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**Datasheet for the decision  
of 25 July 2008**

**Case Number:** T 0588/06 - 3.3.06  
**Application Number:** 95925223.0  
**Publication Number:** 0791041  
**IPC:** C11C 3/12  
**Language of the proceedings:** EN

**Title of invention:**

Hydrogenation of substrate with substrate and hydrogen in a substantially homogeneous super-critical or near-critical solution

**Patentee:**

POUL MÖLLER LEDELSES- OG INGENIÖRRRADGIVNING APS et al

**Opponents:**

01: Thomas Swan & Co Ltd  
02: Evonik Degussa GmbH

**Headword:**

Hydrogenation/MÖLLER-HÄRRÖD

**Relevant legal provisions:**

EPC Art. 123(2), 100(b), 111(1)

**Relevant legal provisions (EPC 1973):**

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**Keyword:**

"Sufficiency of disclosure (yes)"

**Decisions cited:**

G 0001/03, G 0002/03

**Catchword:**

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Case Number: T 0588/06 - 3.3.06

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.06  
of 25 July 2008

**Appellant:** POUL MÖLLER LEDELSES- OG INGENIÖRRADGIVNING  
(Patent Proprietor) APS et al  
Marselis Boulevard 38  
DK-8000 Aarhus (DK)

**Representative:** Hammond, Andrew David  
Valea AB  
Lindholmospiren 5  
SE-417 56 Gothenburg (SE)

**Respondent:** Thomas Swan & Co Ltd.  
(Opponent) Crookhall  
Consett, co. Durham DH8 7ND (GB)

**Representative:** Atkinson, Jonathan David Mark  
Harrison Goddard Foote  
Belgrave Hall  
Belgrave Street  
Leeds LS2 8DD (GB)

(Opponent) Evonik Degussa GmbH  
Rellinghauser Strasse 1-11  
D-45128 Essen (DE)

**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 17 February 2006  
revoking European patent No. 0791041 pursuant  
to Article 102(1) EPC 1973.

**Composition of the Board:**

**Chairman:** P.-P. Bracke  
**Members:** G. Dischinger-Höppler  
U. Tronser

## Summary of Facts and Submissions

- I. This appeal is from the decision of the Opposition Division to revoke the European patent No. 0 791 041 entitled "hydrogenation of substrate with substrate and hydrogen in a substantially homogeneous super-critical or near-critical solution".
- II. Two notices of opposition had been filed against the granted patent, wherein the Opponents sought revocation of the patent on the grounds of inter alia Article 100(b) EPC for insufficient disclosure of the invention and of Article 100(a) for lack of novelty, inter alia, under Article 54(3) EPC over document D5 WO-A-95/22591.
- III. The decision of the Opposition Division was based on amended sets of claims according to a main request and a second auxiliary request, and on the claims as granted as the first auxiliary request which comprises two sets of claims, one for the contracting states AT, BE, CH, DK, ES, FR, GB, IT, LI, NL, PT and SE and one for the contracting state DE only.

The Opposition Division held that the amended claims of the then pending main request and second auxiliary request violated the requirements set out in Article 123(2) EPC. The first auxiliary request was rejected since the invention was held to be not sufficiently disclosed in the patent in suit (Article 100(b) EPC). In particular, it was held that it was credibly presented by two experts of Opponent I and not refuted by the Appellant that the invention

could not be carried out within the whole scope of the claims without undue burden.

IV. This decision was appealed by the Patent Proprietors, now Appellants, who filed amended sets of claims with the statement of grounds of appeal and replaced those requests by a new main and five auxiliary submitted with a letter dated 14 March 2008.

During the oral proceedings before the Board held on 25 July 2008 in the absence of both Opponents, now Respondents, as announced with their letters dated 22 January 2008 and 1 July 2008, the Appellants withdrew their previous main, first and second auxiliary requests and maintained the claims of the third auxiliary request as their main request. Claim 1 thereof reads:

"1. A process for the hydrogenation of a substrate, where hydrogen gas is mixed with the substrate in the presence of a catalyst, and the reaction is carried out at selected conditions of pressure, time and temperature, **excluding continuous hydrogenation of fats, fatty acids or fatty acid esters, in which only the carbon-carbon double bonds (C=C) are hydrogenated in the presence of a shaped catalyst in a fixed bed,** characterized in that substrate, hydrogen gas and a solvent are mixed together, the mixture is brought to a super-critical or near-critical state to form a substantially homogeneous super-critical or near-critical solution, and the substantially homogeneous super-critical or near-critical solution is brought into contact with the catalyst, and also in that the reaction products, i.e. the hydrogenated substrates,

form a constituent in the super-critical or near-critical solution."

The amendments made in relation with Claim 1 as granted consist in the addition of features which have been highlighted in bold by the Board. All other claims remain the same as in the granted version.

- V. The Appellants argued in essence that the invention was sufficiently disclosed since several examples in the patent indicated how the hydrogenation process can be performed under the claimed super- or near-critical conditions and since it was taught how the presence of the such conditions could be observed.
- VI. During the appeal proceedings only Opponent I replied to the Appellants' appeal. He argued in writing that the patent in suit did not provide sufficient disclosure of how to conduct the process under supercritical homogeneous conditions for any given substrate. In particular, there was no information how to determine the critical point of the complex reaction mixtures involved in the claimed process wherein the compositions of the mixtures were varying over time. Nor was there any information how to find the narrow region above the critical point of the mixture where homogeneity exists. In contrast, it was recognised by those skilled in the art that the determination of the critical point of a mixture was extremely difficult and virtually impossible if, in addition, the composition of the mixture was continuously changing.

VII. The Appellants requested that the decision under appeal be set aside and that the case be remitted to the Opposition Division for further prosecution on the basis of the claims according to the third auxiliary request submitted under cover of the letter dated 14 March 2008 (now main request).

The Respondents requested that the appeal be dismissed.

### **Reasons for the Decision**

1. *Amendments (Articles 84 and 123(2) EPC) (main request)*

The amendments made to Claim 1 as granted (point IV above) represent a disclaimer of the process according to document D5 which is allowable according to the criteria laid down in decisions G 1/03 and G 2/03 of the Enlarged Board of Appeal (OJ EPO 2004, 413 and 448) for the following reasons:

Document D5 is a prior art according to Article 54(3) EPC and the process disclosed therein is a continuous hydrogenation of fats, fatty acids or fatty acid esters in the presence of a shaped catalyst in a fixed bed (see Claim 1) wherein the catalyst is suitable to selectively or fully hydrogenate only the carbon-carbon double bonds of the fats, fatty acids and fatty acid esters (page 1, line 21 to page 2, line 8, page 3, lines 4 to 11 and page 5, lines 24 to 35).

Further, it is observed that no problems under Article 84 EPC are introduced by the amendments.

The Board, therefore, concludes that the amendments made in Claim 1 of the main request are allowable under Articles 123(2) and 84 EPC.

2. *Sufficiency of disclosure*

The objection of lack of sufficiency concerns the requirement that the process of Claim 1 is carried out at conditions where the substrate, hydrogen gas and solvent form a substantially homogeneous super- or near-critical solution (see point IV above).

2.1 The term "super-critical" is well-known in the art (see e.g. document D5, page 3, last paragraph and page 4, lines 9 to 14), indicating conditions above the critical point of a medium.

In contrast, the term "near-critical" has not a specific definition in the art and, from an objective point of view, cannot be attributed any other meaning than conditions below the critical point. This was not disputed by the Appellants.

Concerning the term "substantially homogeneous", the Appellants, at the oral proceedings, referred to the definition given in paragraph [0031] of the patent in suit which reads:

"The defi(ni)\*tion substantially homogeneous means, that the principal part of the gas is in the continuous phase which covers the catalyst surface. One method to confirm this is to observe the velocity of reaction, which increases dramatically when the continuous phase

that covers the catalyst surface is substantially homogeneous."

(\* added by the Board)

However, this definition again uses vague terms since it is not explained what is meant by a "dramatic" increase in the velocity of reaction or by the "principle part" of the gas in the continuous phase which covers the catalyst surface. Therefore, the feature "substantially homogeneous" cannot be given any particular qualifying or quantifying meaning.

- 2.2 Under these circumstances, the Board has no reasons to doubt that the patent discloses the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art in the sense of Article 100(b) EPC, since conducting the hydrogenation process at conditions below the critical point of the mixture should not pose any problems.

This was not disputed by the Respondents. Their arguments were based on the opinion that it was extremely difficult, if not impossible, to determine the critical point of a reaction mixture and that the disclosure of the patent was insofar insufficient as it did not provide the information a skilled person needed in order to conduct the process for any substrate under supercritical and homogeneous conditions (point VI above).

However, these arguments are void since - as pointed out above (point 2.1) - Claim 1 does not require that the process be operated at supercritical conditions of the mixture or that the mixture is a homogeneous



solution. Thus, in a case where the critical point of a mixture cannot be determined or where a mixture cannot be brought into a supercritical state, it is according to Claim 1 sufficient to perform the process under "near-critical" conditions in the sense of: at conditions below the critical point of the mixture. The Respondents never challenged that such conditions are usually employed in chemical processes without having to determine the critical point of the reaction mixture first.

Apart from the above, the Board observes that the Appellants rightly referred to the four examples contained in the patent in suit to illustrate how the claimed process can be put into practise and that the Respondents never have questioned the feasibility of those examples, let alone provided evidence of the opposite. In this respect, it has to be noted that it is not necessary for the purpose of Article 100(b) EPC that a patent illustrates the invention for each and every possible embodiment if there are no reasons to assume that the invention cannot be carried out within the whole ambit of the claims (see Case Law of the Boards of Appeal of the European Patent Office, 5<sup>th</sup> edition 2006, II.A.3). In the present case, it is apparent from the wording of Claim 1 that - contrary to the Respondents' opinion - embodiments with substrates which, when mixed with hydrogen gas and a suitable solvent, cannot be brought into a super- or near-critical state, do not fall within the scope of Claim 1.

2.3 The Board, therefore, concludes that the patent satisfies the requirements of Article 100(b) EPC.

3. *Remittal*

The patent was revoked on the grounds of Articles 123(2) EPC and 100(b) EPC. Whether the patent with the amended claims according to the new main request meets the other requirements of the EPC, in particular those of Articles 54 and 56 EPC, has not yet been established.

Since it is the function of appeal proceedings to give a judicial decision upon the correctness of a separate earlier decision taken by a first-instance department (Case Law of the Boards of Appeal, 5th ed. 2006, VII.D.1), the Board finds it appropriate to make use of its power under Article 111(1) EPC and remits the case to the first instance for further prosecution.

**Order**

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

The decision under appeal is set aside.

The case is remitted to the Opposition Division for further prosecution on the basis of the claims according to the third auxiliary request submitted under cover of the letter dated 14 March 2008 (now main request).

The Registrar:

The Chairman:

G. Rauh

P.-P. Bracke