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**DECISION**  
of 23 January 2004

**Case Number:** T 0334/03 - 3.3.3

**Application Number:** 96202186.1

**Publication Number:** 0739933

**IPC:** C08K 3/04

**Language of the proceedings:** EN

**Title of invention:**  
Polyester resin composition

**Patentee:**  
TEIJIN LIMITED

**Opponent:**  
Giesecke & Devrient GmbH

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 56

**Keyword:**  
"Inventive step - non-obvious combination of known features"

**Decisions cited:**  
G 0006/88, G 0007/95, T 0037/82, T 0119/82, T 1002/92

**Catchword:**  
-



Case Number: T 0334/03 - 3.3.3

**DECISION**  
of the Technical Board of Appeal 3.3.3  
of 23 January 2004

**Appellant:** Giesecke & Devrient GmbH  
(Opponent) Prinzregentenstr. 159  
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**Representative:** Klunker, Hans-Friedrich, Dr.  
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**Respondent:** TEIJIN LIMITED  
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**Representative:** Hallybone, Huw George  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office dated 13 March 2002 and  
posted 21 January 2003 rejecting the opposition  
filed against European patent No. 0739933  
pursuant to Article 102(2) EPC.

**Composition of the Board:**

**Chairman:** R. Young  
**Members:** W. Sieber  
A. Pignatelli

## Summary of Facts and Submissions

I. The mention of the grant of European patent No. 0 739 933, with three claims, in respect of European patent application No. 96202186.1, filed in accordance with Article 76 EPC as a divisional application of the earlier European patent application 91310236.4 and claiming JP priorities of 7 November 1990 (299794/90) and 30 January 1991 (27713/91) was published on 3 March 1999 (Bulletin 1999/09). Claim 1 read as follows:

"Use of graphite having an average particle diameter of 0.1 to 150  $\mu\text{m}$  as laser sensitive pigment in thermoplastic polyester resin compositions which are suitable to be marked with laser light wherein the graphite is used in an amount of 0.001 to 2% by weight based on the total weight of graphite and polyester resin."

Claims 2 and 3 were dependent claims directed to elaborations of the subject-matter of Claim 1.

II. A notice of opposition was filed on 3 December 1999, requesting revocation of the patent in its entirety on the grounds of Article 100(a) EPC for lack of inventive step. The opposition was supported by the following documents:

D1: EP-A-0 190 997; and

D2: EP-A-0 101 667.

III. By a decision announced orally on 13 March 2002 and issued in writing on 21 January 2003, the opposition division rejected the opposition.

The decision considered D1, relating to laser markable compositions comprising a high molecular weight organic material and at least one radiation-sensitive additive, to represent the closest prior art. The subject-matter of the disputed patent was a selection of both polymer and additive within the teaching of D1. The examples of the patent in suit showed that the choice of graphite instead of carbon black (also disclosed as additive in D1) led to improved effects of foamability and etching.

IV. On 20 March 2003, a notice of appeal against the above decision was filed by the opponent (hereinafter referred to as the appellant) with simultaneous payment of the prescribed fee.

In the statement of grounds of appeal, filed on 22 May 2003, the appellant submitted, in addition to D1 and D2, documents D3 to D5:

D3: US-A-4 391 764;

D4: JP 62011689 (abstract); and

D5: EP-A-0 413 664.

The appellant's arguments may be summarized as follows:

The object of the patent in suit was to provide a polyester resin composition which permits the marking with laser light. In particular, the polyester resin

... composition should exhibit a high contrast in the marking with a YAG laser or a CO<sub>2</sub> laser and permit the marking of fine lines or precise prints. The solution to this problem, ie the use of graphite having an average particle diameter of 0.1 to 150 µm, was obvious from D1 which was considered to represent the closest prior art. D1 related likewise to a method for forming laser markings which were easily legible and of high contrast and had sharply defined edge zones. According to that method at least one radiation sensitive colour forming additive was incorporated into a high molecular weight organic material such as polyester. Graphite was mentioned as a possible radiation sensitive additive among an extensive list of possible examples of varying inorganic pigments. Thus, a person skilled in the art would seriously contemplate the combined use of polyester resin and graphite in order to solve the posed problem, especially since graphite was a well-known laser sensitive additive for polymeric resins as could be seen from D3 and D4. Furthermore, it was known from D2 that graphite easily could be blended with polymeric resins such as polyester. As regards the average particle diameter of graphite, the range of 0.1 to 150 µm required in Claim 1 of the patent in suit was conventional for laser sensitive additives as could be seen from D1 or D5.

As regards the issue of improved laser marking, any improvement would automatically turn up when following an obvious teaching of the prior art.

V. The proprietor of the patent (hereinafter referred to as the respondent) presented its counterarguments in a written submission filed on 22 September 2003. They can be summarized as follows:

The closest prior art was D1. It had been demonstrated that graphite provided considerable advantages in laser marking over other laser sensitive additives when used specifically in polyester compositions. The objective problem was to provide improved laser marking of plastics in terms of contrast and definition and this was achieved by the use of a combination of a polyester resin and graphite. This was not in any way suggested by the cited documents. As regards the amount of graphite, this was an essential feature of the invention since the colour development properties of the composition obtained by exposure to laser light differed according to the amount of graphite. Furthermore, the respondent stated that the particle diameter of the graphite was not a requirement for attaining the object of the patent at issue although the statement concluded with the finding it "is not within a general range" (page 3, 3<sup>rd</sup> paragraph).

VI. On 23 January 2003, oral proceedings were held before the board.

(a) At the beginning of the oral proceedings, the introduction of the late filed documents D3 to D5 was discussed, whereby the respondent requested that these documents not be admitted into the proceedings, since they did not advance the subject of the appeal. After having been asked to justify the late filing of these documents,

especially taking into account the criteria developed in T 1002/92 (OJ EPO 1995, 605), the appellant withdrew its request for introducing D3 to D5 into the proceedings.

- (b) In its first attempt to challenge the inventiveness of the claimed subject-matter, the appellant started from D2 which disclosed the use of graphite in a high molecular weight organic material. Since the amount of graphite was 0.001 to 3.0 wt.% (page 1), the particle diameter of the graphite up to 20  $\mu\text{m}$  (Claim 5) and polyester was listed on page 1 and in Claim 3, respectively, D2 disclosed all the features of Claim 1 of the patent in suit apart from the use of graphite as laser sensitive additive in laser marking. Such a use was, however, known from D1 and could not serve as a novelty distinguishing feature. In this context, reference was made to the headnote of G 6/88 (OJ EPO 1990, 114). Consequently, the claimed subject-matter was not novel over D2 and also not based on an inventive step.
- (c) In its second approach, the appellant argued that the claimed subject-matter was not inventive when starting from D1 as the closest prior art. It basically followed the argumentation of its written submissions without relying on D3 to D5. As regards the average particle diameter of the graphite which was not mentioned in D1, the appellant argued that this feature could not be taken into account in the assessment of inventive step since it did not contribute to the solution of the problem (see T 37/82 (OJ EPO 1984, 071)).

This was evident from page 3 of the respondent's submission of 22 September 2003.

- (d) The appellant questioned also the finding of the opposition division which acknowledged a two-fold selection over D1. According to its opinion, the principle of a two-fold selection could not equally apply to a use claim.
  
- (e) The respondent pointed out that novelty was not an issue of the present opposition appeal procedure. Furthermore, there was no doubt that D1 was the closest prior art. D2, which did not relate to laser marking, was totally irrelevant. The very general teaching of D1 on laser marking did not disclose the specific combination of polyester resin and graphite as required in the patent in suit. Nor was there any hint to the advantages associated with this combined use. The examples and comparative examples in the patent in suit clearly demonstrated the superiority of graphite over carbon black, which was also mentioned in D1. As regards the average particle diameter of the graphite, also this feature had an effect on the solution of the posed problem as could be seen from Table 3 in the patent specification.
  
- (f) As regards the interpretation of Claim 1, the respondent was of the opinion that Claim 1 included laser marking as a functional technical feature. This was at least hinted at by the claim wording.



(g) Following the discussion, the respondent filed an auxiliary request. Claim 1 of the auxiliary request read as follows:

"Use of thermoplastic polyester resin compositions which are suitable to be marked with laser light for laser marking, the compositions using graphite having an average particle diameter of 0.1 to 150  $\mu\text{m}$  as laser sensitive pigment in the thermoplastic polyester resin compositions wherein the graphite is used in an amount of 0.001 to 2% by weight based on the total weight of graphite and polyester resin."

Claims 2 and 3 corresponded to Claims 2 and 3 of the main request.

The appellant contested the filing of the auxiliary request at that stage of the proceedings which, in any case, was *prima facie* not allowable.

VII. The appellant requested that the decision under appeal be set aside and that the patent be revoked in its entirety.

The respondent requested that the appeal be dismissed and the patent be maintained as granted (main request), or, in the alternative, that the patent be maintained on the basis of the set of Claims 1 to 3 filed as auxiliary request at the oral proceedings.

## Reasons for the Decision

1. The appeal complies with Articles 106 to 108 EPC and Rule 64 EPC and is therefore admissible.

2. *Late filed documents*

It may be convenient to recall at this juncture that Documents D3 to D5 were filed by the appellant for the first time with the statement of grounds of appeal and were, therefore, late filed. At the oral proceedings, the appellant withdrew its request for their introduction into the proceedings (see point VI, above). Consequently, D3 to D5 do not belong to the factual framework of the case which is the subject of the present appeal.

3. *Interpretation of Claim 1 (main request)*

3.1 Claim 1 as granted is in the form of a use claim. In particular, it is directed to the use of a specified amount of graphite having a specific average particle diameter as laser sensitive pigment in thermoplastic polyester resin compositions which are suitable to be marked with laser light.

3.2 It has been stated in decision G 6/88 (*supra*) that there are basically two different types of claim, namely a claim to a physical entity (eg product, apparatus) and a claim to a physical activity (eg method, process, use) (point 2.2 of the reasons) and that the technical features of a claim to an activity are the physical steps which define such activity (point 2.5 of the reasons). Thus, in the present case,

the decisive question is which physical steps are required by the activity (use) referred to in Claim 1.

3.3 As pointed out above, Claim 1 as granted is directed to the use of a specified amount and form of graphite as laser sensitive pigment in thermoplastic polyester resin compositions. In effect, that use claim is directed to the use of a physical entity (graphite) to produce a product (thermoplastic polyester resin composition) which requires the physical step of incorporating the graphite into a thermoplastic polyester resin. This activity is notionally equivalent to a process for producing a thermoplastic resin composition including the step of using graphite. Apart from this, no further physical step forms part of the claimed activity. The resulting composition contains graphite and is, as required in Claim 1, suitable to be marked with laser light. Neither the term "as laser sensitive pigment" nor the term "suitable to be marked with laser light" requires an activity involving the application of laser light. Moreover, these terms refer to an intended use of the resulting composition and are therefore not apt to further limit the claim. In other words, laser marking is not a physical step of the activity claimed in Claim 1 and, hence, not a technical feature of the claim.

3.4 On the other hand, the respondent interpreted Claim 1 as encompassing laser marking as a mandatory technical feature whereby its only justification for this interpretation was that laser marking was at least hinted at by the wording chosen in Claim 1.

3.5 If the board were to follow the interpretation of the respondent that Claim 1 include a laser marking step, Claim 1 as granted would not define the matter for which protection is sought in terms of the technical features of the invention (Article 84 in combination with Rule 29(1) EPC). Since such an objection against a granted claim is not possible at the opposition and the opposition appeal stage, respectively, the board has to interpret the claim in its broadest meaning for the assessment of novelty and inventive step. Consequently, Claim 1 is interpreted as being directed to the use of graphite in the production of a thermoplastic polyester resin composition which is suitable for laser marking whereby laser marking as such is not a limiting technical feature of the claim.

4. *Novelty (main request)*

4.1 In the present case, the only ground of opposition was inventive step. However, in view of the broad interpretation of Claim 1 (point 3, above), the board deems it appropriate to confirm that the claimed subject-matter is novel over D1 and D2 even in this broad interpretation.

4.2 D1 discloses a process for marking high molecular weight organic material containing at least one radiation-sensitive additive that effects a change in colour which process comprises utilising a laser beam, and using as additive at least an inorganic and/or organic pigment and/or a polymer-soluble dye (Claim 1). The markings obtained by this process are - *inter alia* - of high contrast, easily legible and have good edge definition (page 10, last paragraph; page 11,

2<sup>nd</sup> paragraph). Graphite is mentioned as a possible radiation-sensitive additive amongst an extensive list of possible examples of varying inorganic pigments (paragraph bridging pages 3 and 4). The particle size of the pigments, and in particular of the graphite, is not disclosed. Polyester resin is mentioned - *inter alia* - as a suitable high molecular weight organic material (Claims 5 and 6). The amount of the colour-forming additive is in the range of 0.001 to 10 wt.% based on the high molecular weight organic material, preferably in the range of 0.01 to 3 wt.% (page 5, fourth paragraph). However, the use of a polyester resin in combination with graphite, let alone with graphite in the amount and form (average particle diameter) as required in the patent in suit, is not disclosed in D1. Furthermore, none of the examples using a polyester resin (Examples 2, 5 to 8, 16 to 21 and 24 to 26) contains graphite as a laser sensitive additive. Thus, the subject-matter claimed in the patent in suit is novel over D1.

- 4.3 D2 discloses in Claim 1 a composition containing a thermoplastic high molecular weight organic material, 0.001 to 3.0% by weight of graphite, relative to the high-molecular weight organic material, and one or more pigments or polymer-soluble dyes. It has been found that in the dyeing of plastics with a pigment or dye the addition of graphite provides homogeneous, evenly glistening and novel shades of colour. With regard to the nature of the graphite, crystalline graphite having a particle diameter of less than 100  $\mu\text{m}$  is preferred (page 2, last paragraph). Linear polyester resin is mentioned - *inter alia* - as a suitable high molecular weight organic material (Claim 3, page 1, last

paragraph). However, the combination of a polyester resin in combination with graphite in the amount and form (average particle diameter) as required in the patent in suit, is not directly and unambiguously derivable from D2. Furthermore, none of the examples of D2 uses a polyester resin. Thus, the subject-matter claimed in the patent in suit is also novel over D2.

5. *Problem and solution*

5.1 It follows from the above analysis of the wording of Claim 1 (point 3.3) that the patent in suit is concerned with a process for producing a thermoplastic polyester resin composition including the step of using graphite. The compositions obtained according to this process exhibit a high contrast in the marking with a YAG laser or a CO<sub>2</sub> laser and permit the marking of fine lines or precise prints (page 2, lines 31 to 32).

5.2 Such a process is known from D1 which discloses technical effects, purpose and intended use most similar to the claimed invention (see point 4.2, above). Hence, in accordance with the opposition division and the respondent, the board regards this document as representing the closest state of the art. D2 cannot adequately fulfil this function, since, as rightly submitted by the respondent, it is not concerned with laser marking at all.

5.3 It also is clear from the above analysis (see point 4.2, above) that the processes of both the patent in suit and the closest prior art provide compositions with good laser marking properties. Thus, the salient point in the present case is whether or not the process of

Claim 1 of the patent in suit yields a product which has improved properties, as argued by the respondent. The outcome of this issue is important because in this step of the problem solution approach the technical effect(s), if any, that the patent in suit provides over the closest prior art are taken into account when formulating the objective technical problem. When evaluating the technical effect(s) of a process, the character of the product resulting from this process has to be taken into account since the effect of a process manifests itself in the result, ie in the product in chemical cases (see eg T 119/82, OJ EPO 1984, 217, point 11 of the reasons).

- 5.4 All examples in the patent in suit, ie Examples 1 to 6 (polyester resin and graphite) and Comparative Examples 1 to 4 (polyester resin and carbon black), were prepared according to the general teaching of D1 which equally mentions both graphite and carbon black as a laser sensitive additives for thermoplastic resins. It is immediately evident from the data in Tables 1, 2, 4 and 5 in the patent in suit, that the use of graphite in the polyester resin improves the marking properties of the composition with respect to the contrast ratio of background luminance (BL) to characteristic luminance (CL), the etching depth and the foamability. The foamability is related to the phenomenon in which graphite contained in a moulded article absorbs laser light to generate heat, and the polymer around it is thermally decomposed and foamed to form the marking. Therefore, compared with D1, the objective technical problem to be solved by the patent in suit has to be seen in the provision of a thermoplastic resin composition with improved laser marking properties.

5.5 As regards the appellant's objection that the average particle diameter of the graphite did not contribute to the solution of the relevant technical problem and could therefore not be taken into account when assessing the inventive step of the claimed subject-matter (see point VI(c), above), the data in Table 3 of the patent in suit demonstrate, as pointed out by the respondent, that the average particle diameter of the graphite influences the contrast ratio CL:BL, a property which has been taken into account when formulating the objective technical problem (point 5.4, above). Since, furthermore, the respondent resiled from its written statement at the oral proceedings and the appellant has not in fact shown that this parameter is a superfluous feature, the board finds it credible that all the claimed features provide an effective solution of the stated problem arising from D1.

6. *Inventive step*

6.1 For the assessment of inventive step, it is necessary to consider whether the skilled person, in possession of the technical teaching according to D1, would have expected that the laser marking properties of thermoplastic resins could be enhanced by using a combination of a polyester resin and graphite, whereby the graphite has a particle size and is used in an amount as defined in Claim 1 of the patent in suit.

6.2 In D1 itself, there is no suggestion as to how the laser marking properties of the thermoplastic compositions might be further improved, let alone a hint to the combination of a polyester resin and a



specific graphite as a more promising variant within the general teaching of D1. Consequently, the disclosure of D1 itself offers no hint to the solution of the relevant technical problem.

6.3 As to the disclosure of D2, there is no reason why the skilled person should consider this teaching as relevant to the solution of the technical problem in the first place, since it does not relate to laser marking of polymeric compositions. Thus, there can be no pointer to the solution of the technical problem in the teaching of D2, either.

6.4 With its approach pursued at the oral proceedings that the claimed subject-matter was not novel over D2 and therefore not inventive (see point VI(b), above), the appellant avoided the introduction of novelty as a new ground of opposition, presumably relying on the finding in point 7.2 of G 7/95 (OJ EPO 1996, 626) where it has been held that "if the closest prior art document destroys the novelty of the claimed subject-matter, such subject-matter obviously cannot involve an inventive step". This approach proceeds on the assumption that the combination of polyester resin and specific graphite (including the amount thereof) is disclosed in D2. Since, however, D2 does not clearly and unambiguously disclose this specific combination (see point 4.3, above), ie a general disclosure does not take away the novelty of a specific disclosure, the basis assumption of the appellant's approach is not correct. Thus, the present case is different from G 6/88 (*supra*) which dealt with a claim to the new use of a known compound. Consequently, this approach must fail.

6.5 In view of the above, it is evident that the subject-matter of Claim 1 of the main request, and by the same token, that of dependent Claims 2 and 3, does not arise in an obvious way from documents D1 and D2. Hence, the subject-matter of Claims 1 to 3 as granted involves an inventive step.

7. Because the respondent succeeded on the main request, there was no need to consider the introduction of the auxiliary request into the proceedings.

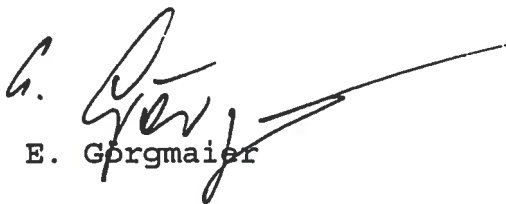
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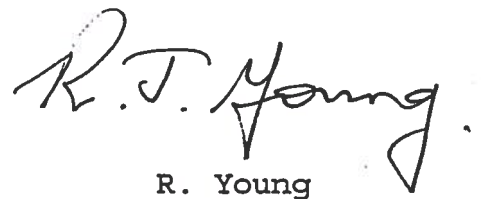
**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

  
E. Gorgmaier

  
R. Young