

Internal distribution code:

- (A) [] Publication in OJ
(B) [] To Chairmen and Members
(C) [X] To Chairmen
(D) [] No distribution

**Datasheet for the decision
of 14 June 2012**

Case Number: T 1115/09 - 3.3.05

Application Number: 96100518.8

Publication Number: 722766

IPC: B01D 53/86

Language of the proceedings: EN

Title of invention:

Process for the purification of inert gases recycled from reactors for solid state polycondensation of polyester resins

Patentee:

UOP Sinco S.r.l.

Opponent:

Bühler AG

Headword:

Gas purification/UOP

Relevant legal provisions:

EPC Art. 54(1)(3)
RPBA Art. 13(1)(3)

Keyword:

"Late filed requests (not admissible)"

"Novelty (Main request and auxiliary requests 1 to 7): no - lower end of claimed range anticipated by upper end of range disclosed in the state of the art"

Decisions cited:

T 0240/95, T 0730/01

Catchword:

-



Case Number: T 1115/09 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 14 June 2012

Appellant I:
(Patent Proprietor) UOP Sinco S.r.l.
Viale Milanofiori
Strada 1
Palazzo E1
I-20090 Assago (Milano) (IT)

Representative: Dossmann, Gérard
Casalonga & Partners
Bayerstraße 71-73
D-80335 München (DE)

Appellant II:
(Opponent) Bühler AG
Patentabteilung
CH-9240 Uzwil (CH)

Representative: Hepp, Dieter
Hepp Wenger Ryffel AG
Friedtalweg 5
CH-9500 Wil (CH)

Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
12 March 2009 concerning maintenance of
European patent No. 722766 in amended form.

Composition of the Board:

Chairman: G. Raths
Members: J.-M. Schwaller
S. Hoffmann

Summary of Facts and Submissions

- I. This appeal lies from the decision of the opposition division concerning the maintenance of European patent No. 0 722 766 on the basis of the claims filed as 2nd auxiliary request on 5 January 2009 during the oral proceedings before the department of first instance, with claim 1 of said request reading as follows (differences to claim 1 as granted emphasized by the board):

*"1. Process for the purification from organic impurities of an inert gas stream exiting, **at a temperature between 200 and 240 °C**, a solid state polycondensation reactor of an aromatic polyester resin **selected among polyethylene terephthalate copolymers, wherein up to 20% of terephthalic acid units are substituted with units of isophthalic acid**, wherein the gas is added with oxygen or gas containing oxygen and passed on a catalyst bed-containing Pt or a mixture of Pt and Pd supported on an inert porous support at a temperature comprised between 250°C and 600°C, wherein the quantity of the added oxygen is in such an excess over the stoichiometric amount referred to the impurities present in the gas that the gas at the exit of the catalytic bed contains more than 10 ppm oxygen and up to 250 ppm, and the purified gas is recycled to the reactor after drying to remove the water formed in the oxidation stage, wherein a deoxidation stage with hydrogen is not present before recycle of the purified gas to the reactor, **and the reaction of oxidation is monitored by inserting at the exit of the catalyst bed an analyzer of oxygen capable to analyse ppm of oxygen with response time of analysis inferior to 5 sec.**"*

Claim 1 of the main request - also claim 1 as granted - reads as follows:

"1. Process for the purification from organic impurities of an inert gas stream exiting a solid state polycondensation reactor of an aromatic polyester resin, wherein the gas is added with oxygen or gas containing oxygen and passed on a catalyst bed-containing Pt or a mixture of Pt and Pd supported on an inert porous support at a temperature comprised between 250°C and 600°C, wherein the quantity of the added oxygen is in such an excess over the stoichiometric amount referred to the impurities present in the gas that the gas at the exit of the catalytic bed contains more than 10 ppm oxygen and up to 250 ppm, and the purified gas is recycled to the reactor after drying to remove the water formed in the oxidation stage, characterised in that a deoxidation stage with hydrogen is not present before recycle of the purified gas to the reactor."

II. In the contested decision, the opposition division held claim 1 of the main request to meet the requirements of Articles 54, 83 and 123(2) EPC, but concluded that its subject-matter lacked an inventive step under Article 56 EPC.

The department of first instance considered in particular that document

D1: WO 95/02446

did not disclose the range of oxygen concentrations defined in claim 1 at issue. It argued in this respect

that even if there was an overlap at the endpoint of 10 ppm, the teaching of D1 was clearly to operate the purification process such that the oxygen concentration was kept below 10 ppm, because there was a strong disincentive (due to the potential for polymer degradation) for the skilled person to consider operating at a higher oxygen concentration, and so the skilled person would not seriously contemplate working with a gas at the exit of the catalytic bed containing more than 10 ppm oxygen.

- III. The grounds for appeal from appellants I and II were both dated and received on 22 July 2009.
- IV. With letter dated 30 November 2009, appellant I/the patentee contested the decision and filed seven amended sets of claims as first to seventh auxiliary requests, respectively.

Claim 1 of auxiliary request 1 differs from claim 1 as granted in that the gas at the exit of the catalytic bed is defined as containing "**a quantity of oxygen comprised between 10 and 250 ppm**" (instead of "more than 10 ppm oxygen and up to 250 ppm").

In claim 1 of auxiliary request 2, the gas at the exit of the catalytic bed is defined as containing "**from 10 to 250 ppm of oxygen, except 10 ppm**".

In claim 1 of auxiliary request 3, the gas at the exit of the catalytic bed is defined as containing "**a quantity of oxygen comprised between 10 and 250 ppm, which remains present in the gas recycled in the polycondensation reactor**". Further, the passage

"wherein a deoxidation stage with hydrogen is not present before recycle of the purified gas to the reactor" has been deleted.

Claim 1 of auxiliary request 4 differs from claim 1 as granted in that the inert gas stream is defined as exiting the solid state polycondensation reactor of an aromatic polyester resin **"at a temperature between 200 and 240°C"** (difference with claim 1 of the main request emphasised by the board).

Claim 1 of auxiliary request 5 differs from claim 1 of auxiliary request 4 in that the aromatic polyester resin is defined as being **"chosen from polyethylene terephthalate, copolymers wherein up to 20% of terephthalic acid units are substituted by units deriving from other bicarboxylic acids, and polybutylene terephthalate"**.

Claim 1 of auxiliary request 6 differs from claim 1 of auxiliary request 4 in that the aromatic polyester resin is defined as being **"selected among polyethylene terephthalate copolymers, wherein up to 20% of terephthalic acid units are substituted with units of isophthalic acid"**.

Claim 1 of auxiliary request 7 corresponds to claim 1 as maintained by the opposition division.

- V. In response to the summons to oral proceedings, appellant II/the opponent submitted observations with letter dated 16 April 2012. It argued in particular that the claims 1 of the different sets of claims on file lacked the requirements of Articles 83, 54 and 56

EPC. In particular, it alleged document D1 to destroy the novelty of the subject-matter of claim 1 of all the requests on file.

VI. At the oral proceedings, which were held on 14 June 2012 in the presence of both parties, Appellant I/the patentee filed three amended sets of claims called auxiliary request 3a, 6a and 6b, respectively.

Claim 1 of auxiliary request 3a differs from claim 1 of auxiliary request 3 in that the gas at the exit of the catalytic bed is defined as containing "**from 10 and 250 ppm of oxygen, except 10 ppm**" instead of "a quantity of oxygen comprised between 10 and 250 ppm".

Claim 1 of auxiliary request 6a differs from claim 1 of auxiliary request 6 in that the gas at the exit of the catalytic bed is defined as containing "**a quantity of oxygen comprised between 10 and 250 ppm, which remains present in the gas recycled in the polycondensation reactor**" instead of "more than 10 ppm oxygen and up to 250 ppm".

Claim 1 of auxiliary request 6b differs from claim 1 of auxiliary request 6 in that the gas at the exit of the catalytic bed is defined as containing "**from 10 and 250 ppm of oxygen, except 10 ppm, which remains present in the gas recycled in the polycondensation reactor**" instead of "more than 10 ppm oxygen and up to 250 ppm".

Appellant II/the opponent declared dropping its objection that patentee's appeal was inadmissible.

VII. The parties' requests were established as follows:

Appellant I/the patentee requested that the decision under appeal be set aside and the patent be maintained as granted. Alternatively, it requested that the decision under appeal be set aside and that the patent be maintained on the basis of one of the sets of claims filed as auxiliary requests 1 to 7 with letter dated 30 November 2009, or as auxiliary requests 3a, 6a, 6b filed during the oral proceedings before the board.

Appellant II/the opponent requested that the decision under appeal be set aside and the patent be revoked.

Reasons for the Decision

1. Admissibility of the auxiliary requests 3a, 6a and 6b
 - 1.1 These requests were submitted during the oral proceedings, i.e. more than three months after the issuance of the summons to oral proceedings.
 - 1.2 Appellant I/the patentee justified this late filing of requests by the necessity of having further fallback positions. Further, the amendments carried out consisted only in mere variations of the requests already on file.
 - 1.3 The board observes that the requests could have been filed much earlier, in particular during the opposition proceedings or under cover of the statement of the grounds of appeal. Relevant criteria for assessing the admissibility of requests filed at such a late stage of the appeal proceedings are indicated in Article 13(1)(3) RPBA.

1.4 In the present case, the number of requests presently on file is plethoric and they thus already offer a multitude of fallback positions. Furthermore, even if the late filed amendments may appear to be mere variations of the requests on file, they may raise issues which the board or the other party could not reasonably be expected to deal with instantly, i.e. without adjournment of the oral proceedings. Therefore the board decides, in the exercise of the discretion conferred on it by Articles 13(1) and (3) RPBA, not to admit these requests into the proceedings.

2. Main request - Novelty

2.1 Document D1 (claim 1) discloses a process for the purification of an inert gas from impurities formed of organic compounds, where the gas added with oxygen or gas containing oxygen is circulated on a catalyst bed containing Pt or mixtures of Pt and Pd supported on an inert porous support at temperatures from 250° to 600 °C, the quantity of oxygen used being stoichiometric with respect to the organic impurities or in such an excess that the gas at the outlet of the oxidation reactor contains no more than about 10 ppm of oxygen. D1 (claim 3) further specifies the gas to be purified as coming from a solid-state polycondensation reactor of a polyester resin and that the gas, after purification, is recycled to the solid-state polycondensation reactor after a drying treatment to eliminate the water formed in the oxidation stage.

It is undisputed that the sole issue to be decided is whether D1 discloses a quantity of oxygen in the gas exiting the catalytic bed which falls within the terms

of claim 1 or not, and in particular whether an amount of "no more than about 10 ppm of oxygen" falls within the range "more than 10 ppm oxygen and up to 250 ppm".

2.2 In this respect, it is a generally applied principle for concluding lack of novelty that there must be a direct and unambiguous disclosure in the state of the art inevitably leading the skilled person to subject-matter falling within the scope of what is claimed.

2.3 D1 discloses that the gas at the outlet of the catalytic bed contains no more than about 10 ppm oxygen, i.e. a range of oxygen concentrations ending with the upper value of "about 10 ppm".

According to established case law of the boards of appeal (see e.g. T 0240/95, point 4.2 of the reasons), the disclosure of a range is an explicit disclosure of the end values. In the present case it follows by analogy that the end value "about 10 ppm" is explicitly disclosed in D1.

2.4 The sole question which remains to be answered is whether this end value falls within the range defined in claim 1 at issue, i.e. "more than 10 ppm oxygen and up to 250 ppm".

In the board's view, in the absence of a clear definition in document D1 of the relative term "about", the expression "about 10 ppm of oxygen" is to be given its broadest meaning, namely " $10 \pm \varepsilon$ ppm of oxygen", with ε denoting - as in mathematics - a small undefined positive quantity. It follows that the upper end value "about 10" can be read as: " $10-\varepsilon$ ", "10" or " $10+\varepsilon$ ",

which means that document D1 directly and unambiguously discloses a list of three ranges ending respectively with "10- ϵ ", "10" and "10+ ϵ ".

As the value "10+ ϵ " is synonymous with the value "more than 10", the choice of the latter as the lower end of the range defined in claim 1 thus boils down to the selection of one discrete value within the list of three: "10- ϵ ", "10" and "10+ ϵ " disclosed in D1.

2.5 Following the case law (e.g. T 0730/01, in particular point 2.3 of the reasons) according to which the selection of one item within one single list of equivalent alternative items does not confer novelty, in the present case the board concludes by analogy that the disclosure of document D1 inevitably leads to subject-matter falling within the scope of protection of claim 1 at issue.

2.6 Appellant I/the patentee argued that document D1 taught to work with less than 5 ppm (as in the Example) and even with no oxygen (as in the statement at page 6, paragraph 4: "*the gaseous stream at the reactor outlet contains only nitrogen, carbon dioxide and water*"). In this context the skilled person would not consider carrying out the process of document D1 with more than 10 ppm oxygen, because there was a risk of degradation of the PET polymer.

The board cannot accept these arguments because even if document D1 discloses that the risk of degradation is limited with a gas leaving the oxidation reactor containing less than 5 ppm oxygen, there is no limitation at all in the claims - let alone in the

description - regarding the degree of degradation which might be accepted with the claimed process.

Furthermore, it is directly and unambiguously disclosed in D1 (page 6, lines 1 to 4) that a maximum excess of about 10 ppm of oxygen is tolerated at the oxidation reactor outlet.

It follows that the skilled person has no reason to worry about a risk of degradation of the PET polymer within the whole range claimed and he would therefore indeed consider also carrying out the process of document D1 with a gas containing $10+\epsilon$ ppm of oxygen at the oxidation reactor's outlet.

2.7 For the above reasons, claim 1 does not meet the requirements of Article 54(1) and (3) EPC (document D1 being state of the art under the meaning of Article 54(3) EPC).

3. Auxiliary request 1 - Novelty

3.1 Claim 1 of this request defines the quantity of oxygen in the gas exiting the catalytic bed as being *"comprised between 10 and 250 ppm"*.

3.2 According to the established case law of the boards of appeal, the wording used for defining the above range is to be considered as an explicit disclosure of the end values "10" and "250".

The end value "10" being explicitly disclosed in D1 as one of the upper end values of the oxygen concentration range (see point 2.4 above), the subject-matter of

claim 1 at issue lacks novelty under Article 54 (1) and (3) EPC.

3.3 The board observes that even if - as argued by appellant I/the patentee - one would consider the value "10" to be excluded by the wording used in above claim 1, the scope of protection of claim 1 would then be the same as that of claim 1 of the main request, since the lower end value of the range would then be the same - apart from the semantic difference - as in claim 1 of the main request. The subject-matter of claim 1 of the first auxiliary request lacks novelty under Article 54 (1) and (3) EPC.

4. Auxiliary request 2 - Novelty

4.1 Claim 1 of this request defines the gas at the exit of the catalytic bed as containing "*from 10 to 250 ppm of oxygen, except 10 ppm*".

4.2 The board observes that - apart from the semantic difference of wording - the lower end value of this corresponds to the one in claim 1 of the main request ("more than 10") and so, for the same reasons that apply to claim 1 of the main request, the present request is to be rejected under Article 54 (1) and (3) EPC.

5. Auxiliary request 3 - Novelty

The feature "*which remains present in the gas recycled in the polycondensation reactor*", which has been added to the subject-matter of claim 1 of this request, is also disclosed in document D1, page 3, lines 5 to 7.

The quantity of oxygen in the gas exiting the catalytic bed being defined in the same way as in claim 1 of auxiliary request 1, for the same reasons as the latter, the subject-matter of present claim 1 lacks novelty under Article 54 (1) and (3) EPC.

6. Auxiliary request 4 - Novelty

The feature "*at a temperature between 200 and 240°C*", which has been added to the subject-matter of claim 1 of this request, is also disclosed in document D1 (page 5, last two lines).

The quantity of oxygen in the gas exiting the catalytic bed being defined in the same way as in claim 1 of the main request, for the same reasons as the latter, the subject-matter of present claim 1 lacks novelty under Article 54 (1) and (3) EPC.

7. Auxiliary request 5 - Novelty

In comparison to claim 1 of auxiliary request 4, claim 1 of this request has been amended to include the feature "*chosen from ... and polybutylene terephthalate*", which feature is also disclosed in document D1 (see in particular page 7, lines 5 to 11). It follows that claim 1 of this request also lacks novelty under Article 54 (1) and (3) EPC over this document.

8. Auxiliary request 6 - Novelty

In comparison to claim 1 of auxiliary request 4, claim 1 of this request has been amended to include the feature "*selected among ... isophthalic acid*", which feature is also disclosed in document D1 (see in particular page 7, lines 5 to 12). It follows that claim 1 of this request also lacks novelty under Article 54 (1) and (3) EPC over this document.

9. Auxiliary request 7 - Novelty

In comparison to claim 1 of auxiliary request 6, claim 1 of this request further includes the feature "*the reaction of oxidation is monitored ... inferior to 5 sec.*", which feature is also disclosed in document D1 (see in particular claim 2) in combination with those of claim 1 of auxiliary request 6. It follows that claim 1 of this request also lacks novelty under Article 54 (1) and (3) EPC over this document.

10. As none of the requests meet the requirements of the EPC, the patent cannot be maintained in any of the forms proposed by appellant I/the patentee.

Order

For these reasons it is decided that:

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

The Registrar:

The Chairman:

C. Vodz

G. Rath