a rate in the range from 0.1 to 10°C/min to a final temperature in the range from 240 to 320 °C,
- keeping the catalyst dispersed in the hydrocarbon liquid at the final temperature level for at least 2 hours;

and, subsequently, contacting the catalyst with a mixture of hydrogen and carbon monoxide at hydrocarbon synthesis reaction conditions."

According to the appellants novelty with respect to D4 and D5 should be acknowledged in view of the specific range of hydrogen partial pressure (50 to 60 bar abs.), which resulted also in the presence of an inventive step.

IX. Oral proceedings were held on 13 September 2011.

X. The arguments of the appellants (patent proprietors), as far as relevant to the present decision, can be summarised as follows:

Admissibility of the new main request and of the new second auxiliary request

(a) The requests were filed in reaction to the communication of the Board, when it became apparent to the appellants that by means of them they could be in a better position than with the two previously filed requests. Moreover, they were filed within the time limit which had been set in that communication. Claim 1 according to the new main request had been limited to the most preferred catalyst and to the most preferred range for the hydrogen partial pressure, which had only been considered as the crucial parameter of the invention, so that those amendments could not come as a surprise to the respondents. Moreover, it appeared at first sight that the request met the requirements of Articles 123(2), 54 and 56 EPC and was therefore allowable. The same arguments were valid for the new second auxiliary request, which, in addition to the amendments in the main request, included the specification of a temperature and pressure program as in the second auxiliary request filed with the grounds of appeal. That request covered the most preferred embodiment in the patent and the examples confirmed the advantages of the claimed process. For those

reasons, the new requests should be admitted into the proceedings.

First auxiliary request - Article 123(2) EPC

- (b) A basis for the amendments made to the claims as compared to the claims as granted could be found in the application as filed on page 6, lines 34-36; page 7, lines 9-13; page 7, line 34 to page 8, line 4; page 9, lines 23-25; page 12, lines 21-24; page 13, line 30 to page 14, line 2; page 16, lines 3-8, 13-14 and 28-34.

- XI. The arguments of the respondents (opponents), as far as relevant to the present decision, can be summarised as follows:

Admissibility of the new main request and of the new second auxiliary request

- (a) All the objections against the requests filed with the statement setting out the grounds of appeal had been presented in the reply to that statement and no new objection had been introduced in the communication of the Board, so that there was no justification for filing new requests at a late stage of the procedure. The limitations to a specific catalyst and to a much more limited range for hydrogen partial pressure were not present in any of the claims previously on file and resulted in a fresh case, which was presented to the respondents and to the Board four weeks before oral proceedings. Such a new situation might even require a new search and/or comparative tests,

which the respondents could not accomplish in the limited time. Moreover, those amendments did not result in a clearly allowable request, since they raised issues under Article 123(2) EPC related to the combination of features which appeared in different parts of the description and questions regarding novelty related to the selection of a specific hydrogen partial pressure range and concerning inventive step related to whether there was evidence on file that that specific feature resulted in a technical effect. In this respect, it was questionable whether the examples in the application fell within the amended claims, which were prima facie not solving any technical problem. In view of that, the new requests should not be admitted.

First auxiliary request - Article 123(2) EPC

- (b) The subject-matter of claim 1 of the first auxiliary request extended beyond the content of the application as originally filed because its features were not clearly and unambiguously derivable in combination with each other from the application as originally filed. In particular, the passage on page 6, lines 34-36 relating to typical reaction conditions of the activation process and the one on page 7, lines 9-13 relating to the activation of some catalysts containing catalytically active metal compounds which were difficult to reduce could not be combined with each other and a part of the disclosure on page 7, line 34 to page 8, line 8 could not be taken in

isolation from the whole embodiment described therein.

XII. The appellants (patent proprietors) requested that the decision under appeal be set aside and the patent be maintained according to the new main request filed by letter of 4 August 2011 or, in the alternative, according to the first auxiliary request filed with the grounds of appeal or according to the new second auxiliary request filed by letter of 4 August 2011.

XIII. The respondents (opponents) requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. *Admissibility of the new main request and of the new second auxiliary request*

2.1 Admissibility of amendments to a party's case in appeal proceedings is governed by the Rules of Procedure of the Boards of Appeal (RPBA, in OJ EPO 2007, 536), which prescribe that:

- "The statement of grounds of appeal and the reply shall contain a party's complete case." (Article 12(2) RPBA, first sentence),

- "Any amendment to a party's case after it has filed its grounds of appeal or reply may be admitted and considered at the Board's discretion. The discretion

shall be exercised in view of inter alia the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy." (Article 13(1) RPBA) and

- "Amendments sought to be made after oral proceedings have been arranged shall not be admitted if they raise issues which the Board or the other party or parties cannot reasonably be expected to deal with without adjournment of the oral proceedings." (Article 13(3) RPBA).

- 2.2 The new main request and the new second auxiliary request were submitted by the appellants after oral proceedings had been arranged. Since the communication of the Board did not contain any new objection against the requests on file, but only reiterated the objections of the respondents in the reply to the statement setting out the grounds of appeal, those requests cannot be considered as a legitimate reaction to the Board's communication, as contended by the appellants, so that Article 113(1) EPC cannot be invoked in favour of their admissibility. No other justification has been provided by the appellants for their late submission.
- 2.3 Claim 1 according to both requests comprises, among others, two amendments taken for the description, namely that the catalyst comprises cobalt oxide (with reference to page 4, lines 35-36 of the original application) and that contacting of the catalyst with a hydrogen-containing gas takes place at a hydrogen partial pressure in the range from 50 to 60 bar abs. (with reference to page 4, lines 26-27 of the original

application). These features did not appear in any of the previously filed requests and had therefore not been discussed in the appealed decision, nor in any of the previous submissions of the parties in appeal.

- 2.3.1 However, the very specific range for the hydrogen partial pressure was considered in the argumentation of the appellants related to the new requests as the crucial feature to confer novelty and justify the presence of an inventive step with respect to documents D4 and D5, which had been considered throughout the procedure as the most relevant pieces of prior art.
- 2.3.2 That choice resulted in a completely new line of defence of the patent with respect to the requests filed with the grounds of appeal, which had been considered by the appellants as novel and inventive with respect to D4 and D5 in view of the changes in temperature and hydrogen partial pressure according to a specific program.
- 2.4 It is indeed true that the hydrogen partial pressure during contacting of the catalyst with a hydrogen-containing gas is presented in the patent as a key feature of the invention (paragraphs [0013] and [0014]). However, it is explicitly said that it must exceed a certain limit (paragraph [0014]) and an open range of "at least 15 bar abs." is indicated in the independent claims of the patent as granted and of all requests filed with the statement setting out the grounds of appeal. Moreover, no argument was provided in that statement as to the relevance of that feature for novelty and inventive step. It is only in the description that the range "50 to 60 bar abs." (page 4,

lines 26-27 of the application as filed; paragraph [0018] of the patent) is indicated as the most preferred one, without, however, an indication of any further effect associated with the specific range.

2.4.1 The introduction of that feature opens a number of new issues at least in the analysis of novelty and inventive step with respect to documents D4 and D5. It is questionable whether values of hydrogen partial pressures falling within the range have been at least implicitly disclosed in D4, D5, which mention values of the total pressure in the range 1 to 100 atmospheres and the use of plant or refinery hydrogen (D4, column 3, lines 19 and 50-52; D5, column 2, line 41 and column 3, lines 21-22). In any case the question arises whether the range can be acknowledged as a new selection with respect to the disclosure in D4 and D5. Moreover, the presence of an effect related to the specific range, which is crucial in the analysis of inventive step, would need to be analysed by comparing experiments with hydrogen partial pressure within the range and outside it.

2.4.2 In order to be able to deal with those issues the parties (and in particular the respondents) would have to be given time to conduct further experiments. Moreover, the respondents would have to have the possibility (as requested) to conduct a further search and/or comparative tests in view of the addition of a crucial feature taken from the description.

2.5 In summary, the Board and the respondents were confronted, as a result of the amendments, with a fresh case, which they could not reasonably be expected to

deal with without adjournment of the oral proceedings. This is exactly the situation in which the RPBA prescribe that amendments should not be admitted (Article 13(3) RPBA).

2.6 It is noted, finally, that the fact that the requests were filed before the time limit indicated in the Board's communication for filing any further submissions has no bearing on their admissibility. Such a time limit may appear in a Board's communication at the Board's discretion in order to ensure that any written submissions reach the concerned parties well before the convened oral proceedings, but there is no legal disposition by means of which any right of the parties can be derived from filing their submissions before that time limit. In this respect it is worthwhile mentioning that Rule 116 EPC (old Rule 71a EPC 1973, unchanged apart from a renumbered reference) does not apply to the Boards of Appeal (G 6/95, OJ EPO 1996, 649).

2.7 For these reasons, the new main request and the new second auxiliary request are not admitted into the appeal proceedings.

3. *First auxiliary request - Article 123(2) EPC*

3.1 Claim 1 of the first auxiliary request includes among others amendments the addition of a step in the activation process which reads: "heating the dispersed catalyst to an initial temperature in the range from 150 to 180 °C during which the partial hydrogen pressure is lower than the partial hydrogen pressure at which the actual reduction is carried out". The

appellants have indicated page 7, lines 9-13 and page 7, line 34 to page 8, line 4 of the application as filed as basis for that feature.

3.2 The passage on page 7, lines 9-13 discloses that "At temperatures below 220 °C, especially below 200 °C, more especially below 180 °C, the partial hydrogen pressure may be lower than the partial hydrogen pressure at which the actual reduction is carried out". That disclosure relates to the activation of some catalysts containing catalytically active metal compounds which are difficult to reduce (page 7, lines 2-9).

3.3 The passage on page 7, line 34 to page 8, line 8 discloses a preferred embodiment of the activation process in which the temperature is varied in a programmed way (page 7, lines 29-33). That embodiment includes the following steps: "Fresh catalyst, in admixture with hydrocarbon liquid, is first heated to an initial temperature, typically in the range from 150 to 180 or even 200 °C, preferably in the presence of an inert gas like nitrogen. Once this initial temperature is reached, the catalyst is contacted with a hydrogen-containing gas, at the appropriate partial pressure. The temperature is incrementally (stepwise) or continuously increased at a rate in the range from 0.1 to 10 °C/min to a final temperature, typically at least 240 °C, preferably at least 250 °C, but within the temperature ranges as indicated above."

3.4 The introduction of the specific heating step in claim 1 of the first auxiliary request amounts therefore to isolating a specific feature ("heating the

dispersed catalyst to an initial temperature in the range from 150 to 180 °C") from a preferred embodiment (the one on page 7, line 34 to page 8, line 8) and combining it with specific conditions ("during which the partial hydrogen pressure is lower than the partial hydrogen pressure at which the actual reduction is carried out") of another unrelated embodiment (the one on page 7, lines 9-13). Such a combination is not derivable from the original application and clearly results in an extension of the subject-matter beyond the content of the application as filed.

3.5 Claim 1 of the first auxiliary request therefore does not fulfil the requirements of Article 123(2) EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairman

S. Sánchez Chiquero

J. Riolo