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**Datasheet for the decision
of 13 June 2007**

Case Number: T 0782/05 - 3.3.03

Application Number: 96930592.9

Publication Number: 0846138

IPC: C08G 69/04

Language of the proceedings: EN

Title of invention:

Process for the manufacture of nylon compositions with improved flow

Patentee:

E.I. DU PONT DE NEMOURS AND COMPANY

Opponent:

Degussa GmbH
Rhodia Engineering Plastics SA

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56, 84, 100(c), 123(2), 123(3)
EPC R. 57(a)
RPBA Art. 10b(1)

Keyword:

"Main request - novelty (no)"
"First new auxiliary request - clarity (no)"
"Second new auxiliary request - inventive step (no)"

Decisions cited:

G 0002/88, G 0009/91, T 0198/84, T 0651/91, T 0112/92,
T 0988/02

Catchword:

-



Case Number: T 0782/05 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 13 June 2007

Appellant:
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Decision under appeal: Decision of the Opposition Division of the European Patent Office dated 1 March 2005 and posted 19 April 2005 revoking European Patent No. 0846138 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: R. Young
Members: C. Idez
H. Preglau

Summary of Facts and Submissions

- I. The grant of the European patent No. 0 846 138 in the name of E. I. du Pont de Nemours and Company in respect of European patent application No. 96 930 592.9 filed on 23 August 1996 and claiming priority of the US patent application No. 2791 filed on 25 August 1995 and the US patent application No. 15862 filed on 9 July 1996 was announced on 24 October 2001 (Bulletin 2001/43) on the basis of 5 claims.

Claims 1 to 5 read as follows:

- "1. A process for making a part by injection molding, comprising providing an injection molding apparatus, adding to the apparatus a polyamide having an excess of acid or amine end groups such that the ratio of the end groups in excess to the end groups not in excess is at least 2.0:1.0, and injecting the polyamide into the mold to form a molded part.
2. The process of claim 1 wherein the melt viscosity of the polyamide resin is controlled by adjusting the ratio of end groups in excess to the end groups not in excess.
3. The process of claims 1 or 2 wherein the polyamide resin is prepared by polymerizing polyamide forming monomers in the presence of either excess acid or amine.
4. The process of claim 3 wherein the polyamide forming monomers are selected from diacids, diamines, aminocarboxylic acids, lactams, and mixtures thereof.

5. The process of claims 3 or 4 wherein the excess acid or amine is a diacid, diamine, monofunctional acid or monofunctional amine."

II. Two notices of Opposition against the patent were filed, as follows:

(i) by Degussa AG (later Degussa GmbH) (Opponent I), on 22 July 2002, and

(ii) by Rhodia Engineering Plastics SA (Opponent II), on 22 July 2002.

Opponents I and II opposed the patent on the grounds of lack of novelty and lack of inventive step (Article 100(a) EPC).

In addition, Opponent II opposed the patent on the ground of insufficiency of disclosure (Article 100(b) EPC). This ground was however dropped by Opponent II at the oral proceedings before the Opposition Division. The objections were supported *inter alia* by the following documents:

D1: Leaflet "Formmassen VESTAMID" of Hüls AG, No. 1129, October 1988, pages 6,7, 10-12 and 60-63;

D2: EP-A-0 344 427;

D3: EP-A-0 629 653;

D4: US-A-4 963 646;

D5: US-A-5 112 908;

D6: US-A-5 245 005;

D7: FR-A-1 220 968;

D9: D.H. Solomon; "Kinetics and mechanisms of polymerization series; vol. 3; Step-Growth

Polymerizations"; Marcel Dekker, Inc. New York, 1972;
pages 52-73;

D11: US-A-4 564 650;

D14: US-A-4 945 129;

D15: US-A-5 140 098;

D16: US-A-5 274 033;

D18: US-A-5 508 345; and the late filed but admitted
document

D19: M.I. Kohan; "Nylon Plastics Handbook", Hanser
Publishers, 1995, pages 34-39, 80-81 and 176.

III. By a decision announced orally on 1 March 2005 and
issued in writing on 19 April 2005, the Opposition
Division revoked the patent.

The decision of the Opposition Division was based on
Claims 1 to 5 as granted as main request and on three
auxiliary requests submitted at the oral proceedings of
1 March 2005.

Claim 1 of the first auxiliary request was a
combination of granted Claims 1 and 2. Claims 2 to 4 of
the first auxiliary request corresponded to granted
Claims 3 to 5.

Claim 1 of the second auxiliary request read as follows:

"A process for making a part by injection molding,
comprising
providing an injection molding apparatus,
adding to the apparatus a polyamide having an excess of
acid or amine end groups such that the ratio of the
end groups in excess to the end groups not in excess is
at least 2.0:1.0, and

injecting the polyamide into the mold to form a molded part, wherein the melt viscosity of the polyamide resin is controlled by adjusting the ratio of end groups in excess to the end groups not in excess such that the polyamide having end groups in excess to the end groups not in excess of at least 2.0:1.0 has lower melt viscosity than a corresponding polyamide of the same molecular weight having end groups in excess to the end groups not in excess of < 2.0."

Dependent Claims 2 to 4 corresponded to granted Claims 3 to 5.

Claim 1 of the third auxiliary request read as follows:

"Use of amines or acids in excess to produce a polyamide such that the ratio of the end groups in excess to the end groups not in excess is at least 2.0:1.0 in said polyamide to reduce the melt viscosity of said polyamide compared to another polyamide with the same molecular weight but having a ratio of said end groups in excess to said end groups not in excess of below 2.0 and use of said polyamide in a process for making a part by injection molding, comprising providing an injection molding apparatus, adding said polyamide to the apparatus and injecting said polyamide into the mold to form a molded part."

Dependent Claims 2 to 5 of the third auxiliary request corresponded to a reformulation of granted Claims 2 to 5 as use claims.

According to the decision of the Opposition Division, the subject-matter of granted Claim 1 and the subject-matter of Claim 1 of the first and second auxiliary requests were not novel over documents D15 and D7. Concerning the third auxiliary request, it was held in the decision that Claim 1 thereof did not meet the requirements of Article 84 EPC.

- IV. A Notice of Appeal was filed on 20 June 2005 by the Appellant (Patent Proprietor) with simultaneous payment of the requested fee.

With the Statement of Grounds of Appeal filed on 26 August 2005, the Appellant submitted a new main request and five auxiliary requests, as well as a statistical analysis of the experimental data submitted by Opponent II with its letter dated 22 December 2004.

Claims 1 to 4 of the main request corresponded to Claims 1 to 4 of the first auxiliary request on which the decision of the Opposition Division was based.

Dependent Claim 5 read as follows

"The process of any of claims 1 to 4 wherein the molded part is a cable tie, electrical connector, battery seal or radiator end tank."

Claims 1 to 4 of the first auxiliary request corresponded to Claims 1 to 4 of the second auxiliary request on which the decision of the Opposition Division was based, and dependent Claim 5 corresponded to Claim 5 of the main request.

Claims 1 to 5 of the second auxiliary request corresponded to Claims 1 to 5 of the claims of the third auxiliary request on which the decision of the Opposition Division was based.

Dependent Claim 6 read as follows

"The use of any of claims 1 to 5 wherein the molded part is a cable tie, electrical connector, battery seal or radiator end tank."

Independent Claim 7 corresponded to a combination of independent Claim 1 and dependent Claim 5 of the main request.

Claim 1 of the third auxiliary request corresponded to Claim 7 of the second auxiliary request. The remaining Claims 2 to 5 corresponded to granted Claims 2 to 5.

Claim 1 of the fourth auxiliary request differed from Claim 1 of the first auxiliary request in that the molded parts had been restricted to cable tie, electrical connector, battery seal or radiator end tank. Dependent Claims 2 to 4 corresponded to granted Claims 3 to 5.

Claim 1 of the fifth auxiliary request differed from Claim 1 of the second auxiliary request in that the molded parts had been restricted to cable tie, electrical connector, battery seal or radiator end tank. Dependent Claims 2 to 5 corresponded to Claims 2 to 5 of the second auxiliary request.

The Appellant also argued essentially as follows:

(i) Concerning the main request:

(i.1) Document D15 failed to disclose an injection-molding process, wherein the melt viscosity of a polyamide was controlled by adjusting the ratio of end groups in excess to the end groups not in excess, thus leading to an unbalanced polyamide having a decreased melt viscosity compared with a balanced polyamide of the same molecular weight.

(i.2) The gist of the present invention was that a polyamide having unbalanced end groups had an improved melt flow compared to a balanced polyamide having a comparable molecular weight and moisture content.

(i.3) In contrast to the prior art, the present invention sought to improve the melt viscosity without affecting the molecular weight, and even led to improved mechanical properties.

(i.4) The conventional knowledge was that the melt viscosity was influenced by the initial molecular weight and moisture in polyamides. The present inventors unexpectedly found that the melt viscosity was also influenced by the balance of the end groups.

(i.5) According to the present invention, only the end group ratio of the polyamide was varied, whereby the molecular weight and the moisture content were kept comparable between the balanced and the unbalanced polymer, leading to an improvement of the melt viscosity.

(i.6) The annexed statistical analysis showed that the effect of the end group ratio was separated from the further factors contributing to the change in melt viscosity.

(i.7) There was no indication in D15 to control the melt flow by adjusting the amine/acid end group ratio.

(i.8) The statistical analysis clearly demonstrated a separate contribution by the end-group balance on melt viscosity. This controlled adjustment of the end-group ratio represented a technical feature on its own of the claimed process, establishing novelty with regard to the cited prior art.

(i.9) Document D7 also said nothing about an injection-molding process wherein the melt viscosity of polyamide resins is controlled by adjusting the ratio of acid to amine end groups.

(i.10) Thus, the subject-matter of Claim 1 was novel over the cited prior art.

(i.11) The problem underlying the patent-in-suit might be seen in the provision of an injection-molding process for polyamides wherein the molecular weight of the polyamides was kept comparable to maintain the mechanical properties of the parts manufactured but at the same time the melt viscosity was reduced and thus the melt flow was increased to improve the molding process.

(i.12) This problem was solved by using a polyamide of comparable molecular weight having an excess of acid or

amine end groups such that the ratio of the end groups in excess to the end groups not in excess was at least 2:1.

(i.13) D15 was concerned with a continuous method for preparing polyamides having a regulated amino and carboxyl end-group content, prepared by granular production followed by solid phase post-condensation.

(i.14) Therefore, there was no suggestion in D15 regarding the inventive concept of the patent-in-suit.

(i.15) The same conclusion applied for D7 which taught the use of unbalanced ends for improving the hydrolytic resistance of polyamides.

(i.16) Thus, the claimed subject-matter was inventive with regard to the cited prior art.

(ii) Concerning the first auxiliary request:

(ii.1) Claim 1 included feature that the polyamide having a ratio of end groups in excess to the end groups not in excess of at least 2:1 had a lower melt viscosity than a corresponding polyamide of the same molecular weight having a ratio of end groups in excess to the end groups not in excess of less than 2.

(ii.2) Said feature, which represented a technical feature of the claimed process was neither explicitly nor implicitly disclosed in D7 or D15.

(iii) Concerning the second auxiliary request:

(iii.1) Claim 1 covered the use of amines or acids in excess for AABB type and AB-type polyamides. Both embodiments were clearly supported by the disclosure in the original documents. Thus, the claims according to the second auxiliary request met the requirements of Art. 84 and Art. 123(2) EPC.

(iv) Concerning the third, fourth and fifth auxiliary requests:

(iv.1) D7 and D15 both failed to disclose a process for making the specific articles listed in Claim 1.

(iv.2) The feature of using an unbalanced polyamide for reducing the melt viscosity of said polyamide in an injection-molding process for producing these specific articles was neither disclosed nor suggested in the prior art documents.

V. With its letter dated 5 January 2006, Respondent I (Opponent I) submitted the following document:

D21: H.G. Elias, "Makromoleküle, Volume 1, 5th Edition, Hüthig & Wepf Verlag, 1990, pages 225-231, and 895-899.

It also argued essentially as follows:

(i) According to D21, molecular weight and melt viscosity were directly linked. It was not possible to dissociate melt viscosity from the molecular weight.

(ii) It was known to reduce the increase of molecular weight of polyamides during injection molding by using unbalanced polyamides (cf. D5; column 2, lines 58 to column 3, line 4; column 3, lines 7 to 10; column 4, lines 20 to 25, and 62 to 68).

(iii) The subject-matter of Claim 1 of the main request was not novel over documents D2, D3, D4, D5,, D6, D7 and D15.

(iv) Claim 5 of the main request contravened Article 123(2) EPC.

(v) The Opposition Division was right to consider the subject-matter of Claim 1 of the first auxiliary request as lacking novelty.

(vi) Claim 1 of the second auxiliary request did not meet the requirements of Article 84 EPC and contravened Article 123(3) EPC due to the change of category.

(vii) The third, fourth and fifth auxiliary request contravened Article 123(2) EPC. Furthermore their subject-matter was obvious over D5.

VI. With its letter dated 9 March 2006, Respondent II (Opponent II) submitted the following document:

D22: J. Bost, "Matières Plastiques II technologie-plasturgie", 1982; page 219, as well as a statistical analysis.

It also argued essentially as follows:

(i) Concerning the statistical analysis made by the Appellant:

(i.1) This analysis was based on the wrong hypothesis that there was a linear relationship between Newtonian viscosity and intrinsic viscosity.

(i.2) It was however well established that there was a power law dependency between these two viscosities.

(ii) Concerning the main request and the first auxiliary request:

(ii.1) Documents D7, D11, D14, D15 and D16 were novelty destroying for the subject-matter of Claims 1 to 5 of these requests.

(ii.2) The subject-matter of Claims 1 to 5 would also lack inventive step over D15, which taught that unbalanced polyamides had better flow properties in injection molding.

(iii) Concerning the second auxiliary request:

(iii.1) Claims 1 to 5 did not meet the requirements of Article 84 EPC.

(iii.2) Concerning novelty and inventive step, reference was made to the arguments presented for the main request.

(iv) Concerning the third, the fourth and the fifth auxiliary requests:

(iv.1) The choice of the molded articles did not represent a purposive selection.

(iv.2) Thus, these requests lacked novelty and inventive step in view of the cited prior art.

VII. With its letter dated 14 May 2007, the Appellant submitted a new main request and fifteen auxiliary requests.

Claims 1 to 5 of the main request and of the first auxiliary request differed from Claims 1 to 5 of the main and the first auxiliary requests submitted with the Statement of Grounds of Appeal, respectively, only in that the term "automobile" had been inserted before the term "radiator" in Claim 5 thereof.

Claims 1 to 7 of the second auxiliary request differed from Claims 1 to 7 of the second auxiliary request submitted with the Statement of Grounds of Appeal, only in that the term "automobile" had been inserted before the term "radiator" in Claims 6 and 7.

Claims 1 to 5 of the third auxiliary request differed from Claims 1 to 5 of the third auxiliary request submitted with the Statement of Grounds of Appeal, only in that the term "automobile" had been inserted before the term "radiator" in Claim 1.

Claims 1 to 4 of the fourth auxiliary request differed from Claims 1 to 4 of the fourth auxiliary request

submitted with the Statement of Grounds of Appeal only in that the term "automobile" had been inserted before the term "radiator" in Claim 1.

Claims 1 to 5 of the fifth auxiliary request differed from Claims 1 to 5 of the fifth auxiliary request submitted with the Statement of Grounds of Appeal, only in that the term "automobile" had been inserted before the term "radiator" in Claim 1.

Claims 1 to 5 of the sixth auxiliary request differed from Claims 1 to 5 of main request only in that the expression "/electronic" had been inserted between the terms "electrical" and "connector" in Claim 5.

Claims 1 to 5 of the seventh auxiliary request differed from Claims 1 to 5 of first auxiliary request only in that the expression "/electronic" had been inserted between the terms "electrical" and "connector" in Claim 5.

Claims 1 to 7 of the eighth auxiliary request differed from Claims 1 to 7 of second auxiliary request only in that the expression "/electronic" had been inserted between the terms "electrical" and "connector" in Claims 6 and 7.

Claims 1 to 5 of the ninth auxiliary request differed from Claims 1 to 5 of the third auxiliary request only in that the expression "/electronic" had been inserted between the terms "electrical" and "connector" in Claim 1.

Claims 1 to 4 of the tenth auxiliary request differed from Claims 1 to 4 of the fourth auxiliary request only in that the expression "/electronic" had been inserted between the terms "electrical" and "connector" in Claim 1.

Claims 1 to 5 of the eleventh auxiliary request differed from Claims 1 to 5 of the fifth auxiliary request only in that the expression "/electronic" had been inserted between the terms "electrical" and "connector" in Claim 1.

Claims 1 to 6 of the twelfth auxiliary request corresponded to Claims 1 to 6 of the second auxiliary request.

Claim 1 of the thirteenth auxiliary request read as follows:

"Use of amines or acids in excess in the preparation of a polyamide such that the ratio of the end groups in excess to the end groups not in excess is at least 2.0:1.0 in said polyamide to reduce the melt viscosity of said polyamide compared to another polyamide with the same molecular weight but having a ratio of said end groups in excess to said end groups not in excess of below 2.0 and use of said polyamide in a process for making a part by injection molding, comprising providing an injection molding apparatus, adding said polyamide to the apparatus and injecting said polyamide into the mold to form a molded part, wherein the polyamide resin is prepared by polymerizing polyamide forming monomers which are diacids and

diamines in the presence of either excess acid or amine being a diacid or diamine."

Dependent Claims 2 and 3 corresponded to dependent Claims 2 and 6 of the second auxiliary request.

Claim 1 of the fourteenth auxiliary request differed from Claim 1 of the second auxiliary request only in that the disclaimer "wherein said polyamide does not include additives" had been incorporated therein. Claims 2 to 6 corresponded to Claims 2 to 6 of the second auxiliary request.

Claim 1 of the fifteenth auxiliary request read as follows:

"Use of amines or acids in excess in the preparation of a polyamide such that the ratio of the end groups in excess to the end groups not in excess is at least 2.0:1.0 in said polyamide to reduce the melt viscosity of said polyamide compared to another polyamide with the same molecular weight but having a ratio of said end groups in excess to said end groups not in excess of below 2.0 and use of said polyamide in a process for making a cable tie, electrical/electronic connector, battery seal or automobile radiator end tank by injection molding, comprising providing an injection molding apparatus, adding said polyamide to the apparatus and injecting said polyamide into the mold to form a molded cable tie, electrical/electronic connector, battery seal or automobile radiator end tank, wherein the polyamide resin is prepared by polymerizing polyamide forming monomers which are diacids and

diamines in the presence of either excess acid or amine being a diacid or diamine."

Claim 2 corresponded to Claim 2 of the second auxiliary request.

The Appellant also argued essentially as follows:

(i) The statistical analysis submitted with the Statement of Grounds of Appeal showed that there was a contribution of the imbalance of the terminal groups on melt viscosity.

(ii) The feature of controlling the melt viscosity of a polyamide resin by adjusting the ratio of end groups in excess represented a distinct technical feature.

(iii) The subject-matter of the main request was novel and inventive over the prior art relied on by the Respondents.

(iv) Claim 1 of the second auxiliary request was not open to objection under Article 84 EPC, because granted Claim 3 already referred to the use of excess of amine or acids in the context of AB and AABB type polymers (cf. also granted Claims 4 and 5 which were dependent on Claim 3).

(v) The change of category from a process claim to an use claim did not contravene Article 123(3) EPC.

VIII. In its letter dated 14 May 2007, Respondent II argued essentially as follows:

(i) The melt viscosity was linked to the molecular weight of the polyamide.

(ii) The imbalance between acid and amino groups and the water content of the polyamide had however an influence on the change of molecular weight during remelting.

(iii) As shown by Fig.3 on page 66 of document D9 the molecular weight of balanced and unbalanced polyamides were differently modified during injection molding under the same conditions (same temperature and water content).

(iv) Consequently, the skilled person wishing to obtain a certain level of flowability during injection molding would evidently choose the appropriate molecular weight, the water content and the imbalance in end-groups of the starting polyamide.

IX. In its letter dated 31 May 2007, Respondent I requested that the requests submitted by the Appellant with its letter dated 14 May 2007 should not be admitted into the proceedings as being late filed. Furthermore, it submitted that the high number of requests amounted to an abuse of proceedings.

X. Oral proceedings were held before the Board on 13 June 2007.

(a) At the oral proceedings the discussion firstly focussed on the admissibility of the main request

submitted by the Appellant with its letter dated 14 May 2007.

The Appellant having conceded that the filing of dependent Claim 5 thereof had not been occasioned by a ground of opposition but that it referred to a preferred embodiment of the claimed invention, and the Board, having, hence, questioned the allowability of that claim under Rule 57(a) EPC, the Appellant submitted a new main request which differed from the main request submitted with the letter dated 14 May 2007 in that Claim 5 of that request had been deleted.

(b) The Respondents having indicated that they had neither objection to the admission of that request into the proceedings, nor objection under Article 84, 123(2), or 123(3) EPC to the claims of this request, the discussion moved to the assessment of novelty of the subject of Claim 1 thereof.

While the Parties essentially relied on their arguments presented in the written phase of the appeal, emphasis was placed by the Parties on the following points:

(b.1) By the Respondents:

(b.1.1) The injection molding of polyamide having unbalanced end groups in a ratio of at least 2:1 for making molded parts was known in the prior art (cf. e.g. documents D1, D2, D3, D4, D5, D6, D7, D11, D14, D15).

(b.1.2) The feature in Claim 1 that the melt viscosity was controlled by adjusting the ratio of end groups in

excess to the end groups not in excess had merely an explanatory character.

(b.1.3) Melt viscosity was dependent on the molecular weight. Polyamides were living polymers, and it was known in the art how the ratio of end groups influenced the change of molecular weight (cf. D21, page 231, lines 12 to 19; D9, page 66, Fig. 3).

(b.2) By the Appellant:

(b.2.1) The aim of the patent of the patent in suit was to provide an injection molding process in which the parts could be easily molded without affecting their mechanical properties.

(b.2.2) It was known in the art that the melt viscosity might be controlled by the moisture content, and the molecular weight.

(b.2.3) Reducing the molecular weight would improve the melt viscosity but would impair the mechanical properties of the molded part.

(b.2.4) It had been found that the melt viscosity could be independently controlled by the end-groups ratio.

(b.2.5) Thus, the control of the melt viscosity by the ratio of end-groups represented a new technical feature which had not been previously made available to the public. Reference was made to the decision G 2/88 (OJ EPO 1990, 093).

(c) Following considerations of the Board concerning the relevance of the decision G 2/88 to the assessment of novelty of the claimed process according to Claim 1, the Board expressed the opinion that the feature of controlling the melt viscosity incorporated in Claim 1 would appear to be fulfilled by performing an injection molding process using a polyamide having the requested unbalance of end groups. The Appellant indicated then that it wished to proceed on the tenth auxiliary request submitted with the letter of 14 May 2007, as its new first auxiliary request.

The arguments presented by the Parties in respect of the admissibility of the new first auxiliary request may be summarized as follows:

(c.1) By the Respondents:

(c.1.1) This request should be considered as being late filed and should not been admitted in the proceedings.

(c.1.2) It was not clearly allowable since it contravened Article 123(2) EPC in view of the expression "electric/electronic connector" in Claim 1, and since the amendments made could not be presented as overcoming a ground of opposition (Rule 57(a) EPC).

(c.2) By the Appellant:

(c.2.1) This request was very similar to the fourth auxiliary request submitted with the Statement of Grounds of Appeal.

(c.2.2) The introduction of the expression "electric/electronic connector" had been made in response to objections under Article 123(2) EPC in view of the expression "electric connector" raised by Respondent I in respect of that fourth auxiliary request.

(d) The Board having informed the Parties that the new first auxiliary request would be admitted into the proceedings, the discussion moved to the question of the allowability under Article 123(2) and 84 EPC of the amendments made in Claim 1 of the request. The arguments presented by the Parties in that respect may be summarized as follows:

(d.1) By the Respondents:

(d.1.1) The feature "electric/electronic connectors" was unclear and was not supported by the application as originally filed.

(d.1.2) The change of molecular weight of the polyamide during the injection molding was dependent on the water content of the starting polyamide. Claim 1 did not however indicate the water content of the polyamide.

(d.1.3) According to Claim 1, the melt viscosity should be determined for a balanced and unbalanced polyamide having the same molecular weight. It was however not clear whether reference was made in Claim 1 to the molecular weight before or after injection molding.

(d.1.4) If according to the Appellant the mechanical properties were not altered during injection molding,

this would imply that the molecular weight remained the same for the unbalanced polyamide.

(d.1.5) It had been shown (cf. the calculations submitted by Respondent II at the oral proceedings and derived from the Fig. 3 of document D9 and from the general knowledge document D19), that the molecular weight of the polyamide inevitably varied during injection molding, and that furthermore the change in molecular weight would be different between balanced and unbalanced polyamides.

(d.1.6) It was thus unclear what was meant with the expression "same molecular weight" in respect of the determination of the melt viscosity of the balanced and unbalanced polyamide.

(d.1.7) Furthermore it was unclear to which molecular weight e.g. number average molecular weight, weight average molecular weight, or viscosity average molecular weight reference was made in Claim 1.

(d.2) By the Appellant:

(d.2.1) The feature "electric/electronic connector" was supported by the last paragraph on page 8 of the application as filed.

(d.2.2) These terms would also be clear the skilled person.

(d.2.3) It was clear that for sake of comparison the water content must be same in the balanced and in the

balanced polyamide. This was also clear from the Examples of the patent in suit.

(d.2.4) It was further clear that the same kind of molecular weight should be used.

(d.2.5) In view of the description of the patent in suit and the determination of the relative viscosity of the polyamide before injection molding, the skilled person would have understood that reference was made in Claim 1 to the molecular weight before injection molding.

(d.2.6) In any case the molecular weight of the polyamides did not substantially vary during the injection molding process. This was shown by the tests carried out in Annex A submitted by Respondent II in its letter dated 22 December 2004.

(d.2.7) Although the validity of the calculations made by the Respondent II was not challenged, they presupposed that the conditions of equilibrium for the polycondensation reaction were met. This was however not the case in an injection molding machine.

(d.2.8) It would further be possible for the skilled person by way of tests to come to conditions (e.g. water content, temperature) where during injection molding the molecular weights of the balanced and unbalanced polyamide were the same and hence to determine their respective melt viscosity.

(e) The Board, after deliberation having informed the Parties that the new first auxiliary request was

refused for lack of clarity in particular in view of the expression "same molecular weight" used in Claim 1 thereof, the Appellant submitted a new second auxiliary request.

Claim 1 of this request differed from Claim 1 of the third auxiliary request submitted with the letter dated 14 May 2007 only in that the reference to "electrical connector" had been deleted in Claim 1. Claims 2 to 5 of the new second auxiliary request corresponded to Claims 2 to 5 of the third auxiliary request submitted with letter dated 14 May 2007.

The discussion moved to the question of assessment of novelty and inventive step of the subject-matter of Claim 1 of this new second auxiliary request.

The arguments presented by the Parties in that respect may be summarized as follows:

(e.1) By the Respondents:

(e.1.1) The limitation to specific molded parts did not represent a purposive selection. No specific effect had been shown in relation to this selection. Reference was also made to the decision T 198/84 (OJ EPO 1985, 209) in that respect.

(e.1.2) Document D22 disclosed the use of polyamides in electrical and automobile applications.

(e.1.3) Furthermore, D11 disclosed flame retardant polyamide compositions for injection molding. The

requirement of flame resistance was typical of use in electrical applications.

(e.1.4) Document D18 would also be novelty destroying since it disclosed the injection molding of harness parts, e.g. protector, clamp and tying band serving to tie electrical wires.

(e.1.5) Concerning inventive step:

(e.1.5.1) Document D5 could be used as closest state of the art. It disclosed the use of polyamide having unbalanced end groups for the injection molding into complex thin parts with long flow length.

(e.1.5.2) Starting from D5 the technical problem would have to be seen in the provision of further application of the compositions of D5.

(e.1.5.3) The compositions of D5 were not restricted to the molding of large parts such as automotive exterior parts but were also used for small parts (pen barrels).

(e.1.5.4) Claim 1 of the second auxiliary request contained absolutely no limitation in terms of size of the molded articles, nor in terms of the molecular weight of the polyamide to be used.

(e.1.5.5) If one would consider as starting point the prior art referred in the patent in suit [0001], the technical problem would be, as could be deduced from the patent in suit, the provision of a process for easily injection molding parts necessitating a long flow without lowering the mechanical properties, i.e.

without reducing the molecular weight of the polyamide used.

(e.1.5.6) It had been however shown that there would be a reduction of the molecular weight of the unbalanced polyamide. Consequently, this technical problem was not solved by the claimed invention.

(e.2) By the Appellant:

(e.2.1) Document D5 was concerned with the injection molding of large parts (column 4, lines 1 to 5).

(e.2.2) The claimed process suit was, in contrast, directed to the injection molding of very small and complex parts while maintaining good mechanical properties.

(e.2.3) The compositions of D5 used low molecular weight polyamides. Without polymeric toughener, the compositions of D5 would have no commercial value as mechanical parts (cf. column 16, lines 8 to 16).

(e.2.4) There was hence no hint in D5 to use unbalanced polyamides for the injection molding of the very specific parts referred to in Claim 1, which had to fulfil specific mechanical requirements.

XI. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the new main request, filed during the oral proceedings, or in the alternative on the basis of one of the following auxiliary requests:

new first auxiliary request (filed as 10th auxiliary request on 14 May 2007), new second auxiliary request (filed during the oral proceedings), 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 11th, 12th, 13th, 14th, 15th auxiliary request (filed on 14 May 2007).

The Respondents requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. *Wording of the claims*

- 2.1 It is noted by the Board that an objection under Article 100(c) EPC has neither been raised against the granted patent by the Opponents (Respondents), nor dealt with in the appealed decision.

- 2.2 This has as a consequence that the assessment of the allowability of Claim 1 under Article 123(2) EPC must be limited to that of the amendments made during the opposition and/or opposition appeal proceedings (G 9/91 OJ EPO, 1993, 408).

- 2.3 Since Claim 1 of the main request corresponds to a combination of granted Claims 1 and 2, and since dependent Claims 2 to 4 correspond to granted dependent Claims 3 to 5, the claims of the new main request are not open to objection under Article 123(2) EPC.

2.4 No objections under Article 84 or 123(3) EPC to the claims of the main request have been raised by the Respondents.

2.5 The Board is also satisfied that the requirements of these articles are met by all the claims.

3. *Novelty*

3.1 Lack of novelty of the subject-matter of Claim 1 has been alleged by the Respondents in view, inter alia, of documents D3, D5, and D7.

3.2 Document D3 discloses the injection molding of unbalanced polyamides having a ratio of end groups in excess to the end groups not in excess of at least 2 for making test plates (cf. page 7, lines 15 to 33; page 8, lines 41 to 42).

3.3 Document D5 relates to polyamide compositions comprising a polyamide matrix having an end group imbalance of at least 1.9/1 and an organic polymeric toughener, which are used in the manufacture of injection molded articles (cf. column 3, line 33 to column 4, line 5). According to D5, these polyamide compositions could be molded at low pressure. In its Examples 1 to 19 (cf. Table 4), D5 discloses compositions in which the end group ratio of the polyamide matrix is higher than 2, which are used in the manufacture of test bars (column 8, line 56 to column 9, line 2). It further discloses in its Comparative Examples C-5 the use of an unbalanced polyamide (end-group ratio 6.3) in the manufacture of test bars by injection molding (cf. Table 5).

- 3.4 Document D7 discloses in its Example 1 the injection molding of test parts of a polyamide having as end groups 25 equivalents per 10^6 gram of carboxylic groups and 83 equivalents per 10^6 gram of amino groups, i.e. a ratio of 3.32 of amine end groups to acid end groups.
- 3.5 In this connection, the Board observes that Claim 1 of the main request is directed to a process for making a part injection molding which comprises the steps of
- (a) providing an injection molding apparatus,
 - (b) adding to the apparatus a polyamide having an excess of acid or amine end groups such that the ratio of the end groups in excess to the end groups not in excess is at least 2.0:1.0, and
 - (c) injecting the polyamide into the mold to form a molded part.
- 3.6 It is hence evident that a process comprising the steps (a) to (c) of the claimed process is known from documents D3, D5 and D7.
- 3.7 It had however been submitted by the Appellant that the mention in Claim 1 that the melt viscosity of the polyamide resin is controlled by adjusting the ratio of end groups in excess to the ratio of end groups not in excess would represent a technical feature of the claimed process, which would provide a distinction over the prior art relied on by the Respondents and

the Appellant has referred in that respect to the decision G 2/88.

- 3.7.1 In this connection, the Board notes that the decision G 2/88 (Reasons point 10.3) contains the following statement:

"with respect to a claim to a new use of a known compound, such new use may reflect a newly discovered technical effect described in the patent. The attaining of such a technical effect should then be considered as a functional technical feature of the claim (e.g. the achievement in a particular context of that technical effect). If that technical feature has not been previously made available to the public by any of the means as set out in Article 54(2) EPC, then the claimed invention is novel, even though such technical effect may have inherently taken place in the course of carrying out what has previously been made available to the public."

- 3.7.2 Thus, according to the decision G 2/88 (Order point (iii)) "A claim to the use of a known compound for a particular purpose, which is based on a technical effect which is described in the patent, should be interpreted as including that technical effect as a functional technical feature, and is accordingly not open to objection under Article 54(1) EPC provided that such technical feature has not previously been made available to the public."

- 3.7.3 Independently of the facts that the decision G 2/88 is concerned with the assessment of novelty of the subject-matter of such use claims, and that Claim 1 of

the main request is drafted as a process claim, so that it is, in the Board's view, at least for this reason, questionable as to whether the considerations made in decision G 2/88 in respect to the novelty of use claims are pertinent in the present case, the Board further observes that the decision G 2/88 makes a clear distinction between use claims which define the use of a particular entity to achieve an effect and use claims which define a use to produce a product.

- 3.7.4 As indicated at point 5.1 of the decision G 2/88, "provided that a use claim in reality defines the use of a particular physical entity to achieve an 'effect', and does not define such a use to produce a 'product', the use claim is not a process claim within the meaning of Article 64(2) EPC."
- 3.7.5 Consequently, even if one would consider that the use of the unbalanced polyamide would allow control of the melt viscosity of the polyamide in the injection molding process, it would still remain true that the use of the unbalanced polyamide in the injection molding process results in a "product" (molded part) and not in a "technical effect"; and that therefore the considerations made in G 2/88 according to which a "technical effect" could be considered as a technical feature of a claim would not apply to the feature in Claim 1 according to which "the melt viscosity of the polyamide resin is controlled by adjusting the ratio of end groups in excess to the end groups not in excess".
- 3.7.6 It thus follows that the claimed process must be considered as being defined only by the process steps (a), b) and (c) indicated above, and that the control

of melt viscosity is inevitably fulfilled by performing these process steps.

3.8 Consequently, documents D3, D5 or D7 are novelty destroying documents for the subject-matter of Claim 1 (Article 54 EPC).

3.9 Since the subject-matter of Claim 1 lacks novelty, the main request must be refused.

New first auxiliary request

4. *Admissibility*

4.1 As indicated above in Section X (c), the Appellant, at the oral proceedings before the Board, made the tenth auxiliary request submitted with the letter 14 May 2007 its new first auxiliary request.

4.2 In this connection, the Board notes that Claims 1 to 4 of that request differ from Claims 1 to 4 of the fourth auxiliary request submitted with the Statement of Grounds of Appeal only in that the expression "/electronic" and the term "automobile" have been inserted in Claim 1 before the wordings "connector" and "radiator end tank", respectively.

4.3 In that respect, it is firstly clear in the Board's view, that the amendments carried out in Claim 1 of the fourth auxiliary request have been made in order to take into account the objections under Article 123(2) EPC raised by Respondent I in its letter dated 5 January 2006 in view of the presence of the expressions "electrical connector" and "radiator

end tank" in the claims of the main, third and fourth auxiliary requests submitted with the Statement of Grounds of Appeal by the Appellant (cf. page 7; second paragraph, page 8; second and third paragraphs).

4.4 Furthermore, in the Board's view, these amendments neither add complexity to the case nor raise issues which the Board or the Respondents could not be expected to deal with without adjournment of the oral proceedings.

4.5 Thus, under these circumstances, the Board, making use of its discretion under Article 10(b)(1) RPBA decides to admit the new first auxiliary request into the proceedings.

5. *Wording of the claims*

5.1 Claim 1 of the new first auxiliary request differs from granted Claim 1 in that (i) it has been restricted to the manufacture of cable tie, electrical/electronic connector, battery seal or radiator end tank by injection molding, and (ii) by the introduction of the the feature that "the melt viscosity of the polyamide resin is controlled by adjusting the ratio of end groups in excess to the end groups not in excess such that the polyamide having end groups in excess to the end groups not in excess of at least 2.0:1.0 has lower melt viscosity than a corresponding polyamide of the same molecular weight having end groups in excess to the end groups not in excess of < 2.0."

- 5.2 Amendment (i) finds its support at page 8, lines 6 to 8 of the application as originally filed (cf. WO-A-97/08222).
- 5.3 Concerning amendment (ii), it is supported by the passage on page 1, lines 25 to 28, and the passage on page 2, lines 4 to 11 of the application as originally filed.
- 5.4 Since dependent Claims 2 to 4 are based on Claims 3 to 5 as granted, the new first auxiliary request must be considered as meeting the requirements of Article 123(2) EPC.
- 5.5 The Board is also satisfied that the amendments made in Claim 1 do not result in an extension of scope of protection in comparison to the scope of protection conferred by the claims as granted, so that the requirements of Article 123(3) EPC are also fulfilled.
6. *Clarity*
- 6.1 When amendments are made to a patent during an opposition, Article 102(3) EPC requires consideration as to whether the amendments introduce any contravention of any requirement of the Convention, including Article 84 EPC.
- 6.2 Claim 1 of the new first auxiliary request now contains the feature that the melt viscosity of the polyamide resin is controlled by adjusting the ratio of end groups in excess to the end groups not in excess such that "the polyamide having end groups in excess to the end groups not in excess of at least 2.0:1.0 has lower

melt viscosity than a corresponding polyamide of the same molecular weight having end groups in excess to the end groups not in excess of < 2.0."

- 6.3 It is hence clear that the comparison between the melt viscosities of the unbalanced polyamide and of the balanced polyamide of the same molecular weight is the essential factor for the adjustment of the ratio of end groups in the unbalanced polyamide, i.e. for the selection of the unbalanced polyamide to be used in the claimed process.
- 6.4 It thus follows that the comparison of the melt viscosities between the unbalanced and the balanced polyamides of same molecular weight has hence a crucial role in indicating the limits of the claimed subject-matter, or, in other words, in defining the matter for which protection is sought.
- 6.5 According to Article 84 EPC, the claims shall define the matter for which protection is sought (first sentence) and for this purpose they shall, inter alia, be clear and supported by the description (second sentence). This implies that the claims must be clear in themselves when being read with the normal skills, but not including any knowledge derived from the description of the patent application (cf. decision T 0988/02 of 30 October 2003, not published in OJ EPO; Reasons point 3.3.1).
- 6.6 Thus, in order to allow the matter for which protection is sought to be defined, it must be clear from the claim itself when being read by the person skilled in the art exactly how the comparison between the melt

viscosity of the unbalanced polyamide and the melt viscosity of the balanced polyamide should be carried out.

- 6.7 In that respect, it had been submitted by the Respondents that Claim 1 does not indicate the amount of water in the balanced and unbalanced polyamides, the kind of molecular weight of the polyamides (e.g. weight average molecular weight, number average molecular weight, or viscosity average molecular weight), or the moment of the injection molding process at which the comparison between the melt viscosity of balanced and unbalanced polyamide of the same molecular weight should be carried out.
- 6.8 While it can be considered, in the Board's view, that a valid comparison between the balanced and the unbalanced polyamides would inherently presuppose that they exhibit the same water content and that the same kind of molecular weight is used for characterizing both polyamides, it still remains to be clarified what is meant by the requirement that the balanced and unbalanced polyamide should exhibit the same molecular weight when comparing their melt viscosities.
- 6.8.1 In that respect, the Board notes that the Appellant has submitted that the skilled person would interpret Claim 1 as requiring that the unbalanced and the balanced polyamides should exhibit the same molecular weight before injection molding. This is supported, in the Appellant's view, by the examples of the patent in suit, where the unbalanced and the balanced polyamides used exhibit similar relative viscosities, i.e. similar molecular weight before injection molding (cf. Control

A and Examples 1 and 2; Control B, Example 3; and Control C and Example 4).

6.8.2 The Appellant has further submitted that the molecular weight of both the unbalanced polyamide and the balanced polyamide do not substantially vary during the injection molding process, so that this would allow a comparison of the melt viscosity at similar molecular weight, and moreover that the skilled person would be able to determine using trials the processing conditions leading to a similarity of molecular weight of both the unbalanced and the balanced polyamides during injection molding.

6.8.3 While it could be accepted, in the Board's view, that the molecular weight of the unbalanced and of the balanced polyamide used in the respective Examples and Control of the patent in suit were similar before injection molding, the Board notes that there is, however, no evidence in the patent in suit that the molecular weight of the unbalanced and of the balanced polyamide did not substantially vary during the injection molding process, since no determination of the molecular weight of the polyamides used in the examples of the patent in suit had been carried out after injection molding.

6.8.4 The Board cannot also accept the allegation of the Appellant that the molecular weight of both the unbalanced and the balanced polyamide containing the same amount of water would not substantially vary during the injection molding process, since, as shown by Fig.3 on page 66 of document D9 and the calculations submitted by the Respondent II in that respect at the

oral proceedings before the Board and derived from the equilibrium formula (3.1) set out on page 34 of document D19, whose validity as such had not been challenged by the Appellant, the molecular weight of a balanced and the molecular weight of an unbalanced polyamide having the same content of water at the start would inevitably vary differently when exposed at temperatures corresponding to those used in an injection molding process, because their respective water content at the equilibrium under these conditions would differ.

6.8.5 The fact that the molecular weights of balanced and unbalanced polycondensation resins vary differently during melt processing is further supported by document D21 (page 231; lines 12 to 19) and by the tests reported in Annex A submitted with letter dated 22 December 2004 of the Respondent II (Table 2; Example 1 (balanced; water content 1465 ppm) and Example 2 (unbalanced; water content 1499 ppm); Example 1 (balanced, water content 463 ppm) and Example 4 (unbalanced water content 472 ppm) which show different variations of the intrinsic viscosity, i.e. of molecular weights, for the balanced and the unbalanced polyamides.

6.8.6 Nor could the Board accept the further argument of the Appellant that the skilled person would arrive by way of trials at injection molding conditions under which the molecular weight of both the unbalanced polyamide and the balanced polyamide remained substantially the same, since Claim 1 does not contain any limitation either in terms of injection molding conditions (e.g.

- temperature, pressure) or in terms of water content of the polyamide.
- 6.8.7 The same conclusion applies for the argument of the Appellant (cf. Section X (d.2.7) above) that the calculations presented by Respondent II at the oral proceedings would not be relevant since the conditions in the injection molding machine would not correspond to the conditions of equilibrium of the polycondensation reaction.
- 6.8.8 This is primarily because there is no evidence that the conditions in an injection machine would differ from those of the equilibrium of the polycondensation reaction. On the contrary, as shown by document D5 (column 4, lines 62 to 65), conditions close to equilibrium are achievable in the injection molding machine.
- 6.8.9 This is also because it belongs to the general knowledge (cf. D19; page 34; lines 31 to 42) that the displacement of the polycondensation reaction either in the direction of an amidation reaction (molecular weight increase) or in the direction of an hydrolysis reaction (molecular weight decrease) is inevitably governed at a specific temperature and pressure (e.g. conditions of injection molding) by the concentration of amino and acid end groups (i.e. their ratio), and the concentration of water in the melt.
- 6.8.10 Since, as indicated above, the molecular weights of the unbalanced and of the balanced polyamides vary differently during the injection molding process, and since the melt viscosity can evidently be determined

only when the starting balanced and unbalanced polyamides of same molecular weight have been submitted to the temperature conditions of the injection molding process, this would inevitably imply that at the time of determination and comparison of the melt viscosities, the molecular weight of the unbalanced polyamide and of the balanced polyamide would no longer be the same.

- 6.8.11 Consequently, the interpretation relied on by the Appellant of the wording "same molecular weight" in Claim 1 as referring to the molecular weight of the polyamides before injection molding is irreconcilable with the requirement that the melt viscosity of the unbalanced polyamide should be compared with the melt viscosity of an unbalanced polyamide of the same molecular weight.
- 6.9 Under these circumstances, the Board can only come to the conclusion that there is a lack of information in Claim 1 regarding the requirement according to which the melt viscosity of the balanced and the unbalanced polyamide should be compared at the same molecular weight.
- 6.10 This lack of information results in uncertainty as to the definition of the unbalanced polyamide to be used in the claimed process. In other words, Claim 1 is not clear as required by Article 84 EPC.
- 6.11 Since Claim 1 does not comply with Article 84 EPC, the new first auxiliary request must be refused.
- 6.12 Under these circumstances, there is no need for the Board to deal with the further objection under

Article 84 EPC raised by Respondent I in view of the expression "electric/electronic connector".

New second auxiliary request

7. *Admissibility*

7.1 Claims 1 to 5 of the new second auxiliary request differ from Claim 1 of the third auxiliary request submitted with the Statement of Grounds of Appeal only in that the reference to "electrical connector" has been deleted in Claim 1, and that the wording "automobile" has been inserted before the expression "radiator end tank" in Claim 1.

7.2 Since the same considerations as made in paragraph 4. above concerning the admissibility of the new first auxiliary request also apply to the claims of the new second auxiliary request, the Board, making use of its discretion under Article 10(b)(1) RPBA decides to admit the new first auxiliary request into the proceedings.

8. *Wording of the claims*

8.1 No objections under Articles 123(2), 123(3) and 84 EPC have been raised by the Respondents in respect of the claims of the new second auxiliary request.

8.2 The Board is also satisfied that the requirements of these articles are met.

9. *Novelty*

- 9.1 While documents D1, D2, D3, D4, D5, D6, D7, D11, D14, D15, D16 and D18 have been cited by the Respondents as disclosing the use of unbalanced polyamides having a ratio of end groups in excess to the end groups not in excess of at least 2 in the manufacture of molded parts by injection molding, the Board is unable to find in these documents a direct and unambiguous disclosure of the use of such polyamides for the manufacture of cable tie, battery seal, or automobile radiator end tank by injection molding as referred to in Claim 1.
- 9.2 Even if it would be considered in view of document D22 (page 219; lines 1 to 2 and 20 to 21) that it belongs to the general knowledge in the field of injection molding that polyamides could be used in the manufacture of mechanical parts for automobile or electric applications, and even if documents D1, D2, D3, D4, D5, D6, D7, D11, D14, D15, D16 and D18 would be read in combination with that general knowledge, such a generic disclosure would not take away the novelty of the process according to Claim 1 which is directed to the manufacture of specific molded parts even falling within this generic disclosure (cf. also T 651/91 of 18 February 1993, not published in OJ EPO, Reasons point 4.3).
- 9.3 Consequently, the subject-matter of Claims 1 to 5 of the new second auxiliary request must be regarded as novel over the cited prior art (Article 54 EPC).
- 9.4 This conclusion cannot be altered by the further argument of Respondent II in view of the decision

T 198/84 that the choice of the specific articles mentioned in Claim 1 would represent an arbitrary selection.

9.4.1 This is primarily because the circumstances of the present case totally differ from those underlying that decision, which dealt with the novelty of the selection of a sub-range of numerical values from a broader range.

9.4.2 This is further because, in contrast to the considerations made in the decision T 198/84 in respect to the selected range of numerical values (cf. Reasons, point 7) it cannot be held that the selected specific articles according to Claim 1 have the same capabilities as all articles falling under the generic terms electric or automobile parts.

10. *Inventive step*

10.1 Claim 1 of the new second auxiliary request relates to a process for making specific articles by injection molding of an unbalanced polyamide composition.

10.2 Such process is known from document D5, which the Board regards as the closest state of the art.

10.3 D5 relates to thermoplastic polyamide compositions having good impact toughness and which can easily molded into large parts with complex shapes in thin sections and with long flow paths (column 1, lines 9 to 13; column 1, line 63 to column 2, line 4).

According to D5 the polyamide composition comprises

a) 60 to 90 wt% of a polyamide matrix and b) 10 to 40%

of at least one organic polymeric toughener (column 2, lines 12 to 21). The polyamide matrix exhibits an end group imbalance of at least about 1.9/1. Such end group imbalance is convenient in order for the polyamide matrix to be maintained at low molecular weight during the molding operation at the low moisture levels (column 2, line 58 to column 3, line 3).

These compositions could be molded at a fraction of the pressures needed to mold conventional higher molecular weight polyamides (column 3, lines 7 to 10).

These polyamide compositions can be molded under low pressure into a wide range of useful articles such as cabinets, instrument consoles, automotive exterior parts, tractor and truck consoles, sleds, stretchers, boats, pen barrels, louvres and the like, and a variety of parts with large surface area and thin section (column 3, line 67 to column 4, line 5).

10.4 As can be understood from the description of the patent in suit, its aim was to provide a process allowing the injection molding of polyamide compositions into complex parts with thin cross section such as cables ties, battery seals, or automobile radiator end tanks at lower injection pressure without adversely affecting the mechanical properties of the molded parts (cf. paragraphs [0001], [0032] and [0033]).

10.5 Nevertheless, the only distinguishing feature between the disclosure of D5 and the subject-matter of Claim 1 is the fact that D5 does not mention the injection molding of cables ties, battery seals or automobile radiator end tanks.

10.6 Thus, starting from D5 the technical problem underlying the patent in suit has to be seen in the provision of further applications of the polyamide compositions according to D5 in the manufacture of parts by injection molding.

10.7 Since as indicated above, the polyamide compositions of D5 are particularly adapted for the injection molding of complex shapes with thin sections, it would have been obvious for the skilled person to use the unbalanced polyamide compositions according to D5 in the manufacture by injection molding of further complex shaped articles with thin section such as cable ties, battery seals or automobile radiator end tanks (cf. also T 112/92 (OJ EPO 1994, 192; Reasons point 3.9)).

10.8 Thus, the subject-matter of Claim 1 must be regarded as obvious over D5.

10.9 This conclusion could not be altered by the argument of the Appellant that the polyamide matrices according to D5 have a low molecular weight and that they would not be suitable for the claimed applications, since Claim 1 puts absolutely no limitation on the molecular weight of the polyamide to be used, and since the patent in suit does not exclude the presence of a toughener in the polyamide composition (cf. patent in suit paragraph [0005]).

10.10 Nor could the further argument of the Appellant that D5 relates to the molding of large parts while Claim 1 is

directed to the molding of small parts be relevant for the following reasons:

10.10.1 Independently of the fact that Claim 1 does not contain any limitation concerning the size of the molded parts, so that there is no clear distinction between parts which should be considered as "small" and parts which should be considered as "large", it is in any case more than questionable whether the term "small parts" would inevitably apply to parts such as automobile radiator end tanks.

10.10.2 Furthermore, while it might be true that D5 would appear to refer predominantly to the molding of "large" parts, it nevertheless further discloses the use of the molding compositions in the injection molding of pieces as small as pen barrels (cf. column 4, line 4).

10.10.3 In any case, even it would be considered for sake of argument that D5 only discloses the injection molding of large pieces and that the molded parts referred to in Claim 1 are small parts, it would still remain that compositions of D5 which are known to be suitable for molding complex thin parts with long flow length would obviously be suitable for molding complex thin parts with much shorter flow length.

10.11 Since Claim 1 of the new second auxiliary request does not meet the requirements of Article 56 EPC, this request must be refused.

11. *Further requests*

- 11.1 The Board notes that the first, second, sixth, seventh, eighth, twelfth, thirteenth, and fourteenth auxiliary requests submitted with the letter of 14 May 2007 would be subject to the same deficiency under Rule 57(a) EPC as the main request submitted with that letter (cf point above X (a)).
- 11.2 The Board also notes that Claim 1 of the third and ninth auxiliary requests submitted with the letter of 14 May 2007 encompasses the subject-matter of Claim 1 of the new second auxiliary request, and would hence suffer from the same lack of inventive step as Claim 1 of that request.
- 11.3 The Board further observes that Claim 1 of the fourth, fifth, eleventh and fifteenth auxiliary requests submitted with the letter of 14 May 2007 would also be open to the same objection as Claim 1 of the first auxiliary request in view of the wording "same molecular weight".
- 11.4 Thus, under these circumstances, the Board decides not to admit these further requests into the proceedings (Article 10b(1) RPBA).
12. Since none of the requests of the Appellant can be granted, the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

E. Görgmaier

R. Young