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Datasheet for the decision of 12 August 2010

Case Number: T 2016/09 - 3.3.06

Application Number: 03737625.8

Publication Number: 1483356

IPC: C10G 67/00

Language of the proceedings: EN

Title of invention:
Process for increasing the yield of lubricating base oil from a Fischer-Tropsch plant

Applicant:
Chevron U.S.A. Inc.

Opponent:
-

Headword:
Treatment of hydrocarbon products/CHEVRON

Relevant legal provisions:
EPC Art. 83, 84, 123(2), 111(1)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Added subject-matter (no)"
"Compliance with the requirements of Article 84 (yes)"
"Sufficiency of disclosure (yes)"
"Remittal (yes)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 2016/09 - 3.3.06

D E C I S I O N
of the Technical Board of Appeal 3.3.06
of 12 August 2010

Appellant: Chevron U.S.A. Inc.
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 1 April 2009 refusing European application No. 03737625.8 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: P.-P. Bracke
Members: L. Li Voti
J. Van Moer

Summary of Facts and Submissions

I. This appeal lies from the decision of the Examining Division to refuse European patent application no. 03 737 625.8, relating to a process for upgrading Fischer-Tropsch products.

II. As regards the then pending set of claims according to the main request the Examining Division found in its decision that

- it was not clear in both claims 1 and 20 if the pressure values expressed in MPa were absolute values or gauge ones;

- moreover, the gauge pressure of above 500 psi of the hydrofinishing steps (c) and (f) of claim 1 and (d) and (f) of claim 20 was indicated in brackets to correspond to a value of 3.45 to 20.7 MPa; the real extent of the indicated pressure interval thus was not clear;

- the dehydration steps (d) of claim 1 and (a) of claim 20 defined the extent of these dehydration steps by the result to be achieved only; in fact, they did not specify the conditions under which the required conversion of alcohols to olefins had to be brought about in order to achieve the conversion required;

- moreover, document (3): Charles L. Thomas: "Catalytic Processes and Proven Catalysts", Academic Press, 1970, Chapter 5 "Dehydration", pages 36-40, cited in the part of the description relating to the dehydration step, did not contain any generic teaching about a dehydration step as carried out in the present

application; therefore, the extent of the sought protection was unclear;

- claims 1 and 20 thus did not comply with the requirements of Article 84 EPC.

As regards the then pending claims according to the auxiliary request 1, the Examining Division found that

- claims 1 and 20 required in the dehydration steps (d) and (a), respectively, that all alcohols were converted into olefins whilst the application appeared to teach only that most of the alcohols but not all of them were converted to olefins; therefore, the real extent of protection of claims 1 and 20 was unclear;

- these claims thus contravened the requirements of Article 84 EPC.

III. An appeal was filed against this decision by the Applicant (Appellant).

Following the Board's communication of 21 April 2010 raising objections under Articles 83, 84 and 123(2) EPC against the then pending requests, the Appellant submitted with the fax of 30 June 2010 an amended set of claims according to the main request.

The independent claims 1 and 20 of the set of 35 claims according to the main request read as follows:

"1. A process for increasing the yield of C_{10} plus hydrocarbon products from a Fischer-Tropsch plant which comprises:

(a) separating a feedstock comprising C_5 plus Fischer-Tropsch products recovered from the Fischer-Tropsch plant into a Fischer-Tropsch wax fraction and a Fischer-Tropsch condensate fraction, wherein the Fischer-Tropsch condensate fraction contains alcohols boiling below about 370 degrees C;

(b) dewaxing the Fischer-Tropsch wax fraction in a catalytic dewaxing zone to produce a high boiling intermediate having a lower pour point as compared to the Fischer-Tropsch wax fraction, wherein conditions in the dewaxing zone include a temperature from 400°F (200°C) to 800°F (425°C), a gauge pressure from 200 to 3000 psi (1.38 to 20.7 MPa) and a space velocity from 0.2 to 5 LHSV;

(c) hydrofinishing the high boiling intermediate in a hydrofinishing zone, wherein conditions in the hydrofinishing zone include a gauge pressure above 500 psi (3.45 MPa), a temperature from 300°F (149°C) to 700 °F (371°C), a space velocity from 0.2 to 2.0 LHSV and a hydrogen feed rate of from 1000 to 10,000 SCF per barrel (0.165 to 1.65 Nm^3/l);

(d) contacting the Fischer-Tropsch condensate fraction separated in step (a) with a dehydration catalyst in a dehydration zone, whereby at least some of the alcohols present in the fraction are converted to olefins;

(e) oligomerizing over an oligomerization catalyst the olefins in the Fischer-Tropsch condensate fraction and those olefins formed in step (d) in an oligomerization reactor to form an intermediate oligomerization mixture

having a higher average molecular weight than the Fischer-Tropsch condensate fraction, wherein conditions in the oligomerization reactor include a space velocity from 0.1 to 3 LHSV, a gauge pressure of 0 to 2000 psi (0 to 13.8 MPa) and a temperature between 32°F (0°C) and 800°F (425°C);

(f) hydrofinishing the intermediate oligomerization mixture in the hydrofinishing zone, wherein conditions in the hydrofinishing zone include a gauge pressure above 500 psi (3.45 MPa), a temperature from 300°F (149°C) to 700 °F (371°C), a space velocity from 0.2 to 2.0 LHSV and a hydrogen feed rate of from 1000 to 10,000 SCF per barrel (0.165 to 1.65 Nm^3/l); and

(g) recovering from the hydrofinishing zone a C_{10} plus hydrocarbon product."

"20. A process for increasing the yield of C_{10} plus hydrocarbon products from a Fischer-Tropsch plant which comprises:

(a) contacting a C_5 plus feedstock containing alcohols recovered from the Fischer-Tropsch plant with a dehydration catalyst under dehydration conditions to convert at least some of the alcohols present into olefins;

(b) separately recovering from the pretreated C_5 plus feedstock a Fischer-Tropsch wax fraction and a Fischer-Tropsch condensate fraction comprising both saturated hydrocarbons and olefins having an upper boiling point below about 370 degrees C;

(c) dewaxing the Fischer-Tropsch wax fraction in a catalytic dewaxing zone to produce a high boiling intermediate having a lower pour point as compared to the Fischer-Tropsch wax fraction, wherein conditions in the dewaxing zone include a temperature from 400°F (200°C) to 800°F (425°C), a gauge pressure from 200 psi to 3000 psi (1.38 to 20.7 MPa) and a space velocity from 0.2 to 5 LHSV;

(d) hydrofinishing the high boiling intermediate in a hydrofinishing zone wherein conditions in the hydrofinishing zone include a gauge pressure above 500 psi (3.45MPa), a temperature from 300°F (149°C) to 700°F (371°C), a space velocity from 0.2 to 2.0 LHSV and a hydrogen feed rate of from 1000 to 10,000 SCF per barrel (0.165 to 1.65 Nm^3/l);

(e) oligomerizing over an oligomerization catalyst the olefins in the Fischer-Tropsch condensate fraction recovered in step (b) including those olefins formed in step (a) in an oligomerization reactor to form an intermediate oligomerization mixture having a higher average molecular weight than the Fischer-Tropsch condensate fraction, wherein conditions in the oligomerization reactor include a space velocity from 0.1 to 3 LHSV, a gauge pressure of 0 to 2000 psi (0 to 13.8 MPa) and a temperature between 32°F (0°C) and 800°F (425°C);

(f) hydrofinishing the intermediate oligomerization mixture in the hydrofinishing zone, wherein conditions in the hydrofinishing zone include a gauge pressure above 500 psi (3.45MPa), a temperature from 300°F (149°C) to 700 °F (371°C), a space velocity from 0.2 to

2.0 LHSV and a hydrogen feed rate of from 1000 to 10,000 SCF per barrel (0.165 to 1.65 Nm^3/l); and

(g) recovering from the hydrofinishing zone a C_{10} plus hydrocarbon product."

Dependent claims 2 to 19 and 21 to 35 relate to particular embodiments of the processes of claims 1 and 20, respectively.

IV. The Appellant submitted in writing *inter alia* that the amended claims according to the main request removed the deficiencies with regard to the pressure values contained in the claims.

Moreover, the dehydration of alcohols to olefins was a reaction well known to the skilled person at the priority date of the application; therefore, the skilled person would have found suitable operative conditions for the claimed dehydration steps by applying his common knowledge and information provided in the application.

Therefore, the claims according to the amended main request complied with the requirements of Articles 84 EPC and 123(2) EPC and the claimed invention was sufficiently disclosed.

V. The Appellant requests that the decision under appeal is set aside and that the Board of Appeal declares the patent application to comply with Articles 123(2), 83 and 84 EPC on the basis of the claims submitted with fax of 30 June 2010.

Reasons for the Decision

1. Main request

1.1 Article 123(2) EPC

The Board finds that claims 1 and 20 of the set of claims submitted with fax of 30 June 2010 is supported by claims 1 and 20 of the application as originally filed read in combination with the following passages of the description (reference being made to the published WO 03/066777 application):

- page 4, line 3 to 19;
- page 4, line 29 to page 5, line 12;
- page 10, lines 20 to 23;
- page 14, lines 9 to 12; 22 to 24 and 30 to 33;
- page 15, lines 27 to 28 and 31 to 33;
- page 16, lines 1 to 4.

Moreover, the wordings of the dependent claims 2 to 19 and 21 to 35 are identical to those of claims 2 to 19 and 21 to 35 as originally filed with the exception of the wording of claim 33, which contains a correction of "dewaxing step (b)" into "dewaxing step (c)" to bring this claim in accordance with the independent claim 20 wherein the dewaxing step is indicated as step (c).

Therefore, the Board is satisfied that the claims according to the main request comply with the requirements of Article 123(2) EPC.

1.2 Article 84 EPC

1.2.1 The Board remarks that in both claims 1 and 20 according to the main request the pressure values are specified to be gauge pressure values; moreover, they have been expressed in psi values with the equivalent values in MPa in brackets.

Therefore, it is clear that these MPa values also concern gauge pressure values and not absolute ones.

1.2.2 The open interval of gauge pressure of above 500 psi of the hydrofinishing steps (c) and (f) of claim 1 and (d) and (f) of claim 20 is accompanied with the corresponding MPa value indicated in brackets, which also relate to an open interval; therefore, the extent of the indicated pressure interval is clear.

1.2.3 The interval of temperature expressed in degree Fahrenheit in the hydrofinishing steps (c) and (f) of claim 1 and (d) and (f) of claim 20 is accompanied with the corresponding values in degrees Celsius in brackets, which values correspond with the values for the same steps reported in the original description (page 15, lines 32 to 33).

The values of hydrogen feed rate given in SCF per barrel in the hydrofinishing steps (c) and (f) of claim 1 and (d) and (f) of claim 20 are accompanied with the corresponding values in Nm^3/l in brackets. These values have been calculated by considering that 1 SCF of hydrogen gas should be equal to 0.02628 Nm^3 and that 1 barrel is 0.159 m^3.

Therefore, the Board finds that the conversion factors used for expressing the original values of temperature, pressure and hydrogen feed rate into alternative units are consistent throughout the application and the extent of these claims is clear.

1.2.4 Claims 1 and 20 do not indicate any operational conditions for the dehydration step, i.e. step (d) of claim 1 and step (a) of claim 20; however, the description teaches that the dehydration of alcohols may be accomplished by processing the feedstock over a catalyst, typically gamma alumina and that dehydration of alcohols to olefins is discussed in document (3) (page 13, lines 22 to 27).

Document (3), which is a textbook representing common general knowledge of the skilled person at the priority date of the present application, teaches that the dehydration of alcohols to olefins is one of the oldest known catalytic reactions and that it is known to use many different catalysts for this reaction (page 36, first three lines).

Moreover, even though document (3) indicates that a review of the dehydration of organic compounds is reported thoroughly in another chapter of the same book, it also specifies that chapter 5 concerns the proven types of catalysts, such as gamma alumina, for the dehydration of alcohols to olefinic hydrocarbons (page 36, lines 3 to 10 and part III on pages 38 to 40).

Therefore, it is clear that the catalytic dehydration of alcohols to olefinic hydrocarbons, i.e. the same reaction which is carried out according to step (d) of

claim 1 and step (a) of claim 20, was well known to the skilled person. Therefore, the operational conditions for carrying out such a catalytic dehydration step belonged also necessarily to common general knowledge.

Since the dehydration steps of claims 1 and 20 do not require any specific rate of conversion, they relate simply to a dehydration step of alcohol which, as explained above, belonged to common general knowledge of the skilled person.

Therefore, it is clear that the extent of the claim is limited to the dehydration conditions belonging to such a common general knowledge.

1.2.5 The Board concludes that the amended claims according to the main request comply with the requirements of Article 84 EPC.

1.3 Article 83 EPC

1.3.1 Sufficiency of disclosure was not contested in the decision under appeal.

The Board finds that the description (pages 6 to 19) describes thoroughly each step of the claimed processes and that the operational conditions of the dehydration step belonged to common general knowledge as explained in point 1.2.4 above.

Therefore, the skilled person would have been able to carry out the invention by following the teaching of the description and using common general knowledge.

Moreover, the objections raised under Article 83 EPC in the Board's communication of 21 April 2010 concerned a technical feature of claims 1 and 20 according to the then pending first auxiliary request, which feature is not present in claims 1 and 20 according to the present main request. Therefore, these objections are not relevant for the present decision.

1.3.2 The Board concludes that the invention claimed according to the main request is sufficiently disclosed.

2. *Remittal*

In the present case the decision under appeal was based on the ground of lack of compliance with the requirements of Article 84 EPC only.

Therefore, it has still to be assessed whether the claims satisfy other requirements of the EPC, for example, whether novelty and inventive step are involved.

The Board thus finds that in order not to deprive the Appellant of the opportunity to argue the remaining issues at two instances it is appropriate in the present case to make use of its powers under Article 11(1) EPC to remit the case to the Examining Division for further prosecution.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Examining Division for further prosecution.

The Registrar: The Chairman:

G. Rauh P.-P. Bracke