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**D E C I S I O N**  
**of 19 December 2001**

**Case Number:** T 0786/00 - 3.3.3

**Application Number:** 89306982.3

**Publication Number:** 0351168

**IPC:** C08G 64/00

**Language of the proceedings:** EN

**Title of invention:**  
Process for preparing polycarbonates

**Patentee:**  
GENERAL ELECTRIC COMPANY

**Opponent:**  
Teijin Limited  
Asahi Kasei Kogyo Kabushiki Kaisha

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 54, 107, 111(1), 114(2)  
EPC R. 64(a), 64(b), 65(1)

**Keyword:**  
"Admissibility of the appeal (yes)"  
"Novelty (yes) - common general knowledge - relevant date"

**Decisions cited:**  
T 0279/89, T 0666/89, T 0229/90, T 0288/90, T 0483/90,  
T 0677/91, T 0766/91, T 1002/92, T 0990/96, T 0001/97,  
T 0097/98

**Catchword:**

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Case Number: T 0786/00 - 3.3.3

**D E C I S I O N**  
**of the Technical Board of Appeal 3.3.3**  
**of 19 December 2001**

**Appellant:** GENERAL ELECTRIC COMPANY  
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**Representative:** Strehl Schübel-Hopf & Partner  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 6 October 2000  
revoking European patent No. 0 351 168 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** R. Young  
**Members:** C. Idez  
J. De Preter

## Summary of Facts and Submissions

- I. The grant of European patent No. 0 351 168 to General Electric Company, in respect of European patent application No. 89 306 982.3 filed on 10 July 1989 and claiming priority from the Japanese patent applications Nos. 172297/88 and 238427/88 dated respectively 11 July 1988 and 22 September 1988 was announced on 5 November 1997 (Bulletin 1997/45) on the basis of 5 claims.

Claim 1 as granted read as follows:

"A process for preparing a polycarbonate by the melt polycondensation of an aromatic dihydroxy compound and a carbonic acid diester, wherein the total content of hydrolysable chlorine in said aromatic dihydroxy compound and carbonic acid diester is not more than 3 ppm, characterised by using a catalyst comprising:

(a) from  $10^{-6}$  to  $10^{-1}$  mole of a nitrogen-containing basic compound,

(b) from  $10^{-8}$  to  $10^{-3}$  mole of an alkali metal or alkaline earth metal compound, and optionally

(c) from  $10^{-8}$  to  $10^{-1}$  mole of boric acid or a boric ester, the amounts of (a), (b) and (c) being expressed in terms of moles per mole of the aromatic dihydroxy compound."

Dependent Claims 2 to 5 referred to specific embodiments of the process according to Claim 1.

- II. Notices of Opposition were filed on 5 August 1998 by the two Opponents

OI: Teijin Ltd, and

OII: Asahi Kasei Kogyo Kabushiki Kaisha.

The Opponents requested the revocation of the patent in its entirety based on the grounds of lack of novelty and inventive step (Article 100(a) EPC).

The oppositions were supported inter alia by the following documents:

D1': JP-B-38/1373 (partial English translation),

D1'': JP-B-38/1373 (partial English translation),

D2: H. Schnell, "Chemistry and Physics of Polycarbonates", 1964, Interscience Publishers, pages 44-51,

D3: Plastic Material Course [17], fourth edition, 25 February 1965, Book "Polycarbonate", pages 44-47, (partial English translation from the Japanese),

D4: JP-B-42/9820 (partial English translation),

D5: GB-A-1 079 822,

D6: GB-A-1 096 936,

D7': partial English translation of JP-B-47/14742 (referred below as D7),

D7'': partial English translation of D7,

- D8': partial English translation of JP-B-47/14743  
(referred below as D8),
- D8'': partial English translation of D8,
- D9: DE-A-2 439 552,
- D10: Plastic Material Course [5], third edition,  
20 February 1979, Polycarbonate resin; pages 44-  
67, (partial English translation from the  
Japanese), and
- D11: Polycondensation and Polyaddition, first  
edition, 15 August 1980, Kyouritsu shuppan Co.  
Ltd, Japan, pages 140-141; (partial English  
translation from the Japanese).

III. By a decision issued in writing on 6 October 2000, the  
Opposition Division revoked the patent. The decision  
was based on a set of Claims 1 to 5 filed by the  
Patentee with a letter dated 22 January 1999. Claims  
1, 2, 3 and 5 of this set of claims corresponded  
respectively to Claims 1, 2, 3 and 5 as granted.  
Dependent Claim 4 was directed to a process according  
to any one of the preceding claims and characterised  
by the use of a specific amount of component (b) (i.e.  
 $10^{-6}$  or less mole).

According to the decision, Claim 1 lacked novelty,  
since D8'(D8''), D7'(D7''), and D5 disclosed a process  
for preparing polycarbonate resin by melt  
polycondensation of an aromatic dihydroxy compound and  
a carbonic acid diester, in the presence of a catalyst  
composition which fell within the scope of Claim 1  
(cf. Example 2 of D8'(D8''); Example 1 of D7'; Example

6 of D5). The decision stated that the level of purity of the monomers was not indicated in these documents. It was, however, considered that a document disclosing a low molecular compound and its manufacture normally rendered this compound available to the public in all grades of purity as desired by a person skilled in the art since, as a rule, conventional methods of purification were within the common general knowledge, and, in that respect, reference was made to decision T 990/96 (OJ EPO, 1998, 489). Thus, the decision held that a chosen value of purity for the monomers could not establish the novelty of a process using these monomers. It further stated that the person skilled in the art would not intentionally have used monomers having a high level of impurity since it was known that such monomers led to coloured polycarbonates. Hence, it concluded that the subject-matter of Claim 1 lacked novelty in view of documents D8'(D8''), D7'(D7'') and D5.

IV. On 7 November 2000, a Notice of Appeal was lodged by the Patentee against this decision with simultaneous payment of the prescribed fee.

With the Statement of Grounds of Appeal filed on 20 November 2000, the Appellant submitted three sets of claims forming a new main request and two auxiliary requests, respectively.

Following the issue, on 1 August 2001, of a summons to oral proceedings, the Appellant filed, with a letter dated 20 August 2001, eight sets of claims forming a new main request and seven auxiliary requests, respectively.

At the oral proceedings held on 19 December 2001, the Appellant submitted a new main request, which corresponded to the set of Claims 1 to 5 as granted.

The arguments submitted by the Appellant in the Statement of Grounds of Appeal, in his letter of 20 August 2001 and at the oral proceedings may be summarized as follows:

- (i) Admissibility of the Appeal:
  - (i.1) With its letter of 2 October 1998, the European Patent Office had confirmed that Mr Frederik Grever of General Electric Plastics B.V. had been registered as representative of the Patent Proprietor (General Electric Company) for the European patent Nr. 0 351 168.
  - (i.2) The Notice of Appeal and the Statement of Grounds of Appeal had been signed by Mr Frederik Grever under reference to his general authorisation GA 8600. This general authorization showed that Mr Grever was appointed as representative of General Electric Company.
  - (i.3) Thus, there could be no doubt that the Notice of Appeal and the Statement of Grounds of Appeal had been filed in the name of the Patent Proprietor and not in the name of the subsidiary mentioned on the letterhead used (i.e. General Electric Plastics B.V). The reference made to GA 8600 in the Notice of Appeal implicitly gave the name and the address of the Appellant.



- (i.4) In the Notice of Appeal dated 2 November 2000 and in the cover letter to the Statements of Grounds of Appeal dated 14 November 2000, reference had been made to the application/patent number 89306982.3-2102/0351168 and it was stated that the appeal was directed to the decision of the Opposition Division. Thus, it was clear against which decision an appeal had been filed.
  
- (i.5) Hence, the appeal met the requirements of Article 107 and of Rules 64(a) and (b) EPC.
  
- (ii) Concerning novelty:
  - (ii.1) The opposition division had not applied the decision T 990/96 correctly. It might be true that, once a compound was known, it was known in all its degrees of purity, but this did not mean that the use of the known compound in a specified degree of purity in a known process was also known. Furthermore, the cited decision dealt with a different constellation of facts, since it was concerned with end-products and not with raw materials to be used in a manufacturing process.
  
  - (ii.2) The subject-matter of the main request met the requirements of selection invention as set out in decision T 279/89 of 3 July 1991 (not published in OJ EPO). The selected range of impurity was extremely narrow. Since D8', D7' and D5 did not give any suggestion about impurities, no preferred part of the known range had been disclosed. The choice of the

range had been made on purpose as evidenced by the improved resistance against boiling water of the obtained polycarbonates.

(ii.3) The skilled reader would not have derived from D5, D7' and D8', in the light of his general technical knowledge, that the raw materials would inevitably have an amount of not more than 3 ppm hydrolysable chlorine in total. Even if highly pure raw materials had been available, the skilled reader of D5, D7' and D8' would, indeed, not understand that they were the most likely to be used, since they would have been very expensive.

(ii.4) Thus, the subject-matter of the main request was novel over the cited prior art.

V. With its letter of 13 June 2001, Respondent I (Opponent I) submitted the following documents:

- D18: Macromolecules, Vol. 14, 1981, pages 532-537,
- D19: Polymer Engineering and Science, Vol. 22, No. 6, April 1982, pages 370-375,
- D20: J. Org. Chem., Vol. 27, 1962, pages 3717-3720,
- D24: Plastic Material Course [5], first edition, 15 October 1961, [Polycarbonate], pages 44-53,
- D25: partial English translation from the Japanese of D24, and
- D26: Journal of liquid chromatography, Vol. 1,

No. 1, 1978, pages 89-96.

With a letter dated 24 April 2001, Respondent II (Opponent II) submitted the following documents:

D23: US-A-4 448 943,

D1''b: Full English translation of document JP-B-38/1373,

D10a: Plastic Material Course [5], third edition, 20 February 1979, Polycarbonate resin; pages 44-67 (in Japanese), and

D10b: partial English translation of D10a.

With its letter of 19 October 2001, Respondent II further submitted the document

D2a: Schnell, "Chemistry & Physics of Polycarbonates", 1964, pages 180-181.

VI. The arguments presented by the Respondents I and II in their written submissions and during the oral proceedings may be summarized as follows:

(i) According to Respondent I, the Notice of appeal should be rejected as inadmissible according to Rule 65(1) EPC for the following reasons:

(i.1) The Notice of Appeal did not state that an appeal had been filed on behalf of the Patentee, nor did it contain, contrary to the requirements of Rule 64(a) EPC, the name and address of the Patentee. The only name and

address found in the Notice of Appeal were those of General Electric Plastics B.V, which under Article 107 EPC was not entitled to appeal.

(i.2) The fact that a general authorization reference was included did not mean that the Notice of Appeal had been filed on behalf of the entity to whom the general authorization "GA 8600" was connected. Thus, the name and address of a party adversely affected by the decision of the Opposition Division was not actually contained in the Notice of Appeal.

(i.3) Furthermore, the Notice of Appeal did not contain a statement identifying the decision that was being impugned (Rule 64(b) EPC).

(ii) Concerning novelty:

(ii.1) The use of starting monomers having a low content of hydrolysable chlorine belonged to the general technical knowledge of the person skilled in the art of manufacture of polycarbonates by the polycondensation in the melt phase. In that respect, reference was made to the documents D2, D3, D10 and D11.

(ii.2) Diphenyl carbonate and bisphenol having the required purity were commonly available for polycarbonate production before the priority date. Thus, the skilled person would normally have used these pure raw materials in the manufacture of the polycarbonate. In that respect, reference was made to the decision

T 288/90 of 1 December 1992 (not published in OJ EPO).

- (ii.3) The need for highly pure reaction monomers was well known in the art. As stated in the decision T 990/96, it was common practice to (further) purify a compound obtained in a particular chemical manufacturing process according to the prevailing needs and requirements. This general rule would also be applicable in the present case, since the purification method used in the patent in suit (e.g. treatment with hot water and vacuum distillation) was a conventional one.
  
- (ii.4) The need for highly pure reaction monomers also implied that the use of raw materials having a content of impurity between 0 and a very low value was known in the art. Thus, the subject-matter of the main request could not be considered as a selection invention, since, on the one hand, the selected subrange was not sufficiently far removed from the preferred part of the known range and since, on the other hand, the person skilled in the art would also apply this technical teaching in the range of overlap (cf. T 666/89; OJ EPO, 1993, 495; in particular paragraph 7).
  
- (ii.5) Consequently, when read in combination with the general technical knowledge concerning the use of highly pure raw monomers for the manufacture of polycarbonate by the melt polycondensation, the disclosures of D5, D7'(D7''), D8'(D8'') and D22 destroyed the novelty of the subject-matter

of the main request.

(ii.6) Document D23 disclosed the use of starting monomers in which the total content of ionic impurities was 1 ppm. Having regard to the fact that the hydrolysable chlorine according to the patent in suit included only ionic chlorine, the total amount of Fe, Na and hydrolysable chlorine in the monomers according to D23 would be lower than 1 ppm. This document also disclosed the combination of components (a), (b) and (c) of the catalyst according to the patent in suit. Thus, D23 was novelty destroying for the subject-matter of the main request.

VII. The Appellant requested that the decision under appeal be set aside, that the novelty of the subject-matter of the main request of the patent as granted (main request) or alternatively of one of the auxiliary requests 1 to 7 as submitted on 25 August 2001 be acknowledged, and that the case be remitted to the Opposition Division for further prosecution.

Respondent I requested that the Appeal be rejected as inadmissible (main request) or that the patent be revoked (auxiliary request).

Respondent II requested that the patent be revoked.

Both Respondents requested that the issue of inventive step be dealt with by the Board.

## **Reasons for the Decision**

*Procedural Matters*

1. Admissibility of the appeal
  - 1.1 Concerning the admissibility of the appeal the questions arise as to whether or not the Notice of Appeal meets the requirements of Rules 64(a) and (b) EPC, and whether or not the appeal has been filed by a person entitled to appeal (Article 107 EPC).
  - 1.2 In the present case, the Notice of Appeal contains a reference to the patent in suit by the indication of its number and its application number (i.e. 89306982.3-2102/0351168), and the following statement "we herewith appeal against the Decision of the Opposition Division".
  - 1.3 Since there was only one decision of only one Opposition Division concerning the patent referred to in the Notice of Appeal, the Board is satisfied that the impugned decision can be identified without undue burden. Thus, the Notice of Appeal meets the requirements of Rule 64(b) EPC.
  - 1.4 According to Article 107 EPC an appeal may only be filed by a party to proceedings who is adversely affected by a decision. If this requirement is not met within the two-month time limit set out in Article 108 EPC, the appeal must be rejected as inadmissible under Rule 65(1) EPC.
  - 1.5 According to Rule 64(a) EPC the Notice of Appeal shall contain the name and address of the Appellant. The non compliance with Rule 64(a) EPC can even be remedied in accordance with Rule 65(2) EPC after expiry of the

two-months time limit set out in Article 108 EPC.

1.6 It follows from these considerations and in accordance with the case law of the boards of appeal (cf. T 97/98 of 21 May 2001 and T 1/97 of 30 March 1999, neither published in OJ EPO) that it is sufficient that it is possible to derive from the information in the appeal with a sufficient degree of probability, where necessary with the help of other information on file, by whom the appeal should be considered to have been filed, within the two-month period, in order to establish that it is entitled to appeal under Article 107 EPC first sentence.

1.7 The Patent Proprietor is General Electric Company and the decision of the Opposition Division was given to the said company as Patent Proprietor and sent, according to Rule 81(1) EPC, to its representative (Mr Frederik Grever; General Electric Plastics B.V, P.O. Box 117, 4600 Bergen op Zoom, Pays Bas).

1.8 The fact that Mr Frederik Grever has been appointed as representative of General Electric Company for the patent in suit is established by the letter of 4 September 1998 of Mrs Anne C. Szary, who was the representative of the Patent Proprietor, whereby the EPO was asked to note that the responsibility for the case has been transferred to Mr Frederik Grever (G.A. 8600) and to address all future correspondence to Mr Frederik Grever, General Electric Plastics B. V. in the Netherlands. This letter was acknowledged by a communication of corrected entries concerning the representative (Rule 92(1)(h) EPC) sent by the EPO on 2 October 1998. In the further correspondence from Mr Frederik Grever to the EPO the same business



address was mentioned to which all the communications of the EPO were sent on behalf of Mr Frederik Grever in his capacity of representative of General Electric Company.

- 1.9 It is true that the only name and address of a company to be found in the Notice of Appeal is that of General Electric Plastics B. V. in the Netherlands. Thus, the question arises whether, as submitted by Respondent I, the appeal was filed by General Electric Plastics B. V. which was not a party to the proceedings before the Opposition Division. It is, however, evident from the information on file (cf. point 1.8. above), that this name and address, mentioned in the letterhead of the Notice of Appeal at the same level of that of the name of the representative of the Patentee, Mr Grever, that General Electric Plastics B. V. in the Netherlands is merely the business address of the latter. Therefore it cannot be accepted that General Electric Plastics B. V. is the Appellant in the present case.
- 1.10 It is also true that the name and the address of the Appellant are not explicitly mentioned in the Notice of Appeal filed by the representative of the Patent Proprietor before the Opposition Division, but the Notice of Appeal does mention the name and the address of this representative (cf. letterhead of the Notice of Appeal) and makes reference to his general authorization (i.e. G.A. 8600).
- 1.11 It is further observed by the Board that there is no indication on file that a transfer of rights might have taken place at the time where the Notice of Appeal had been lodged.

1.12 Thus, when reading the Notice of Appeal with the help of the information on file (e.g. the identified impugned decision itself), it can be derived that the party on behalf of which the appeal is intended to be filed is the Patent Proprietor, i.e. General Electric Company, the party adversely affected by the impugned decision of the Opposition Division, since it is the party represented before the Opposition Division by the representative who has filed the appeal.

1.13 It follows from the above considerations, that the appeal cannot be rejected as inadmissible under Rule 65(1) EPC.

1.14 In the Board's view, the Notice of Appeal provides sufficient information to identify the Appellant itself and its address, which can be taken e.g. from the patent in suit (cf. also T 483/90 of 14 October 1992, not published in OJ EPO; Reasons, paragraph 1). Thus, the Board holds that the requirements of Rule 64(a) EPC are met.

1.15 The appeal is therefore admissible.

## 2. *Late-filed documents*

2.1 This point concerns the late-filed documents D1''b, D2a, D10a, D10b, D18, D19, D20, D22, D23, D24, D25 and D26.

2.2 The Board sees no reason not to admit D1''b and D10b to the proceedings, since they are merely more complete English translations of the same Japanese prior art documents than, respectively, D1'' and D10, both already submitted in the opposition proceedings.

In any case, no objection to their introduction was raised by the Appellant.

2.3 Concerning the other late-filed documents and according to well established case law, only documents which are relevant, i.e., in the present case, which may have an impact on the issue of novelty, should be admitted to the proceedings.

2.3.1 In that respect, document D22, which has been cited as a novelty destroying document by Respondent II is the US patent corresponding to D5 and does add anything to the disclosure of D5 for the assessment of the novelty of the subject-matter of the patent in suit.

2.3.2 Documents D18, D19, and D20, said to be relevant to inventive step arguments, were not admitted to the proceedings by the Opposition Division. Inventive step is an issue beyond the scope of the present decision (cf. section 4, below) and these documents have not been shown to have a sufficient degree of relevance for the issue of novelty to justify admitting them to the present proceedings, since they only refer to the hydrolysis reaction rate of aromatic carbonates (D20) or polycarbonates (D18, D19).

2.3.3 Document D2a, which teaches that impurities in the polycarbonate resin, in particular those capable of alkaline reaction, are known to reduce the resistance to boiling water of polycarbonates, could only be relevant to inventive step, which is not an issue dealt with in these proceedings.

2.3.4 Document D21 deals with the preparation of diphenyl carbonate by transesterification of dimethyl carbonate

with phenol. Independently of the fact that the publication date indicated for documents D24 and D25 (i.e. 1961) cannot be correct since they refer to documents published later than 1961 (cf. D24, page 45; reference 130; page 49, reference 157) and that a publication date was not identified unambiguously by Respondent I, they merely indicate that bisphenol A for use in the manufacture of polycarbonate should be of "high purity" but do not refer to the total content of hydrolysable chlorine in the starting raw materials. D26 relates to the analysis by liquid chromatography of bisphenol A useful as raw material for the manufacture of epoxy resins, polycarbonates, and polysulfones and is focussed on the presence of high boiling phenolic impurities such as 2,4'-bisphenol A, Dianin's compound, and BPX trisphenol in bisphenol A. Thus, these documents are *prima facie* not highly relevant for the issue of novelty.

- 2.3.5 The general position of Respondent I at the oral proceedings, that the late-filed documents related to various aspects of the common general knowledge of the skilled person and as such were entitled to be introduced at any stage of the proceedings cannot be accepted by the Board. The question of what belonged to the general knowledge of the skilled person at a specific date is a fact like any other. And like any other, it may fall inside or outside the factual framework of the proceedings up to the point that the document is sought to be introduced and may be relevant or not to the questions in issue. It is thus also a matter for the exercise of the Board's discretion as to whether such late-filed material should be admitted to the proceedings, in particular in relation to the criteria set in decision T 1002/92

(OJ 1995, 605).

- 2.3.6 Since, for the reasons given, the late-filed documents D2a, D18 to D21, and D24 to D26 do not meet the criterion of relevance for the issue of novelty, the Board sees no justification for introducing their content into the proceedings at this late stage.
- 2.3.7 Only document D23 fulfills the criterion of relevance for the issue of novelty.
- 2.4 Consequently, only documents D1''b, D10b and D23 are admitted to the proceedings (Article 114(1) and (2) EPC).

*Main request*

3. *Novelty*

- 3.1 The documents cited against novelty in the decision under appeal were D5, D7'(D7'') and D8'(D8''). Lack of novelty was also alleged by Respondent II in relation to the disclosure of D23.
- 3.2 Document D23 relates to a method for determining polymerization variables, in particular in the melt polycondensation of polycarbonates, by measuring the capacitance and dissipation factor of the reacting mixture at various stages of the process. The method can be used to control the level of ionic impurities of the starting components before the first mixing step (cf. D23, column 3, line 53 to column 4, line 10). As indicated on column 11, lines 13 to 24, if the amount of ionic impurities in the diphenyl carbonate and the bisphenol A is between 1 to 50 ppm,

the monomer can be further purified but if the content is below 2 to 5 ppm, the monomer can be continued to be processed in the polycondensation process. The document does not, however, take into account non ionic chlorine containing impurities such as phenyl chloroformate. This is in contrast to the patent in suit, which clearly teaches that the combined hydrolysable chlorine content of the starting monomers includes hydrolysable chlorine in form of phenyl chloroformate (cf. patent in suit page 3, lines 50 to 52). Moreover, although D23 mentions that bases are used as catalysts for the transesterification in an amount of generally from  $10^{-8}$  to 1 mole per mole of dihydric phenol (column 10, lines 33 to 66), it does not disclose a catalyst composition according to Claim 1 of the patent in suit. For these reasons, D23 cannot destroy the novelty of the subject-matter of Claim 1 of the patent in suit.

3.3 Document D5 relates to the manufacture of polycarbonate by melt polycondensation in the presence of a quaternary ammonium, phosphonium or arsonium base as catalyst (cf. D5, Claim 1; page 1, line 83 to page 2, line 49). In its Example 6, it discloses the manufacture of polycarbonate in the presence of a catalyst composition comprising a nitrogen containing basic compound and an alkali metal compound in amounts corresponding respectively to  $2.49 \cdot 10^{-6}$  mole and to  $1.13 \cdot 10^{-6}$  mole per mole of aromatic dihydroxy compound but the total level of hydrolysable chlorine in the starting raw materials (i.e. aromatic dihydroxy compound and carbonic acid diester) is not indicated. Although D5 generally states that the suitable amounts of the catalyst are determined by the purity of the starting materials used, it defines neither the

impurities nor a quantified relationship between the amount of impurities and amount of catalyst (cf. D5, page 2, lines 50 to 58).

3.4 Documents D7'(D7'') disclose the manufacture of polycarbonate by melt polycondensation in two steps. In the first step a prepolymer is manufactured, preferably in the presence of a catalyst such as NaOH or KOH, and in the second step the prepolymer is subjected to polycondensation after addition therein of a quaternary ammonium catalyst (cf. D7', page 5, line 1 to page 6, line 7; cf. D7'', page 1, line 1 to page 2, line 22). Examples 1 (cf. D7') and 2 (cf. D7'') are carried out in presence of  $3.3 \cdot 10^{-6}$  mole of a nitrogen containing basic compound (quaternary ammonium compound) and of  $3.3 \cdot 10^{-6}$  mole of an alkali metal compound (NaOH) per mole of aromatic dihydroxy compound. D7'(D7'') state that colourless, transparent, heat resistant polycarbonates with high molecular weight are obtained but are totally silent on the total content of hydrolysable chlorine in the aromatic dihydroxy compound and the diaryl carbonate used as starting components.

3.5 Documents D8'(D8'') refer to the manufacture of polycarbonate by melt polycondensation in the presence of quaternary ammonium hydroxide as catalyst. Example 2 (cf. D8' and D8'') is carried out in the presence of  $1 \cdot 10^{-4}$  mole nitrogen containing basic compound (quaternary ammonium hydroxide) and of  $1.65 \cdot 10^{-6}$  mole alkali metal compound (NaOH) per mole of aromatic dihydroxy compound. The polycarbonate obtained is almost colourless. The documents do not, however, disclose the total amount of hydrolysable chlorine in the starting raw materials.

- 3.6 From these considerations, it follows that D5, D7'(D7'') and D8'(D8'') expressly disclose all the features of the process according to Claim 1 of the patent in suit except the total content of hydrolysable chlorine in the aromatic dihydroxy compound and the carbonic acid ester (i.e. not more than 3 ppm).
- 3.7 The argument of the Respondents (cf. sections IV (ii.1), (ii.2), and (ii.3), above), that the skilled reader would have understood, in the light of his general knowledge, that the raw materials would inevitably have a total amount of hydrolysable chlorine content of not more than 3 ppm is not convincing for the following reasons.
- 3.7.1 According to established case law, when considering the question of novelty, a prior art document must be interpreted in the light of common general knowledge available at its publication date. Common general knowledge which did not exist at this date but which only became available at a later date, cannot be used to interpret such a document (cf. T 229/90 of 28 October 1992, not published in OJ EPO; Reasons 4; cf. also Singer/Stauder, Europäisches Patentübereinkommen, 2<sup>nd</sup> Edition, page 139, paragraph 52).
- 3.7.2 Thus, the relevant question to be decided is whether it can be concluded from the above mentioned examples of D5, D7, and D8, interpreted in the light of common general knowledge available at their respective publication dates, that the starting compounds used in these examples necessarily and inevitably met the purity requirement of Claim 1 of the patent in suit in



terms of total hydrolysable chlorine content.

3.7.3 In that respect, it is normally accepted that common general knowledge is represented by basic handbooks and textbooks on the subject in question (cf. T 766/91 of 21 September 1993, not published in OJ EPO, Reasons 8.2). It follows that, in the Board's view, only documents D2 and D3, respectively published in 1964 and 1965, can be considered as representing the common general knowledge available to the skilled person for the interpretation of D5, D7 and D8, since documents D10 and D11 have been published after the publication dates of D5, D7 and D8.

3.7.4 Document D2 deals with the manufacture of aromatic polycarbonates by means of the transesterification process. As stated in D2, basic catalysts such as alkali metals and alkaline earth metals and their oxides, hydrides, or amides may be used in an amount of 0.0001 to 0.1% calculated on the polycarbonate formed, in order to accelerate the transesterification reaction. The document also teaches that side reactions such as branching and crosslinking can be nearly eliminated by the choice of the proper catalyst, used in small quantities, and by the use of raw materials of high purity. It also discloses a specific process for the manufacture of polycarbonates from bisphenol A by transesterification. According to that process, diphenyl carbonate is prepared in a first step by reaction of phenol with phosgene. The thus obtained diphenyl carbonate is distilled and can then be obtained ash free. The diphenyl carbonate is, in a second step, reacted with bisphenol A (cf. D2, page 45, line 13 to page 48, line 24; Figure III.3; page 50, line 1 to page 51, line 2).

3.7.5 Although D2 suggests that high purity raw materials might be used in order to avoid side reactions and that, in the specific case of bisphenol A polycarbonates, the diphenyl carbonate might be obtained ash-free, it does not contain a clear and unmistakable teaching defining the kind of impurities and their admissible level (cf. T 677/91 of 3 November 1992, not published in OJ EPO, Reasons 1.2). In particular, it does not contain such a teaching, according to which the total content of hydrolysable chlorine in the aromatic dihydroxy compound and the carbonic acid ester must be at most 3 pm in order to allow them to be used in the manufacture of aromatic polycarbonates by transesterification.

3.7.6 Document D3 refers to a process for purifying diphenyl carbonate by treating it with hot water and subjecting it thereafter to distillation under vacuum, but it does not specify any particular level of purity to be obtained. Nor do any of D5, D7'(D7'') and D8'(D8'') refer to the use of such a further purification technique. Consequently, the use of such a purification technique is not directly and unambiguously derivable from the disclosures of D5, D7 and D8, and even if it were, it would not make available a clear and unmistakable teaching of the relevant degree of purity according to Claim 1 of the patent in suit.

3.7.7 Consequently, the disclosures of D5, D7 and D8, when interpreted in the light of the common general knowledge of the skilled person, are not novelty destroying for the subject-matter of Claim 1.

3.7.8 One would not come to a different conclusion, even if,

for sake of argument, D5, D7 and D8 would be read, as done by the Respondents, in the light of the content of documents D10 and D11.

3.7.8.1 Document D10 refers to techniques for purifying diphenyl carbonate used for producing polycarbonates by transesterification and even refers to treating diphenylcarbonate with hot water as claimed in the patent in suit (cf. Claim 4 of the granted patent) but does not disclose any particular level of purity to be obtained. Thus, the same considerations as for document D3 above would apply.

3.7.8.2 Whilst document D11 states, in relation to a process for manufacture of diphenyl carbonate, that phenyl chloroformate must not be detected in the reaction system, and that a diphenyl carbonate in which no chloroformate could be detected would be suitable for use in polycarbonate synthesis, it does not refer to the total content of hydrolysable chlorine of the starting raw materials for the manufacture of polycarbonates by transesterification. Consequently, even this disclosure does not make available the relevant parameter of Claim 1 of the patent in suit.

3.8 The argument submitted by Respondent I with respect to the decisions T 288/90, T 990/96, and T 666/89 is also not convincing, since the facts on which these decisions are based are not comparable with those of the present case.

3.8.1 In the case of the decision T 288/90, an example of a document (I) disclosed each of the features of Claims 1 to 6 of the contested patent which related to a process for the manufacture of a thermoplastic

moulding composition, with the sole exception of the size range of the latex particles used in the thermoplastic composition. A document (12), which was a review of the available latex latices, published only fifteen months before the application date of document (I), was considered as representative of the general technical knowledge at the relevant time. The average particle size of the latices identified in document (12) were, without exception, within the range claimed in the patent in suit. Thus, it was concluded that the skilled reader of document (I) would understand the latices disclosed in document (12) as being the most likely to be used for making a thermoplastic moulding composition according to the relevant example of document (I). In the present case, in contrast to the circumstances of T 288/90, no evidence has been submitted (cf. points 3.7.4 to 3.7.6, above), which would have shown that the skilled reader of D5, D7, and D8 would have been led to understand that aromatic dihydroxy compound and carbonic acid diester raw materials having a total content of hydrolysable chlorine of not more than 3 ppm would have been the most likely to be used for making a polycarbonate by transesterification according to the relevant specific examples of D5, D7 and D8. Thus, the decision T 288/90 is of no relevance in the present case.

- 3.8.2 Decision T 990/96 deals with the problem of the novelty of low molecular organic compounds in the field of preparative organic chemistry. It was held in this decision that it is common practice in this field to purify a particular compound obtained in a particular manufacturing process according to the prevailing needs and requirements, and that, since

conventional purification methods are within the common general knowledge in the field, a document disclosing a low molecular compound and its manufacture normally makes this compound available in all desired grades of purity, i.e. the purity level is not an essential feature for the definition of the organic compound. In contrast to T 990/96, the present case relates to a process for the manufacture of polymers having specific properties (i.e. resistance to boiling water) characterised by the **use** of organic compounds having a required purity as starting components, i.e. the purity level of the starting components is therefore an essential technical feature of the **process**, which can only be carried out in the required range of purity but not in all available grades of purity of the starting materials. Even if it would be considered that aromatic dihydroxy compounds and carbonic acid diesters were available at all grades of purity at the filing dates of D5, D7 and D8, this would not imply that the starting components used in Example 6 of D5, in Examples 1 and 2 of D7, and in Example 2 of D8 would necessarily and inevitably have exhibited the required purity as set out in Claim 1 of the patent in suit. On the contrary, in the Board's view, there is a fundamental difference between the purity requirements presumed to exist for the isolation of a final product, and those for the starting materials used in a preparative process. Where, as in the case of T 990/96, which concerned a mixture of stereo isomers which could be separated by fractional crystallisation so that the product resolved into two optically pure enantiomers, the aim was one of achieving an ultimate degree of purity, the concern with starting materials is the precise opposite. In this connection, the concern of the

skilled person must be presumed to be the use of the most impure starting materials possible consistent with the aim of obtaining a sufficient yield of product, which itself may further be purified. Consequently, the general statements in T 990/96 concerning the purity of final products cannot be applied directly to starting materials or, hence, to the present case.

3.8.3 As stated in the decision T 666/89, in the case of overlapping **numerical** ranges of physical parameters between a claim and a prior art disclosure, one approach to determining what is "hidden" as opposed to what has been made available is to consider whether or not a person skilled in the art would, in the light of all the technical facts at his disposal, seriously contemplate applying the teaching of prior art document in the range of overlap. This approach cannot be applied in the present case. First of all, documents D5, D7 and D8 are totally silent on the kind and amount of impurities present in the starting components used. Furthermore, the pertinent disclosures of D5, D7 and D8 are restricted to very specific examples in which the starting components would have exhibited respectively an individual (but undisclosed) total hydrolysable chlorine content in combination with a specific catalyst composition meeting the requirements of Claim 1 of the patent in suit. Thus, these documents do not at all define a numerical range of hydrolysable chlorine content in the starting components to be used in combination with a catalyst composition according to Claim 1 of the patent in suit. Even if, for sake of argument, it were considered that "highly pure" starting components had been used in the specific examples of D5, D7 and D8,

this wording would not, contrary to the submissions of Respondent I, define a range starting from 0 ppm since, as indicated in the decision T 990/96, it is not possible for thermodynamical reasons to obtain a compound completely pure. Thus, there is no overlapping range of total hydrolysable chlorine content between Claim 1 of the patent in suit and the prior art disclosures such as would render the application of the decision T 666/89 meaningful. The decision is therefore of no relevance in the present case.

- 3.9 It follows from the above considerations, that the subject-matter of Claim 1 of the patent in suit is novel over D5, D7'(D7''), D8'(D8'') and D23 (Articles 54(1)(2) EPC). The same conclusions apply for the subject-matter of dependent Claims 2 to 5.
- 3.10 Since the novelty of the subject-matter of the main request has been acknowledged, there is no need for the Board to consider the auxiliary requests 1 to 7 submitted on 25 August 2001.
4. Furthermore, since the Appellant specifically requested that the case be referred back to the Opposition Division for the remaining issue of inventive step to be considered, so as to avoid loss of one level of jurisdiction, the Board, in its discretion and in particular since this issue was evidently not considered by the first instance, has decided to make use of its powers under Article 111(1) EPC to remit the case for completion of examination of the opposition in this respect.

**Order**

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

1. The decision under appeal is set aside.
2. The case is remitted to the Opposition Division for further prosecution on the basis of the main request submitted at the oral proceedings, corresponding to the patent as granted.

The Registrar:

The Chairman:

E. Görgmaier

R. Young