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D E C I S I O N
of 7 November 1996

Case Number: T 1050/93 - 3.3.3

Application Number: 87310305.5

Publication Number: 0270289

IPC: C08L 67/02

Language of the proceedings: EN

Title of invention:

Polymer compositions and ovenable trays, tray blanks and sheets formed therefrom

Applicant:

ROHM AND HAAS COMPANY

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 84, 123(2)

Keyword:

"Clarity (yes) - established by disclaiming from the definition of one component the part overlapping the definition of another component"

Decisions cited:

T 0004/80; T 0313/87

Catchword:

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Boards of Appeal

Chambres de recours

Case Number: T 1050/93 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 7 November 1996

Appellant:

ROHM AND HAAS COMPANY
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Representative:

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Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 4 August 1993
refusing European patent application
No. 87 310 305.5 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: C. Gérardin
Members: P. Kitzmantel
J. A. Stephens-Ofner

Summary of Facts and Submissions

I. This appeal, which was filed on 9 September 1993, lies against the decision of the Examining Division dated 4 August 1993, refusing European patent application No. 87 310 305.5 in the name of Rohm and Haas Company filed on 23 November 1987, claiming the priority of 5 December 1986 from a US-application, and published under No. 270 289. The appeal fee was paid simultaneously with the Notice of Appeal and a Statement of Grounds of Appeal was filed on 22 November 1993.

II. The decision under appeal was based on a set of 11 claims filed on 24 May 1993, independent Claims 1 and 11 reading as follows:

Claim 1:

"A process for making amorphous sheet which comprises making an amorphous polymer composition comprising, in a weight ratio A:B:C of 70 to 95:4 to 29:0 to 14,5;

(A) poly(ethylene terephthalate) resin having an intrinsic viscosity of from 0.7 to 1.1. dl/g, measured at 30°C for a solution of the polymer in 60/40 phenol/tetrachloroethane;

(B) core/shell polymer having

(1) from 25 to 95% of a first, elastomeric phase, having a Tg below 0°C comprising

(a) up to 99.8% of units of a monomer or monomer mixture which yields a rubbery polymer of Tg below 0°C on polymerization,

- (b) from 0.1 to 5% units of polyunsaturated crosslinking monomer in which substantially all the unsaturated groups react in this phase, and
 - (c) from 0 to 5%, units of polyunsaturated, graftlinking monomer wherein, predominantly, the units retain residual unsaturation for subsequent reaction, and
- (2) from 5 to 75% of an outer, thermoplastic phase, polymerized from a monomer system comprising 50 to 100% alkyl methacrylate wherein the alkyl group has from 1 to 4 carbon atoms;
- (C) aromatic polycarbonate; rolling or extruding it into sheet of thickness 0.5 to 1.5mm under melt conditions above 260°C followed by quenching to a temperature below 75°C, characterised in that there is incorporated into the composition from 1 to 5% of poly(alkylene terephthalate), the alkylene group having from 4 to 6 carbon atoms, in order to accelerate the rate of crystallisation when the amorphous sheet is subsequently reheated to a thermoformable state."

Claim 11:

"A process for making an ovenable tray from amorphous sheet made by a process as claimed in any of the preceding Claims comprising reheating and thermoforming it into the final tray shape while allowing the composition from which the sheet is formed to crystallise."

Claims 2 to 10 relate to preferred embodiments of the process according to Claim 1.

III. The decision under appeal held that the subject-matter of Claim 1 did not meet the requirements of Article 84 EPC, since the "crosslinking" and the "graftlinking" monomers could not be distinguished from one another. Both these monomers were defined as polyethylenically unsaturated compounds of overlapping definition, obscuring thereby the scope of Claim 1.

IV. In his written submissions and during the oral proceedings held on 7 November 1996 the Appellant argued essentially that the terms "crosslinking" and "graftlinking" monomers would be commonly used for categorising polyunsaturated monomers in accordance with the ability of their unsaturated groups to either react substantially all in one phase, or to leave residual unsaturation for subsequent reaction. The only monomer about which evidence was adduced by the Examining Division that it was able to perform both functions, namely allyl methacrylate, was clearly categorised in the application as a preferred "graftlinking" monomer. By virtue of Article 69 EPC and the Protocol thereunder there was thus left no room for any doubt.

During the oral proceedings the Appellant conceded, however, that allyl methacrylate was a monomer that could perform both functions, that of a "crosslinking" and that of a "graftlinking" monomer, and that the original wording in the application did not rule out the possible use of allyl methacrylate as a "crosslinking" monomer.

V. In view of this situation and following various suggestions of the Board to overcome that ambiguity, the Appellant submitted during the oral proceedings an amended set of 11 claims, Claim 1 reading as follows:

"A process for making amorphous sheet which comprises making a polymer composition comprising,

- (A) from 70 to 95% by weight of poly(ethylene terephthalate) resin having an intrinsic viscosity of from 0.7 to 1.1 dl/g, measured at 30°C for a solution of the polymer in 60/40 phenol/tetrachloroethane;
- (B) from 4 to 29% by weight of core/shell polymer having
 - (1) from 25 to 95% by weight of a first, elastomeric phase, having a Tg below 0°C polymerized from a monomer system comprising
 - (a) up to 99.8% by weight of a monomer or monomer mixture which yields a rubbery polymer on polymerization,
 - (b) from 0.1 to 5% by weight of polyunsaturated crosslinking monomer other than allyl methacrylate in which substantially all the unsaturated groups react in this phase, and
 - (c) from 0 to 5% by weight of polyunsaturated, graftlinking monomer wherein, predominantly, the units retain residual unsaturation for subsequent reaction, and
 - (2) from 5 to 75% by weight of an outer, thermoplastic phase, polymerized from a monomer system comprising 50 to 100% alkyl methacrylate wherein the alkyl group has from 1 to 4 carbon atoms;

- (C) from 1 to 5% by weight of poly(alkylene terephthalate), the alkylene group having from 4 to 6 carbon atoms, in order to accelerate the rate of crystallisation when the amorphous sheet is subsequently reheated to a thermoformable state; and
- (D) from 0 to 14.5% by weight of aromatic polycarbonate; rolling or extruding it into sheet of thickness 0.5 to 1.5mm under melt conditions above 260°C and immediately quenching to a temperature below 75°C."

Except for Claims 2 and 6 and apart from some editorial amendments, the further claims of this amended set correspond to the identically numbered claims on which the appealed decision was based.

For reasons of consistency with the wording of amended Claim 1 the statement "present in the elastomeric phase" was deleted from Claim 2; and, for reasons of consistency with page 6, lines 8 to 12 of the original application, the amount of styrene was limited in Claim 6 to "less than 50% by weight".

- VI. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims submitted during oral proceedings.

Reasons for the Decision

1. The appeal is admissible.
2. *Amendments (Article 123 (2) EPC)*
 - 2.1 Claim 1 basically consists of a combination of the features contained in original Claims 1 and 7, accompanied by a change in category from a product (formerly) to a process claim (now).

Further amendments are based on the following statements in the original application:

- percentages by weight: page 4, lines 2 to 8 and 20 to 24;
- conditions of measurement of the intrinsic viscosity of the poly(ethylene terephthalate): page 4, lines 15 to 20;
- definitions of the "crosslinking" and "graftlinking" monomers: page 6, line 15 to page 7, line 3;
- statement "other than allyl methacrylate": amounts to a restriction of the originally disclosed scope of the definition "crosslinking" monomer: see also Section 3.6 of this decision;
- function of crystallization rate accelerator when the sheet is reheated to a thermoformable state: page 2, lines 17 to page 3, line 8; page 8 lines 13 to 19;
- immediate quenching: page 9, lines 7 to 16;

- 2.2 Claims 2 to 11 are based on features disclosed in the following original claims (in this order): Claim 1, 2, 2, 3, 4 plus 5, 6, 1, 1, 8 and 10. The feature of the maximum amount of 50% by weight of styrene in Claim 6 is based on page 6, lines 8 to 13 of the original application.

2.3 The requirements of Article 123(2) EPC are therefore met by all claims.

3. *Clarity (Article 84 EPC)*

3.1 The lack of clarity objection raised by the Examining Division was based on the assumption that "crosslinking" monomers and "graftlinking" monomers, both being polyethylenically unsaturated monomers, could not be distinguished from one another.

3.2 On page 6, line 15 to page 7, line 5 of the original application the following definitions appear:

(i) "The crosslinking polymer is preferably a polyethylenically unsaturated monomer copolymerizable with the other core monomers, the reactivity of its unsaturated groups being such that essentially all of them react during the initial polymerization; examples of crosslinking monomers include butylene diacrylate or dimethacrylate, divinyl benzene and trimethylolpropane trimethacrylate or triacrylate."

(ii) "The graftlinking monomer is preferably a polyethylenically unsaturated monomer copolymerizable with the other core monomers and having sufficiently low reactivity of one or more of the unsaturated groups to allow significant residual unsaturation to remain in the core polymer subsequent to its polymerization. Examples of graftlinking monomers are allyl methacrylate and diallyl maleate, alkyl [should read allyl] methacrylate is preferred."

- 3.3 On page 5, lines 1 to 4 the application in suit points out as "useful in the present invention" those core/shell polymers described in US-A-4 180 494 (document D1) and US-A-4 264 487 (document D4), the latter being preferred.

While D1 contains no disclosure which would be relevant with respect to the characterization of "crosslinking" and "graftlinking" monomers, D4 explains the functional differences between those two classes of monomers in words similar to those used in the above cited quotations from the application in suit. In particular, D4 sets out in column 2, line 68 to column 3, line 11 that "crosslinking" monomers have "a plurality of double bonds all of which polymerize at substantially the same rate", whereas "graftlinking" monomers have "a plurality of double bonds, at least one of which polymerizes at a substantially different rate of polymerization from at least one other of said groups." Examples of "crosslinking" monomers enumerated in D4 are butylene diacrylate and dimethacrylate, divinyl benzene, trimethylolpropane triacrylate and trimethacrylate; examples given of "graftlinking" monomers are allyl methacrylate and diallyl maleate.

- 3.4 This information, in the application in suit itself and in document D4, referring to core/shell polymers, which were said to be particularly suitable for the purposes of the application in suit, demonstrates that the skilled man knew at the relevant time to distinguish between polyethylenically unsaturated monomers acting as "crosslinking" agents and others acting as "graftlinking" agents according to the relative reactivity of their double bonds. It may i.a. be inferred from the definitions given in the application in suit and in D4, as well as from the exemplified monomers that, with respect to the location of their double bonds, "crosslinking" monomers are more or less

of "symmetrical" structure, i.e. the structural units comprising the double bonds are preferably identical, thus providing very similar reactivities; in contrast thereto, in "graftlinking" monomers the double bonds (at least two of them) are located in different structural surroundings, thus providing different reactivities.

3.5 In the appealed decision the Examining Division referred to page 5, lines 43 to 45 of EP-A-260 552 (document D5, claiming a priority date earlier than that of the application in suit, but being published after the latter's filing date) in order to demonstrate that no clear distinction is possible between "crosslinking" and "graftlinking" monomers. In this passage of D5 allyl methacrylate is exemplified among the "graftlinking" monomers, but it is stated too that it "can be used also as a crosslinking agent".

While the Examining Division took this statement in D5 as proof of the lack of a distinguishing character of the monomer definitions concerned, this is not in fact the case.

It rather appears that the statement in D5 that allyl methacrylate can be used also as a "crosslinking" agent merely highlights that this monomer, under the reaction conditions of D5, apart from its primary function as "graftlinking" monomer, also displays an important crosslinking activity. Allyl methacrylate can, thus, be considered as a borderline monomer, which the skilled man may, according to the circumstances, regard as "crosslinking" or "graftlinking" monomer.

This exceptional reaction possibility of allyl methacrylate does not, however, disqualify the distinguishing character of the terms "crosslinking" and "graftlinking" monomer, but shows only that the

boundary between them is to some extent blurred. This is nothing uncommon in technical reality and is particularly so with many functional definitions used in the field of polymers, such as "plasticizers", "mold release agents", "cell size regulators", etc..

However, in situations like the present, where the blurred boundary between the terms "crosslinking" and "graftlinking" monomer obstructs the interpretation of the claim, the requirement of clarity as stipulated in Article 84 EPC is offended.

It is of no consequence for this conclusion that D5 does not belong to the state of the art according to Article 54(2) EPC, because the statement therein relating to the possible double function of allyl methacrylate must be considered to have been part of the common general knowledge of a person skilled in this art already at the priority date of the application in suit. This was not contested by the Appellant.

- 3.6 To remedy this situation, the possibility of allyl methacrylate to be used as "crosslinking" monomer has been excluded in present Claim 1. Thereby the only known overlap of the categories "crosslinking" and "graftlinking" monomer has been removed.

This exclusion is admissible under Articles 84 and 123(2) EPC, because, on the one hand it amounts to the clarification of the technical term "crosslinking" monomer which, in view of the content of the original disclosure, could not be achieved otherwise without undue restriction of the claimed scope, and on the other hand it is fully in accordance with the invention

as original disclosed in the application in suit, which classifies this monomer among the preferred "graftlinking" monomers and makes no mention thereof among the "crosslinking" monomers.

Reference is made in this context to T 4/80 (OJ EPO 1982, 149) where the admissibility of a disclaimer excluding subject-matter that was originally within the claimed invention was admitted "if the subject-matter remaining in the claim cannot be defined more clearly and concisely directly" (Reasons point 3). Similarly, in T 313/87 dated 12 January 1988, the introduction of a statement disclaiming a small part of the originally claimed subject-matter was admitted because this part did not solve the existing technical problem.

- 3.7 The objection of lack of clarity upon which the appealed decision was based is thus removed by the amended wording of Claim 1.
4. Since the lack of clarity objection was the sole ground for the refusal of the application in suit and, consequently, the sole issue to be dealt with by the appeal, the Board is not in a position to grant the application as requested by the Appellant.

Instead, the substantive examination of the application has to be completed. To do this and in order not to deprive the Applicant of its right to be heard before two instances the Board makes use of its power under Article 111(1) EPC and remits the case to the Examining Division for further prosecution.

With respect to the proceedings to follow the Board deems it appropriate to point out that document D3: US-A-3 960 807, because of its disclosure of the relevant process steps (cf. Example 3), seems to be closer to the subject-matter now claimed in Claim 1

than document D1: 4 180 494, which does not describe the production of amorphous sheets from poly(ethylene terephthalate).

Order


For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the Examining Division for further prosecution on the basis of the claims submitted during oral proceedings.

The Registrar:


E. Gorgmaier

The Chairman:


C. Gérardin