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**Datasheet for the decision
of 27 May 2010**

Case Number: T 1394/06 - 3.3.03

Application Number: 97949210.5

Publication Number: 0955337

IPC: C08L 59/00

Language of the proceedings: EN

Title of invention:

Polyacetal resin composition and moldings

Patentee:

Polyplastics Co., Ltd.

Opponent:

E.I. DU PONT DE NEMOURS AND COMPANY

Headword:

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Relevant legal provisions:

EPC Art. 84

Relevant legal provisions (EPC 1973):

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Keyword:

"Main request, auxiliary requests 1-2 - definition of
parameter - clarity (no)"

Decisions cited:

T 1129/97, T 0555/05

Catchword:

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Case Number: T 1394/06 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 27 May 2010

Appellant: Polyplastics Co., Ltd.
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office dated and posted 11 July
2006 revoking European patent No. 0955337
pursuant to Article 102(1) EPC 1973.

Composition of the Board:

Chairman: R. Young
Members: O. Dury
C. Vallet

Summary of Facts and Submissions

I. The mention of the grant of European patent No. EP-B-0955337, based on application 97949210.5, filed on 22 December 1997 in the name of Polyplastics Co., Ltd. was published on 25 February 2004 in Bulletin 2004/09.

II. The granted patent was based on 18 claims, wherein independent claims 1, 14 and 16 read as follows:

"1. A polyacetal resin composition comprising a polyacetal resin, a glyoxyldiureide compound and a basic nitrogen-containing compound wherein the ratio of the glyoxyldiureide compound relative to the basic nitrogen-containing compound is 20/80-80/20 (w/w).

14. A process for producing a polyacetal resin composition which comprises mixing a polyacetal resin, a glyoxyldiureide compound and a basic nitrogen-containing compound wherein the ratio of the glyoxyldiureide compound relative to the basic nitrogen-containing compound is 20/80-80/20 (w/w).

16. A shaped article as molded from a polyacetal resin composition comprising a polyacetal resin, a glyoxyldiureide compound, and a basic nitrogen-containing compound, wherein the ratio of the glyoxyldiureide compound relative to the basic nitrogen-containing compound is 20/80-80/20 (w/w) and the emission of formaldehyde from which on 24-hour standing in a closed space at a temperature of 80°C is not greater than 1.5 µg per cm² surface area of the article."

Claims 2-13, 15 and 17-18 were dependent claims directed to elaborations of the composition of claim 1, of the process of claim 14 and of the article of claim 16, respectively.

III. A notice of opposition against the patent was filed by E.I. du Pont de Nemours and Company on 25 November 2004 on the ground of Art. 100 (a) EPC (lack of novelty, lack of inventive step) and Art. 100 (b) EPC.

IV. By a decision of the opposition division issued in writing on 11 July 2006 the patent was revoked because neither the main request (claims 1 to 18), nor auxiliary request 1 (claims 1 to 10), nor auxiliary request 2 (claims 1 to 9), all filed with letter of 29 June 2005, fulfilled the requirements of Art. 123 (2) EPC. Independent claim 1 of the main request was worded as follows:

"1. A polyacetal resin composition comprising a polyacetal resin, a glyoxyldiureide compound and a basic nitrogen-containing compound wherein the basic nitrogen-containing compound is at least one member selected from the group consisting of hydrazine or a derivative thereof, guanidine or a derivative thereof, a polyaminotriazine, and a nitrogen-containing resin, and the ratio of the glyoxyldiureide compound relative to the basic nitrogen-containing compound is 20/80-80/20 (w/w)."

Claim 1 of the first auxiliary request was directed to a shaped article moulded from a composition comprising,

inter alia, a basic nitrogen-containing compound defined as in claim 1 of the main request.

Claim 1 of the second auxiliary request was based on claim 1 of the first auxiliary request, which was further limited, *inter alia*, by requiring that the basic nitrogen-containing compound be selected from the group consisting of melamine or a derivative thereof, a guanamine or a derivative thereof, melamine resin and guanamine resin.

The opposition division considered that the amendment specifying the basic nitrogen-containing compound in claim 1 of each of the main request and of auxiliary requests 1-2 extended beyond the content of the application as filed, in particular because these requests all failed to specify, for each class of compounds claimed, whether they corresponded to compounds of either "low molecular weight" or "high molecular weight" as recited in the application as filed (see e.g. paragraph [0028] of the A1 publication). Hence, none of the requests of the patent proprietor was found to be allowable.

- V. A notice of appeal against the decision of the opposition division was filed on 8 September 2006 by the patent proprietor with simultaneous payment of the prescribed fee. In its statement of grounds of appeal received on 13 November 2006, the appellant requested that the contested decision be set aside and that the patent be maintained in its amended form according to the main request (claims 1-18) or auxiliary request 1 (claims 1-18) or auxiliary request 2 (claims 1-18) filed therewith.

The three independent claims of the main request read as follows:

"1. A polyacetal resin composition comprising a polyacetal resin, a glyoxyldiureide compound and a basic nitrogen-containing compound wherein the ratio of the glyoxyldiureide compound relative to the basic nitrogen-containing compound is 20/80-80/20 (w/w).

14. A process for producing a polyacetal resin composition which comprises mixing a polyacetal resin, a glyoxyldiureide compound and a basic nitrogen-containing compound wherein the ratio of the glyoxyldiureide compound relative to the basic nitrogen-containing compound is 20/80-80/20 (w/w).

16. A shaped article as molded from a polyacetal resin composition comprising a polyacetal resin, a glyoxyldiureide compound, and a basic nitrogen-containing compound,
the ratio of the glyoxyldiureide compound relative to the basic nitrogen-containing compound is 20/80-80/20 (w/w) and
the emission of formaldehyde from the article on 24-hour standing in a closed space under dry conditions at a temperature of 80°C is not greater than 1.5 µg per cm² surface area of the article."

Claims 2-13, 15 and 17-18 were dependent claims directed to elaborations of the composition of claim 1, of the process of claim 14 and of the article of claim 16, respectively.

Claim 1 of the first auxiliary request read as follows:

"1. A polyacetal resin composition comprising a polyacetal resin, a glyoxyldiureide compound and a basic nitrogen-containing compound wherein the basic nitrogen-containing compound is at least one member selected from the group consisting of a low molecular weight compound and a high molecular weight compound, wherein the low molecular weight compound is hydrazine or a derivative thereof, guanidine or a derivative thereof, a polyaminotriazine, uracil or a derivative thereof, or cytosine or a derivative thereof, and the high molecular weight compound is a nitrogen-containing resin, and the ratio of the glyoxyldiureide compound relative to the basic nitrogen-containing compound is 20/80-80/20 (w/w)."

Claim 1 of the second auxiliary request corresponded to claim 1 of the first auxiliary request further limited by the requirement that the basic nitrogen-containing compound is to be selected from "the group consisting of a low molecular weight compound and a high molecular weight compound, wherein the low molecular weight compound is hydrazine or a derivative thereof, guanidine or a derivative thereof, or a polyaminotriazine, and the high molecular weight compound is a nitrogen-containing resin".

Claim 16 of each of auxiliary requests 1-2 corresponded to a limitation of independent claim 16 of the main request and both referred, *inter alia*, to the same requirement regarding the emission of formaldehyde

measured "under dry conditions" as recited in claim 16 of the main request.

The remaining claims of auxiliary requests 1-2 are not important for the present decision.

Oral proceedings were requested as an auxiliary measure.

VI. In its reply to the notice of appeal dated 23 March 2007, the opponent, now respondent, requested that the appeal be dismissed, the contested decision be confirmed and the patent be revoked in its entirety. The respondent considered that the main request and auxiliary requests 1-2 did not meet the requirements of Art. 84 EPC, Art. 83 EPC, Art. 54 EPC and Art. 56 EPC and that auxiliary requests 1-2 did not satisfy the requirements of Art. 123 (2) EPC.

The respondent, in particular, argued that the expression "under dry conditions" present in claim 16 of the main request and in claim 16 of each of auxiliary requests 1-2 corresponded to an amendment of granted claim 16, which contravened Art. 84 EPC. The respondent first submitted that this term had no accepted technical meaning and that reference to the description e.g. to paragraphs [0059]-[0060] of the patent in dispute was not suitable to render said expression clear. In addition, it was contested that the information provided in said paragraphs [0059]-[0060] were suitable to render said expression sufficiently clear.

The respondent further objected that the terms "low molecular weight" and "high molecular weight", which

were present in claim 1 of both auxiliary requests 1-2 did not have a well-recognised meaning in the art and, thus, rendered the subject matter for which protection was sought unclear. This objection was in particular relevant regarding the claimed high and low molecular weight "derivative(s)" of chemical compounds.

Oral proceedings were requested as an auxiliary measure.

VII. On 28 January 2010 the board issued a summons to attend oral proceedings and informed the parties of its provisional opinion.

Regarding clarity, the board considered that the term "dry conditions" had no clear and unambiguous definition in the art and that it was derivable from the original disclosure that the measurements of the claimed parameter "emission of formaldehyde" were dependent on the measurement conditions. Hence, the parties were informed that the amendment made e.g. to claim 16 of the main request had led to a lack of clarity in the sense of Art. 84 EPC.

In addition, according to the board, the terms "low molecular weight" and "high molecular weight", did not have a precise meaning and, thus, rendered unclear the subject matter for which protection was sought e.g. in claim 1 of each of auxiliary requests 1-2.

The board further considered that the requirements of Art. 123 (2) EPC and Art. 83 EPC appeared to be satisfied by the main request as well as by auxiliary requests 1-2.

Finally, the board indicated that novelty over D1 (WO 96/04591 A) would be examined and that the assessment of the inventive merit would be done following the problem-solution approach, probably starting from either D1 or D3 (Gächter/Müller, *Plastics Additives*, 3rd Ed., 1990, pages 88-93) as closest prior art.

VIII. The appellant withdrew its request for oral proceedings by letter of 6 May 2010.

IX. Oral proceedings were held on 27 May 2010 in the absence of the appellant.

The respondent requested that the appeal be dismissed and the patent be revoked in its entirety because neither the main request, nor auxiliary request 1, nor auxiliary request 2 fulfilled the requirements of Art. 84 EPC, Art. 83 EPC, Art. 54 EPC or Art. 56 EPC and because auxiliary requests 1-2 did not satisfy the requirements of Art. 123 (2) EPC.

X. During the oral proceedings the respondent repeated its objections already made in writing concerning the lack of clarity of the term "under dry conditions" present in claim 16 of the main request and of both auxiliary requests 1 and 2. The first objection was that, due to the presence of such a vague and relative term, claim 16 would not be clear *per se*, contrary to the requirements of Art. 84 EPC. The second objection was that the content of the description of the patent and the examples demonstrated that the degree of humidity had an impact on the measurements of the emission of formaldehyde. Indeed, formaldehyde emissions measured

for a given composition/article under humid environment more than twice as high as those measured under dry environment were e.g. reported in Table 3 of the patent in suit. In the absence of information related to the humidity level used for the determination of formaldehyde emission, claim 16 was further unclear.

The Chairman of the board explained that the mere variability or mathematical imprecision in a parameter was not necessarily enough to be objectionable under Art. 84 EPC. In the present case, the Chairman agreed that the data of the patent showed that the formaldehyde emission measurements depended on the degree of humidity, but remarked that the values of formaldehyde emission under both dry and humid conditions reported in Table 3 for the examples illustrative of the subject matter claimed were all below the claimed value of $1.5 \mu\text{g per cm}^2$. Hence, it was questionable whether the variability of the parameter claimed was such so as to lead to a lack of clarity according to Art. 84 EPC.

The respondent pointed out that it remained that the claims were not clear *per se* and that, in its opinion, the large variability shown in Table 3 was, indeed, objectionable under Art. 84 EPC. The respondent further stressed that all these objections had already been raised in its reply to the statement of grounds of appeal and that the patent proprietor had neither replied to the objections nor modified said claims e.g. on the basis of the description in order to remove these objections raised.

XI. Finally, the respondent also repeated its objections regarding the lack of clarity of the expressions "low molecular weight" and "high molecular weight", in particular in connection with the terms "derivative", present in claim 1 of both auxiliary requests 1-2.

Final requests

XII. The appellant requested that the patent be maintained in its amended form according to the main request or auxiliary request 1 or auxiliary request 2, all filed on 13 November 2006.

The respondent requested that the appeal be dismissed.

XIII. The board announced its decision at the end of the oral proceedings.

Reasons for the Decision

1. The appeal is admissible.

2. *Clarity: Art. 84 EPC*

2.1 Main request

2.1.1 Claim 16 corresponds to granted claim 16, which has furthermore been *inter alia* amended so as to require that the emission of formaldehyde from the article on 24-hour standing in a closed space "under dry conditions" at a temperature of 80°C is not greater than 1.5 µg per cm² surface area of the article.

According to the EPO case law the unambiguous characterisation in a claim of a product by a parameter (here the emission of formaldehyde) necessarily requires that the parameter can be clearly and reliably determined (see e.g. T 555/05 of 24 May 2007, not published in OJ EPO: section 3.2.8 of the reasons). This requirement is in particular necessary in order for the public to know whether they are working within the claims or not.

- 2.1.2 The board agrees with the respondent that the term "under dry conditions" has no well-recognised technical meaning. This term is, thus, vague and renders the subject matter claimed unclear.

There is also no evidence on file that the skilled person reading the patent in suit would have associated said measurement conditions with only one standard method well accepted in the art. Therefore, the skilled person could not have completed the lack of an accepted definition for that term on the basis of its general knowledge.

The board further agrees with the respondent that the claims should be clear in themselves and that reference to the description, here paragraphs [0059]-[0062], is not suitable to render clear the subject matter claimed. This requirement derives in particular from the wording of Art. 84 EPC itself, which requires that the claims should be clear and concise. This conclusion is, furthermore, in agreement with accepted EPO case law, see e.g. T 1129/97 (OJ EPO 2001, 273), wherein it was decided that, in order to meet the requirements of Art. 84 EPC, it was not sufficient for the skilled

person to be able to resolve a lack of clarity in a claim by referring to the description.

The subject matter of claim 16, thus, does not fulfil the requirements of Art. 84 EPC.

2.1.3 Furthermore, in the present case, it is derivable from the patent itself that the conditions of measurement, in particular humidity, have an impact on the determination of said parameter "emission of formaldehyde". It is in particular clearly distinguished between measurements performed either "under dry conditions" (paragraphs [0059]-[0060] of the patent) and "under humid conditions" (paragraphs [0061]-[0062] of the patent). Paragraph [0060], for instance, reads as follows:

"[0060] After the shaped article of polyacetal resin is cut and its surface area measured where necessary, a suitable portion of the article (e.g. the amount equivalent to a surface area of about 10 to 50 cm²) is placed in a hermetically closed vessel (20 ml capacity) and allowed to stand at a temperature of 80°C for 24 hours. Then, this closed vessel is charged with 5 ml of water and the formalin in the aqueous solution is assayed in accordance with JIS K0102, 29 (under the heading of Formaldehyde) to calculate the formaldehyde emission (µg/cm²) per unit surface area of the shaped article."

Similar information is provided in paragraph [0062] of the patent regarding the measurements "under humid conditions", corresponding to conditions of saturated

i.e. maximum humidity as indicated in claim 17 of the patent in suit.

Hence, in addition to the temperature and the period of time during which the article is left under controlled environment - features which are, indeed, recited in claim 16 - the experimental part of the description of the contested patent provides precise information regarding the size of the container in which the article is inserted, as well as the amount of water added in said container at the beginning of the experiment. In the view of the board, this information is provided in order to define, implicitly, the actual degree of humidity present in the container in which the article is stored for a given period of time (e.g. 24 hours for the "dry conditions") before determining the amount of formaldehyde which has eluted from the article during this period of time. This degree of humidity corresponds, in the case of the so-called "dry conditions" to a specific value of relative humidity (ratio in % of the partial pressure of water vapour to the saturated vapour pressure of water vapour at a prescribed temperature). As derivable from claim 17 of the granted patent, the determination under "humid conditions" corresponds, apparently, to maximum humidity i.e. measurement under saturated vapour pressure of water vapour at the prescribed temperature. That the measurements of the emission of formaldehyde are dependent on humidity is derivable from the fact that the patent specifies two different conditions of measurements in relation to two different humidity levels. Furthermore, paragraph [0058] of the patent also states that it is preferable that the article shows said formaldehyde emission levels under either of

said "dry conditions" or "humid conditions", thereby implying that the emissions of formaldehyde are not identical under these different humidity conditions. Finally, examples 15-25 (Table 3 of the granted patent), which all illustrate the subject matter claimed, confirm that, for a given article, the formaldehyde emission measured under dry conditions differs from that measured under humid environment.

Hence, in the absence of any information in claim 16 concerning the volume of the container to be used and/or of the amount of water or water vapour present in said container at the beginning of the measurement, the degree of humidity present during the measurement is not clearly and unambiguously defined. The board, thus, agrees with the argument of the respondent that the parameter related to the formaldehyde emission "under dry conditions" which is recited in claim 16 is unclear.

The board notes that this objection was raised by the respondent as early as possible in the appeal proceedings, namely in its reply to the statement of grounds of appeal. The appellant has, however, never replied to this objection and thus, never contested the submissions made by the respondent in this respect. Considering that this objection is plausible, in particular when considering the evidence on file e.g. Table 3 of the patent in suit, and in the absence of any evidence to the contrary, the board decided that this objection of the respondent could be agreed to.

2.1.4 The board, thus, concludes that the subject matter of claim 16 is characterised by a parameter, namely the emission of formaldehyde, which has been defined incompletely in the claims and for which the lack of definition cannot be completed by the skilled person's general knowledge. The amendment of granted claim 16, thus, does not fulfil the requirements of Art. 84 EPC and is not allowable.

2.1.5 Claim 16 of the main request being not allowable, the main request as a whole must be refused.

2.2 Auxiliary requests 1-2

2.2.1 The same objection as for claim 16 of the main request, regarding the lack of clarity of the expression "under dry conditions" in relation to the emission of formaldehyde, applies to claim 16 of each of auxiliary requests 1-2.

2.2.2 Besides, claim 1 of both auxiliary requests 1-2 requires that the basic nitrogen-containing compound should either be a "low molecular weight compound" selected from specific classes of chemical compounds and derivatives thereof or, alternatively, a "high molecular weight compound" selected from another specific class of compounds.

The board agrees with the respondent that, since the terms "low molecular weight" and "high molecular weight" are of relative nature, they have no clear and unambiguous meaning. In particular, the use of the term "low molecular weight" to characterise the "derivative(s)" of the chemical compounds claimed

renders the subject matter claimed further unclear: in the absence of any definition for these derivatives in the claims, this term is to be understood in its broadest sense and encompasses any compound derivable by any kind of process from the compounds recited in claim 1 (hydrazine, guanidine, uracil and cytosine). The same holds true regarding the claimed polyaminotriazine, which may comprise radicals of any size and molecular weight. Since no definition is provided as to where the limit for the low and high molecular weight compounds is to be set, the skilled person is not in a position to distinguish compounds which belong to the subject matter claimed from those which do not.

The subject matter claimed for which protection is sought is, thus, unclear and does not meet the requirements of Art. 84 EPC.

As discussed above in section 2.1.2, the claims should be clear *per se*, which is not the case. However, for the sake of completeness, the board notes that, contrary to the parameter "emission of formaldehyde", the description of the patent in dispute does not provide a clear definition for these terms.

2.2.3 Each of claims 1 and 16 of both auxiliary requests 1 and 2 being not allowable, these requests, in their entirety, must be refused.

2.3 All these objections of lack of clarity had been raised in writing by the respondent in its reply to the notice of appeal with regard to the valid set of requests. The appellant has, however, never replied to these objections. The withdrawal by the appellant of its

request for oral proceedings is seen as a decision to surrender, voluntarily, its right to be heard pursuant to Art. 113 EPC, in particular with regard to the issue of clarity. The board has, thus, considered that the appellant was relying on its written case (Art. 15 (3) of the Rules of Procedure of the Boards of Appeal).

2.4 Under these circumstances, and since none of the requests of the appellant (patent proprietor) fulfils the requirements of Art. 84 EPC, the patent in suit is to be revoked. A discussion of the other issues addressed in the communication dated 28 January 2010, namely Art. 123 (2) EPC, Art. 83 EPC, Art. 54 EPC and Art. 56 EPC is thus superfluous.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

E. Goergmaier

R. Young