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**Datasheet for the decision
of 17 April 2008**

Case Number: T 0271/06 - 3.3.03

Application Number: 97924785.5

Publication Number: 0900247

IPC: C08G 63/88

Language of the proceedings: EN

Title of invention:

Method of catalyst deactivation in continuous polyethylene terephthalate production

Patentee:

WELLMAN, INC.

Opponent:

EASTMAN CHEMICAL COMPANY

Headword:

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Relevant legal provisions:

EPC Art. 100(c), 123(2)

Relevant legal provisions (EPC 1973):

-

Keyword:

"Main request - extension of subject-matter (yes)"

"First auxiliary request - Amendments - added subject-matter (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 0271/06 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 17 April 2008

Appellant:
(Patent Proprietor)

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Decision under appeal:

Interlocutory decision of the Opposition
Division of the European Patent Office dated
22 November 2005 and posted 28 December 2005
concerning maintenance of European patent
No. 0900247 in amended form.

Composition of the Board:

Chairman: R. Young
Members: W. Sieber
P. Brandt

Summary of Facts and Submissions

I. The mention of the grant of European patent No. 0 900 247, in respect of European patent application No. 97924785.5, based on International application PCT/US97/08536, in the name of Wellman, Inc., filed on 20 May 1997 and claiming a US priority of 20 May 1996 (US 650291), was published on 24 September 2003 (Bulletin 2003/39). The granted patent contained 10 claims, whereby Claim 1 read as follows:

"A process for making polyethylene terephthalate polyester which comprises the steps of:

reacting ethylene glycol and terephthalic acid in a heated esterification reaction to form an oligomer of terephthalic acid and ethylene glycol and water;
removing the water as it is formed in the reacting step to enable the esterification reaction to go substantially to completion;
heating the oligomer and adding a polymerization catalyst comprising antimony and one or more of cobalt, zinc, magnesium, manganese and calcium to polymerize the oligomer in an polycondensation reaction, thereby forming a polymer melt containing polyethylene terephthalate polyester and ethylene glycol;
removing the ethylene glycol as it is formed in the heating step to enable the polycondensation reaction to go to completion; and
adding a phosphorous-containing stabilizer to deactivate the polymerization catalyst,

characterized in that the process is carried out as a continuous process and in that said stabilizer is added to the substantially entirely polymerized polyester melt, at or after the end of the polycondensation and prior to processing the polymerized polyester."

Claims 2 to 10 were dependent claims directed to elaborations of the process as claimed in Claim 1.

II. A notice of opposition was filed by Eastman Chemical Company on 23 June 2004 requesting revocation of the patent in its entirety on the grounds that the claimed subject-matter was not inventive, that the patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art and that the subject-matter of Claim 1 as granted extended beyond the content of the application as filed (Article 100(a), (b) and (c) EPC).

III. During prosecution of the case before the Opposition Division, the Proprietor filed amended sets of claims, namely a first auxiliary request with the letter dated 19 October 2005 and a second auxiliary request during the oral proceedings of 22 November 2005.

(i) Claim 1 of the first auxiliary request corresponded to Claim 1 as granted except that the polymerization catalyst was defined as follows:

"... a polymerisation catalyst system of:

- a) antimony and cobalt; or
- b) i) a first component of at least one of cobalt and zinc,

- ii) a second component of at least one of zinc, manganese, magnesium and calcium, and
- iii) antimony; ...".

Claims 2 to 9 were dependent claims based on Claims 2 to 4 and 6 to 10 as granted.

- (ii) Claim 1 of the second auxiliary request corresponded to Claim 1 as granted except that the polymerization catalyst was defined as follows:

"... a polymerisation catalyst system consisting of antimony and cobalt ...".

Claims 2 to 7 were dependent claims based on Claims 2 to 4 and 8 to 10 as granted.

IV. By an interlocutory decision which was announced orally on 22 November 2005 and issued in writing on 28 December 2005, the Opposition Division refused the Proprietor's main request (claims as granted) and first auxiliary request and found that the patent could be maintained in amended form according to the second auxiliary request.

- (i) The Opposition Division refused the main request because the original disclosure did not support the group of catalysts required in granted Claim 1, ie a polymerization catalyst comprising antimony and one or more of cobalt, zinc, magnesium, manganese and calcium (Article 100(c) EPC).

(ii) The Opposition Division held that the wording "a polymerisation catalyst system of antimony and cobalt in Claim 1 of the first auxiliary request (ie embodiment a)) was not limited to a polymerization catalyst system consisting of antimony and zinc but might comprise any other element as long as antimony and cobalt were present. This embodiment represented a new teaching as compared to the original disclosure which provided in Table 2 basis for a catalyst system consisting of antimony and cobalt but no basis for a system comprising antimony and cobalt, and any other component. Hence, Claim 1 of the first auxiliary request did not meet the requirements of Article 123(2) EPC.

(iii) The Opposition Division found that the claims of the second auxiliary request met the requirements of the EPC, in particular with respect to Articles 123, 83 and 56 EPC.

V. On 24 February 2006, the Proprietor (Appellant) filed a notice of the appeal against the above decision with simultaneous payment of the prescribed fee.

With the statement of grounds of appeal, the Appellant refiled on 5 May 2006 the first auxiliary request which had been considered by the opposition division (point III(i), above). Also filed with the statement of grounds of appeal was a copy of an affidavit of the inventor Dr Carl Steven Nichols (the sworn affidavit was filed on 26 June 2006).

The arguments of the Appellant, as far as they are relevant to this decision, may be summarised as follows:

- (i) Claim 1 as originally filed specified no particular catalyst, since the characterising feature of the invention was considered to be the late addition of a phosphorus-containing stabilizer, which was considered applicable to the whole range of catalysts disclosed. According to Claim 1 as granted, the polymerisation catalyst comprised antimony and one or more of cobalt, zinc, magnesium, manganese and calcium. All the catalysts specified in granted Claim 1 were listed as alternatives in the original description on page 8, lines 8 to 24 and in original Claim 6. Further, the general principle of combining antimony with other metals was set out in original Claim 8 and in the examples. In Claim 8, antimony was combined with various combinations of cobalt, zinc, magnesium, manganese and calcium and in the examples antimony was combined with cobalt or with cobalt and manganese. Thus, Claim 1 as granted combined a much narrower range of possible catalysts than was originally disclosed, but support for all these catalysts could be found in the original description.

- (ii) As regards catalyst system a) of Claim 1 of the first auxiliary request, the specification as originally filed gave a clear basis for a claim to the combination of antimony and cobalt generally, with or without other components. The specific combination of the two metals occurred throughout

the examples, but there were also several examples of processes within the scope of the invention wherein manganese was also included, and numerous other possible catalyst components were listed in the paragraph on page 8, lines 8 to 35, where antimony and cobalt were listed alongside other components such as zinc and manganese. Furthermore, original Claim 6 referred to the catalyst being selected from a wide group of possible catalysts. Since original Claim 1 was not limited to any particular polymerisation catalyst, and it was nowhere suggested in the specification that the particular combinations of catalysts specified were exclusive, the claim would be broad enough to encompass any catalyst system using antimony and cobalt, irrespective of whether any other catalyst component was present.

As regards catalyst system b) of Claim 1 of the first auxiliary request, this system had a clear basis in original Claim 8 and Claim 5 as granted, respectively.

VI. With the letter dated 17 November 2006, the Respondent (Opponent) filed its reply to the statements of grounds of appeal. The arguments, as far as they are relevant to this decision, may be summarized as follows:

- (i) The group of polymerization catalysts defined in Claim 1 as granted comprising necessarily a combination of antimony and one or more of five specifically mentioned metals could neither be found in the application as filed nor in the claims as originally filed, in particular not in

original Claims 6 or 8. The examples of the application as filed disclosed two specific catalyst systems, one consisting of antimony and cobalt and one consisting of antimony, cobalt and manganese. A generalization of two specific examples to a catalyst system comprising antimony and one or more of five specific metals was not admissible under Article 123(2) EPC.

(ii) The catalyst system a) of Claim 1 of the first auxiliary request was directed to a catalyst system comprising antimony, cobalt and any non-defined catalyst material. Such a catalyst system was not disclosed in the application as filed, in particular not at page 8 of the application as filed or in Claim 6 as originally filed. Further, the specific examples in the application as filed provided no sufficient basis for a catalyst system comprising antimony, cobalt and further unspecified catalyst metals.

(iii) As regards catalyst system b) of Claim 1 of the first auxiliary request, such a catalyst system was based on Claim 8 as originally filed. However, Claim 8 as originally filed referred back to Claim 7 as originally filed. The subject-matter of Claim 7 as originally filed had not been included in Claim 1 of the first auxiliary request.

VII. With the letter dated 14 April 2008, the Appellant announced that it did not intend to be represented at the oral proceedings scheduled for 17 April 2008.

VIII. On 17 April 2008, oral proceedings were held before the Board at which the Appellant was, as announced, not represented. Since it had been duly summoned, however, the oral proceedings were continued in its absence in accordance with Rule 115(2) EPC.

(i) The Respondent argued that the group of polymerization catalysts as defined in Claim 1 as granted could not be found in the application as filed. In this context, the Respondent basically relied on its written submissions.

As regards Claim 8 as originally filed, which was directed to a catalyst system comprising a first component of at least one of cobalt and zinc, a second component of at least one of zinc, manganese, magnesium and calcium, and antimony as a third component, the Board was of the opinion that the simplest catalyst system defined by this claim was a catalyst system comprising zinc and antimony (first component = zinc, second component = zinc, and antimony).

(ii) The Respondent also pointed out that the catalyst system as defined in Claim 1 as granted was associated with metals as such whereas the original disclosure, for example page 8 and Claim 6, referred to compounds. This shift in the wording amounted to added subject-matter.

(iii) Further, the Respondent argued that the process of Claim 1 as granted was based on Claim 3 as originally filed. A comparison of the two claims revealed that an essential feature had been

omitted in Claim 1 as granted, namely that the stabilizer had to be added "in the heating step". Consequently, Claim 1 as granted was objectionable under Article 100(c) EPC also under this aspect.

(iv) As regards Claim 1 of the first auxiliary request, the Respondent argued that both the catalyst system a) as well as the catalyst system b) contravened Article 123(2) EPC and relied in this context on its written submissions.

(v) Further, the objections raised against Claim 1 as granted with respect to the wording "metals" and the omission of an essential feature (see points VIII(ii) and (iii), above) applied equally to Claim 1 of the first auxiliary request.

IX. The Appellant requested that the decision under appeal be set aside and the patent be maintained unamended (main request),

or, in the alternative, that the decision under appeal be set aside and the patent be maintained on the basis of Claims 1 to 9 filed with letter dated 5 May 2006 (first auxiliary request).

X. The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal admissible.

2. *Main request (claims as granted)*

2.1 Claim 1 as granted (point I, above) defines the polymerization catalyst used in the claimed process as

"comprising antimony and one or more of cobalt, zinc, magnesium, manganese and calcium".

2.2 Neither the claims as originally filed (and in particular not Claims 1 and 3) nor the application as filed refer to a polymerization catalyst comprising necessarily a combination of antimony and one or more of five metals as defined in Claim 1 as granted. Nevertheless, the Appellant was of the opinion that page 8, lines 8 to 24 of the application as filed, Claims 6 and 8 as originally filed and the examples in the application as filed provided a basis for a polymerization catalyst as defined in Claim 1 as granted. However, the Board cannot concur with this view for the following reasons:

2.2.1 Page 8, lines 8 to 24 of the application as filed discloses that

"The polymerization catalysts that are preferably used in the polycondensation reaction are metals. Specific examples of appropriate polyester catalysts include germanium compounds, titanium compounds, antimony compounds, zinc compounds, cadmium compounds, manganese compounds, magnesium compounds, cobalt compounds, silicon compounds, tin compounds, lead compounds, aluminum compounds, and other similar compounds. Preferred catalysts for polyester bottle resin, for example, include germanium compounds such as germanium

dioxide, antimony compounds such as antimony trioxide, cobalt compounds such as cobalt acetate, titanium compounds such as titanium tetrachloride, zinc compounds such as zinc acetate, manganese compounds such as manganese acetate and silicon compounds such as methyl silicate and other organic silicates."

The above passage simply discloses a list of possible catalysts that can be used in the claimed process. This enumeration of catalysts discloses neither the mandatory presence of antimony in the polymerization catalyst system in general nor the specific combination of compounds as defined in Claim 1 as granted. Thus, the Board cannot accept the Appellant's argument that the above-mentioned passage on page 8 of the application as filed provides a basis for the polymerization catalyst defined in Claim 1 as granted.

2.2.2 Claim 6 as originally filed reads as follows:

"A process according to Claim 1 or Claim 3 wherein the polymerization catalyst is selected from the group consisting of germanium compounds, titanium compounds, antimony compounds, zinc compounds, cadmium compounds, manganese compounds, magnesium compounds, cobalt compounds, silicon compounds, tin compounds, lead compounds, aluminum compounds, germanium dioxide, antimony trioxide, as cobalt acetate, titanium tetrachloride, zinc acetate, manganese acetate methyl silicate, and other organic silicates."

In essence, that claim discloses nothing more than the first sentence of the above-mentioned passage on page 8 of the application as filed. Again, the list of

compounds in Claim 6 as originally filed does not amount to a disclosure of antimony in combination with five specific metals. Therefore, Claim 6 as originally filed is also not a suitable basis for the polymerisation catalyst as defined in Claim 1 as granted.

2.2.3 The Appellant also referred to Claim 8 as originally filed which reads as follows:

"A process according to Claim 7 wherein the polymerization catalyst is a catalyst system comprising:
a first component of at least one of cobalt and zinc;
a second component of at least one of zinc, manganese, magnesium and calcium, and
antimony."

It is admitted that Claim 8 as originally filed discloses the mandatory presence of antimony in the polymerization catalyst. However, this mandatory presence of antimony is linked with further requirements, namely specific combinations with other catalyst components.

As regards these specific combinations with other catalyst components the Proprietor (now the Appellant) argued at the oral proceedings before the Opposition division that a two component system was not within the scope of Claim 8 as originally filed (point 3.4.1.3 of the decision under appeal). If one followed this interpretation, it is immediately evident that Claim 8 as originally filed cannot form a basis for Claim 1 as granted which includes two component catalyst systems

such as antimony and zinc, antimony and magnesium, or antimony and calcium. On the other hand, one could argue, as pointed out by the Board at the oral proceedings, that the simplest catalyst system defined in Claim 8 as originally filed is a catalyst system comprising zinc and antimony, ie a two component polymerization catalyst system (first component = zinc, second component = zinc, and antimony). But even if one adopted this broader interpretation for Claim 8 as originally filed, a catalyst system comprising zinc and antimony would be the **only** catalyst system within the scope of Claim 8 as originally filed comprising a minimum of two components. Any other combination envisaged by Claim 8 as originally filed is directed to a combination comprising at least three catalyst components. Consequently, Claim 8 as originally filed is under no circumstances a proper basis for the polymerization catalyst as defined in Claim 1 as granted.

2.2.4 Nor do the examples of the application as filed provide a proper basis for the polymerization catalyst as defined in Claim 1 as granted. It is conspicuous to the Board that the examples as originally filed demonstrating the late addition of a phosphorous-containing stabilizer use only two specific catalyst combinations, namely a catalyst system consisting of antimony, cobalt and manganese in Example 1 (Polymers 2-5) and Example 3 (Polymer 18) and a catalyst system consisting of antimony and cobalt in Example 2 (Polymers 11-17) and Example 3 (Polymers 19-20). A person skilled in the art cannot deduce from these two specific catalyst combinations any general principle, in particular not the mandatory presence of

antimony or its combination with one or more of five metals as defined in Claim 1 as granted.

2.3 Moreover, it appears that elements of the application as filed have been taken out of their originally disclosed context and combined in a new way thereby creating a previously undisclosed polymerization catalyst system. Since this new combination is neither explicitly disclosed nor implicitly derivable from the application as filed, the polymerization catalyst as defined in Claim 1 as granted constitutes added subject-matter (Article 100(c) EPC). Consequently, the Appellant's main request has to be refused.

2.4 Under these circumstances it is not necessary to consider the Respondent's further objections raised against Claim 1 as granted under Article 100(c) EPC at the oral proceedings before the Board (see points VIII(ii) and (iii), above).

3. *First auxiliary request*

3.1 Claim 1 of the first (and only) auxiliary request defines the polymerization catalyst to be used in the claimed process as a polymerisation catalyst system of:

- a) antimony and cobalt; or
- b) i) a first component of at least one of cobalt and zinc,
 - ii) a second component of at least one of zinc, manganese, magnesium and calcium, and
 - iii) antimony.

3.2 The alternative a) in Claim 1 of the first auxiliary request is defined as a catalyst system of antimony and cobalt. As agreed by both the Proprietor and the Opponent during the opposition procedure, the claim language with respect to "a polymerisation catalyst system of" is open (point 3.1 of the decision under appeal). The Board concurs with this view. Therefore, the alternative a) is not only directed to a catalyst system consisting of antimony and cobalt but also to catalyst systems comprising antimony, cobalt and additional non-defined catalyst materials.

The latter catalyst systems are, however, not disclosed in the application as originally filed. Neither the claims as originally filed nor the application as filed refer to a catalyst system comprising antimony and cobalt. Nevertheless, the Appellant was of the opinion that the application as filed gave a clear basis for a claim to combinations of antimony and cobalt generally, with or without other components. Thus, the specific combination of the two metals occurred throughout the examples, but there were also several examples where manganese was also included. Furthermore, numerous other possible catalyst were listed on page 8, lines 8 to 35 of the application as filed as well as in Claim 6 as originally filed.

3.3 The Board cannot concur with this view for the following reasons:

3.3.1 As explained in point 2.2.4, above, Example 2 (Polymers 11-17) and Example 3 (Polymers 19-20) disclose a catalyst system consisting of antimony and cobalt. Further, Example 1 (Polymers 2-5) and Example 3

(Polymer 18) disclose a catalyst system **consisting of** antimony, cobalt and manganese. At best, these examples could provide a basis for a catalyst system consisting of these specifically mentioned elements. However, a person skilled in the art cannot deduce from these specific examples the more general principle directed to a catalyst comprising antimony, cobalt and additional non-defined catalyst materials.

3.3.2 Furthermore, there is no basis in the application as originally filed which would justify the generalization of these specific examples. As set out in points 2.2.1 and 2.2.2, above, the passage on page 8 of the application as filed and Claim 6 as originally filed disclose merely a list of possible catalysts. There is nothing in this enumeration which would point to the specific combination of antimony and cobalt, let alone to a combination of antimony, cobalt and any other non-defined catalyst component.

3.3.3 In summary, alternative a) of Claim 1 of the first auxiliary request violates Article 123(2) EPC. Hence, for this reason alone the first auxiliary request has to be refused.

3.4 Under these circumstances it is not necessary to decide on the Respondent's further objections raised against Claim 1 of the first auxiliary request under Article 123(2) EPC (see point VI(iii), above) and Article 100(c) EPC (see point VIII(v), above).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

E. Görgmaier

R. Young