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**Datasheet for the decision
of 22 September 2023**

Case Number: T 1225/21 - 3.3.03

Application Number: 11809023.2

Publication Number: 2668229

IPC: C08K5/00, C08K5/20

Language of the proceedings: EN

Title of invention:

ADDITIVE COMPOSITIONS AND THERMOPLASTIC POLYMER COMPOSITIONS
COMPRISING THE SAME

Patent Proprietor:

Milliken & Company

Opponents:

TotalEnergies One Tech Belgium
Adeka Corporation

Relevant legal provisions:

RPBA 2020 Art. 12(6), 13(2)
EPC Art. 100(b)

Keyword:

Amended sets of claims after summons - deletion of claims -
amendment within the meaning of Article 13(2) RPBA 2020 -
exceptional circumstances (yes) - taken into account
Sufficiency of disclosure (no) - lack of guidance (all
requests)

Decisions cited:

T 0409/91, T 0435/91, T 0494/18, T 2091/18, T 2920/18,
T 2988/18, T 0247/20



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Case Number: T 1225/21 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 22 September 2023

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 10 June 2021
revoking European patent No. 2668229 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chairman	D. Semino
Members:	F. Rousseau
	L. Basterreix

Summary of Facts and Submissions

- I. The present appeal lies against the decision of the opposition division revoking European patent No. 2 668 229.
- II. The decision was based on the patent as granted as the main request and auxiliary requests 1 to 6 submitted with letter of 19 March 2021.
- III. Claims 1 to 4 of the patent as granted read as follows:

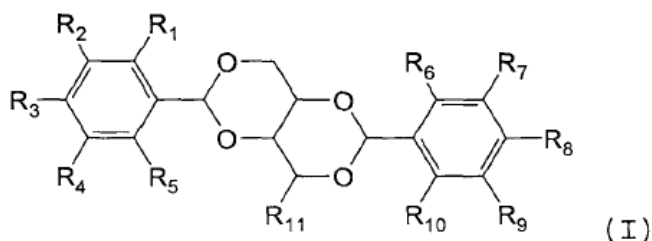
"1. A method for producing a thermoplastic polymer composition, comprising the steps of:

(1) providing separately of each other

(a) a thermoplastic polymer; and

(b) an additive composition comprising:

(i) at least one clarifying agent selected from trisamides, aluminum 2,2'-methylenebis-(4,6-di-*tert*-butylphenyl) phosphate, lithium 2,2'-methylenebis(4,6-di-*tert*-butylphenyl) phosphate, monocarboxylate compounds, and acetal compounds of formula (I)



wherein

R₁-R₁₀ are each independently are selected from H, alkyl, alkoxy, alkenyl, aryl, and halogen; and R₁₁ is -CH₂OH or -CHOHCH₂OH; and

(ii) a coloring agent;

or

(a) a thermoplastic polymer,

(d) a clarifying agent as defined above; and

(e) a coloring agent; and

(2) mixing (a) and (b), or (a), (d) and (e) to produce a thermoplastic polymer composition,

wherein

- the amount of clarifying agent is 100-5,000 ppm, based on the total weight of the thermoplastic polymer composition; and

- the amount of coloring agent present in the thermoplastic polymer composition is sufficient to produce a thermoplastic polymer composition exhibiting a Δa^* value and a Δb^* value satisfying each of the following inequalities

$$\Delta b^* \leq 0 - (2.8571 \times \Delta a^*)$$

$$\Delta b^* \geq -1.5231 + (5.8461 \times \Delta a^*)$$

$$\Delta b^* \geq -2.6000 - (1.0909 \times \Delta a^*)$$

$$\Delta b^* \leq 0 + (1.2727 \times \Delta a^*)$$

wherein a* and b* are CIE L*a*b* color values are determined using a GretagMacBeth Color-Eye 7000A spectrophotometer with measurements taken

- in reflectance mode with a large area view using a cool white fluorescent light source and a 10° observer with specular reflectance included in the measurement,
- using a UV filter to exclude UV light from the light source,
- placing the spectrophotometer's white calibration tile behind the test plaques during the measurements
- taking measurements on five separate 50.8 mm x 76.2 mm x 1.27 mm (2.00 inch x 3.00 inch x 0.05 inch) test plaques made using the polymer composition, and
- averaging the five measurements to yield a single set of L^* , a^* , and b^* values for the polymer composition, and

wherein Δb^* is not zero; and Δa^* and Δb^* are determined by measuring a^* and b^* as described above, measuring a^*_c and b^*_c exhibited by a 1.27 mm (50 mil) plaque made from a control composition containing the thermoplastic polymer and the clarifying agent but not the coloring agent, and calculating $(a^* - a^*_c) = \Delta a^*$ and $(b^* - b^*_c) = \Delta b^*$.

"2. A method for producing a thermoplastic polymer composition, comprising the steps of:

(1) providing separately of each other

(a) a thermoplastic polymer; and

(b) an additive composition comprising:

(i) at least one clarifying agent as defined in claim 1; and

(ii) a coloring agent;

or

(a) a thermoplastic polymer,

- (d) a clarifying agent as defined in claim 1; and
- (e) a coloring agent; and

(2) mixing (a) and (b), or (a), (d) and (e) to produce a thermoplastic polymer composition,

wherein

- the amount of clarifying agent is 100-5,000 ppm, based on the total weight of the thermoplastic polymer composition; and
- the amount of coloring agent present in the thermoplastic polymer composition is sufficient to produce a thermoplastic polymer composition exhibiting an a^* value and a b^* value satisfying each of the following inequalities

$$b^* \leq 3.4 - (1.4196 \times a^*)$$

$$b^* \geq 3.1 + (9 \times a^*)$$

$$b^* \geq 1 - a^*$$

$$b^* \leq 3.6174 + (0.7449 \times a^*)$$

wherein a^* and b^* are CIE $L^*a^*b^*$ color values are determined using a GretagMacBeth Color-Eye 7000A spectrophotometer with measurements taken

- in reflectance mode with a large area view using a cool white fluorescent light source and a 10° observer with specular reflectance included in the measurement,
- using a UV filter to exclude UV light from the light source,
- placing the spectrophotometer's white calibration tile behind the test plaques during the measurements
- taking measurements on five separate 50.8 mm x 76.2 mm x 1.27 mm (2.00 inch x 3.00 inch x 0.05 inch) test plaques made using the polymer composition, and

- averaging the five measurements to yield a single set of L*, a*, and b* values for the polymer composition.

3. The method of claim 1 or 2, wherein the L* value of a 1.27 mm (50 mil) plaque made using the thermoplastic polymer composition is about 88 or greater.

4. The method of claim 1 or 2, wherein the thermoplastic polymer is a polyolefin, and preferably is a polyolefin selected from polypropylene homopolymers, polypropylene random copolymers, and mixtures thereof."

Claim 2 of auxiliary request 4 corresponded to a combination of the features of granted claims 2 and 4. Claim 2 of auxiliary request 5 additionally contained the features of granted claim 3.

IV. The decision was taken having regard *inter alia* to the following documentary evidence:

D5: "Analysis of Experiments from Patent" filed as D1 by opponent 2 with the notice of opposition

D6: "Measurement Timing Experiments" filed as D2 by opponent 2 with the notice of opposition

D28: ISO 11664-4:2008-11

D34: "Experimental Report" filed as D25 by opponent 2 with letter of 15 November 2019

D35: "Analysis of Experiments from Patent" filed as D26 by opponent 2 with letter of 15 November 2019

D37: "Report for Added Subject Matter - EP 2668229" filed as D28 by opponent 2 with letter of 15 November 2019

D44: Excerpt of Wikipedia "CIELAB color space"

D45: Statement of Nathan A. Mehl dated 16 March 2021.

- V. According to the reasons for the contested decision which are pertinent in the appeal proceedings:

Sufficiency of disclosure

- (a) As shown in D37, averaging the a^* and b^* values of control samples 1 to 3 and using these values as a reference led to the conclusion that some coloured samples previously not in the claimed CIE $L^*a^*b^*$ zone (and evaluated as "unenhanced" and therefore not sufficiently eye-pleasing) actually moved into the claimed CIE $L^*a^*b^*$ zone. This meant that, when using the CIE $L^*a^*b^*$ values to select an "enhanced" composition, the skilled person could conclude that a given composition was or was not suitable depending on uncontrolled parameters.

Moreover, experiments 45/47/49, or 46/48/50, or 51/54, according to the opposed patent, represented the same compositions, i.e. containing the same amounts of the same colouring agent and clarifying agent, in the same matrix, but showed significantly different a^* , b^* , Δa^* and Δb^* values, even if the control sample was the same.

The experimental data of the patent in suit thus showed that the CIE $L^*a^*b^*$ values as measured under the guidance of the opposed patent were not reproducible enough without undue effort to guide the skilled person toward the CIE $L^*a^*b^*$ zone defined in the claims, resulting in an "enhanced" appearance of the thermoplastic composition according to the patent in suit.

- (b) The patentee's argument that it was not technically meaningful to average the values of the control

samples, since each experimental result for a coloured sample was associated with a specific control sample, was not convincing, since the patent in suit did not describe any difference in the composition of control samples 1 to 3, let alone that they belonged to different batches of the same composition.

Even if the results shown in tables 1 to 3 corresponded to three different batches of the same composition, this would imply that unknown and unexplained parameters in the preparation of the samples influenced the CIE L*a*b* measurements, for which the opposed patent lacked a relevant teaching.

Similarly, there was no disclosure in the specification that experiments 45/47/49, or 46/48/50, or 51/54 were based on different qualities of colouring agents or the preparation of different batches. The skilled person would conclude that for the same composition there were unexplained significant variations in the measured CIE L*a*b* values.

- (c) Contrary to the patentee's opinion, the variations shown in D37 were not insignificant, reference being made to the Δb^* values. Experiments 45/47/49, or 46/48/50, or 51/54 showed even greater variations, which became relevant, even if the skilled person were to prepare compositions falling within the centre of the claimed CIE L*a*b* zone.
- (d) Accordingly, based on the experimental results presented in the patent in suit, samples could, apparently at random, or at least for unknown

reasons, be according to the claimed colour space or not. The skilled person therefore had no guidance as to how to reliably and reproducibly obtain an "enhanced" composition, which crucially depended on the CIE $L^*a^*b^*$ values defined in the claims.

- (e) Furthermore, Δa^* , Δb^* , a^* or b^* values were not directly linked to the amount of colouring agent in an easily predictable manner, as shown by D5 and D35. Even taking into account that experiment 121 could be a typographical error, as argued by the patentee, it appeared that CIE $L^*a^*b^*$ values such as Δa^* and Δb^* did not simply linearly depend on the colouring agent concentration. The patentee's argument that a linear relationship would be taken into account for all colouring agents was therefore not convincing, also in view of the reproducibility problem shown with the experiments of the patent in suit.

No evidence was provided to support the common general knowledge about extrapolation of CIE $L^*a^*b^*$ values as a function of the amount of colouring agent, and no guidance in this respect was to be found in the specification. It would therefore be necessary to conduct a research programme in order to determine for each colouring agent, how its concentration influenced the measured CIE $L^*a^*b^*$ values. In the absence of any guidance in the opposed patent, and in view of the absence of any limitation as to the colouring agents encompassed by the claims, the skilled person would face undue burden to reproduce the invention over its entire scope.

This was exacerbated by the fact that the claims covered a wide range of clarifying agents and contained no limitation as to the type of thermoplastic polymers to be used.

- (f) Based on declaration D45 the patent proprietor had explained that the skilled person wishing to prepare compositions in accordance with the claimed invention would (i) select a thermoplastic polymer matrix and a clarifying agent, (ii) carry out CIE $L^*a^*b^*$ measurements, (iii) select a promising colouring agent on the basis of its known CIE $L^*a^*b^*$ values, and (iv) adjust its amount so as to fall within the targeted CIE $L^*a^*b^*$ zone.

The method proposed by the patentee made sense, but it was not described in the patent in suit and assumed, contrary to what was shown with the experiments contained in the opposed patent, that the measured values were reproducible. In addition, the patent in suit did not contain any guidance on how to avoid / minimize variations over time of the CIE $L^*a^*b^*$ values, which variations did occur, as demonstrated by D6 and D34.

- (g) It was therefore concluded that, in the absence of guidance on how to reliably and reproducibly select the appropriate components of the composition, the skilled person was presented with an undue burden in order to practice the claimed invention over its entire scope. The claimed invention lacked therefore sufficiency of disclosure.

Auxiliary requests 1 to 6

(h) Despite a restricted definition of the compositions to polyolefin matrices, or to a CIELAB zone comprising a specific range for L*, the same reasoning concerning the lack of reproducibility in the measurements, and the lack of guidance on how to arrive at suitable compositions, still applied. The subject-matter of auxiliary requests 1 to 6 lacked also sufficiency of disclosure.

VI. An appeal was filed by the patent proprietor (appellant). The appellant submitted with its statement of grounds of appeal auxiliary requests 1 to 6, corresponding to the auxiliary requests underlying the contested decision, as well as the following document:

D53: Declaration of R. S. Trinklein dated 19 October 2021.

VII. With their reply to the statement of grounds of appeal opponents 1 and 2 (both respondents) addressed the issue of sufficiency of disclosure, as well as additional objections raised before the opposition decision, in particular the objection that granted claim 1 extended beyond the content of the application as filed.

VIII. In preparation of the oral proceedings, a communication pursuant to Article 15(1) RPBA 2020 conveying the Board's provisional opinion was issued. The Board indicated not only their intention to consider all issues of sufficiency of disclosure raised in relation to granted claims 1 and 2, but also that it would be appropriate first to consider the objection raised

before the opposition division that granted claim 1 extended beyond the content of the application as filed, which issue was not addressed in the contested decision.

- IX. In reply to the Board's communication, the appellant filed with letter of 22 August 2023 auxiliary requests 7 to 14. In auxiliary requests 11 to 14, the color space was defined in terms of a^* and b^* values, as in granted claim 2, but not any more in terms of Δa^* and Δb^* , as in granted claim 1. New auxiliary requests 11 to 14 were indicated by the appellant to correspond to the then pending main request and auxiliary requests 2, 4, and 5, with claim 1 deleted.
- X. With an additional letter of 21 September 2023, the appellant filed a new version of auxiliary requests 11 to 13. Auxiliary request 13 was indicated to correspond to auxiliary request 13 filed with letter of 22 August 2023, in which the accidentally omitted meaning of R_{11} in claim 1 for defining the clarifying agent was included.
- XI. Oral proceedings before the Board were held on 22 September 2023 in the course of which the appellant withdrew their main request and auxiliary requests 1 to 12.
- XII. The parties' submissions, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. They concerned admittance of auxiliary requests 13 and 14 and of declaration D53, as well as the question whether the claimed methods met the requirements of sufficiency of disclosure. The various aspects addressed in this respect concerned the consistency of the control

measurements, the reproducibility of the experiments, the ability for the skilled person to select appropriate colouring agents in addition to those successfully used in the examples of the patent in suit, the timing of the CIE L*a*b measurements, the use of aluminium 2,2'-methylene-bis-(4,6-ditert-butylphenyl) phosphate as a clarifying agent and the availability of the spectrophotometer defined in the claims throughout the whole life time of the patent in suit.

XIII. The final requests of the parties were as follows:

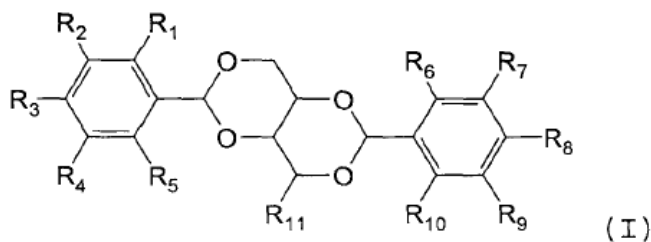
The appellant requested that the decision of the opposition division be set aside and the case be remitted to the opposition division for consideration of novelty and inventive step, either on the basis of auxiliary request 13 submitted with letter of 21 September 2023 or auxiliary request 14 submitted with letter of 22 August 2023.

The respondents requested that the appeal be dismissed.

Respondent-opponent 1 requested in addition that the case not be remitted to the opposition division for further prosecution, or, in that event, that the Board completely decide on the ground for opposition under Article 100(b) EPC.

XIV. Claim 1 according to auxiliary request 13 reads as follows (with addition to the wording of granted claim 2 given in section III above underlined, deleted portions ~~struck-through~~ and unamended portions in *[brackets and italics]*):

"12. [A method for producing a thermoplastic polymer composition
 (i) at least one clarifying agent] ~~as defined in claim 1~~ selected from trisamides, aluminum 2,2'-methylenebis-(4,6-di-tert-butylphenyl) phosphate, lithium 2,2'-methylenebis(4,6-di-tert-butylphenyl) phosphate, monocarboxylate compounds, and acetal compounds of formula (I)



wherein

R₁-R₁₀ are each independently are selected from H, alkyl, alkoxy, alkenyl, aryl, and halogen; and R₁₁ is -CH₂OH or -CHOHCH₂OH; [and

.....

(d) a clarifying agent as defined] ~~in claim 1~~ above; [and

..... *wherein]*

- the thermoplastic polymer is a polyolefin selected from polypropylene homopolymers, polypropylene random copolymers, and mixtures thereof;

[- the amount of clarifying agent to produce a thermoplastic polymer composition exhibiting a a value and a b* value satisfying each of the following inequalities composition.]"*

Claim 1 according to auxiliary request 14 reads as follows (with addition to the wording of claim 1 of auxiliary request 13 underlined and unamended portions in *[brackets and italics]*):

"1. [A method for producing a thermoplastic polymer composition to produce a thermoplastic polymer composition exhibiting a L* value of 88 or greater, and an a* value and a b* value satisfying each of the following inequalities composition.]"

Reasons for the Decision

Admittance of auxiliary requests 13 and 14

1. Auxiliary requests 13 and 14 were submitted after notification of the summons to oral proceedings with letter of 21 September 2023 (one day before the oral proceedings) and with letter of 22 August 2023 (one month before the oral proceedings), respectively. The respondents argued that their filing meant a change of the appellant's case which was neither due to exceptional circumstances nor justified by cogent reasons so that both requests should not be taken into account under Article 13(2) RPBA 2020.
 - 1.1 The Board follows decision T 247/20 (point 1.3 of the Reasons) in that the examination under Article 13(2) RPBA 2020 is of a two-step nature (see also T 2988/18, point 1.2 of the Reasons), i.e. it is first necessary to examine whether there is an amendment to a party's appeal case. If that question is answered in the negative, there is no discretion not to take the relevant submission into account. However, if the question is answered in the positive, it is necessary to examine whether the party concerned has provided cogent reasons for the existence of exceptional

circumstances which may justify the submission at such a late stage of the proceedings.

- 1.2 Auxiliary request 13 differs from auxiliary request 4 submitted with the statement of grounds of appeal, which is the same as auxiliary request 4 underlying the contested decision, in that claim 1 of auxiliary request 4 has been deleted and the wording of the remaining claims has been adapted to take account of the deletion of claim 1. This means that claim 2 of auxiliary request 4 has been renumbered as claim 1 and the expression "as defined in claim 1" to define the clarifying agent has been replaced at its first occurrence by the list of clarifying agents set out in deleted claim 1 and at its second occurrence by the wording "as defined above".

Similarly, auxiliary request 14 differs from auxiliary request 5 submitted with the statement of grounds of appeal, which is the same as auxiliary request 5 underlying the contested decision, in that claim 1 of auxiliary request 5 has been deleted and the wording of the remaining claims has been adapted in the same manner as explained above in relation to auxiliary request 13.

Accordingly, the subject-matter of auxiliary requests 13 and 14 corresponds to that of auxiliary requests 4 and 5 underlying the contested decision, and maintained in the appeal proceedings, but restricted to the embodiments defined in terms of their a^* and b^* values, the embodiments defined in terms of Δa^* and Δb^* having been deleted.

- 1.3 The Board in the present composition endorses the view expressed in decisions T 2920/18 (points 3.6.3 to 3.6.5

of the Reasons), T 2091/18 (point 4.1 of the Reasons) and T 494/18 (point 1.4 of the Reasons) that the filing of an amended set of claims after a party has filed its grounds of appeal or reply, constitutes an amendment to a party's appeal case within the meaning of Article 13(2) RPBA 2020, even if the amended set of claims is the mere result of the deletion of claims and the remaining claims were already part of a set of claims in the appeal proceedings. On that basis, the admittance of auxiliary requests 13 and 14 submitted after notification of the summons to oral proceedings is governed by Article 13(2) RPBA 2020.

- 1.4 The question arises next whether the appellant has provided cogent reasons for the existence of exceptional circumstances within the meaning of Article 13(2) RPBA 2020 which may justify to take auxiliary requests 13 and 14 into account.

As outlined in point 1.2 above, the subject-matter of auxiliary requests 13 and 14 corresponds to that of auxiliary requests 4 and 5 underlying the contested decision, and maintained in the appeal proceedings, but restricted to the embodiments defined as in granted claim 2 in terms of the a^* and b^* values of the thermoplastic compositions, the embodiments defined in terms of the Δa^* and Δb^* values of the thermoplastic compositions as in granted claim 1 having been deleted.

Moreover, as pointed out by the appellant the embodiments defined now in auxiliary requests 13 and 14 in terms of the a^* and b^* values had already been discussed in detail by the parties in their written submissions. In fact, the arguments submitted in relation to embodiment defined in terms of the a^* and b^* values or embodiments defined in terms of the Δa^*

and Δb^* values were essentially the same. Accordingly, auxiliary requests 13 and 14 neither altered the factual or legal framework of the proceedings, nor was there a need for a reassessment of the subject of the proceedings, so that the respondents' legitimate interests in expedient and fair proceedings were not adversely affected by the amendment within the meaning of Article 13(2) RPBA 2020 resulting from the filing of auxiliary requests 13 and 14.

Moreover, as argued by the appellant, the filing of auxiliary requests 13 and 14 in which the embodiments defined in terms of the Δa^* and Δb^* values of the thermoplastic compositions had been deleted was in direct response to the Board's preliminary opinion. Indeed, although the ground of opposition under Article 100 (c) EPC concerning the definition of the Δa^* and Δb^* values in granted claim 1 had not been decided upon by the opposition division, the Board had indicated in its communication, not only that it was appropriate to address first this additional ground of opposition before addressing the issue of sufficiency of disclosure, but also that this objection appeared to prejudice the maintenance of the patent. This was also indicated to be the case in relation to all pending auxiliary requests.

In view of this, the filing of auxiliary requests 13 and 14 in which the claims relevant for the objection of added-subject-matter had been deleted appeared to be an appropriate and legitimate reply to the Board's indication to deal first with a ground of opposition under Article 100 (c) EPC, validly raised before the opposition division, but not decided upon by the division.

It is to be added that auxiliary request 13 filed one day before the oral proceeding corresponded to previous auxiliary request 13 filed with letter of 22 August 2023, in which the accidentally omitted definition of substituent R₁₁ in formula (I) taken from granted claim 1 had been reinserted. In view of the statement in section (11) of the appellant's letter of 22 August 2023 according to which auxiliary requests 11-14 corresponded to the main request and auxiliary requests 2, 4, and 5, with claim 1 deleted, respectively, it was however clear that R₁₁ in formula (I) defined in auxiliary request 13 submitted with letter of 22 August 2023 was meant to have the same meaning as in granted claim 1.

- 1.5 The Board considers that these reasons related both to the lack of any change in the legal and factual issues to be decided upon and to the specific procedural situation outlined above constitute exceptional circumstances within the meaning of Article 13(2) RPBA 2020. The Board made therefore use of its discretion pursuant to Article 13(2) RPBA 2020 by admitting auxiliary requests 13 and 14 into the proceedings.

Admittance of document D53

2. D53 was filed by the appellant with the statement of grounds of appeal. Its admission to the proceedings, which is contested by respondent 2, is subject to the discretionary power of the Board in accordance with Article 12, paragraphs (4) to (6) RPBA 2020.
 - 2.1 According to the appellant, D53 provides a statement from an independent expert and additional evidence on the manner the skilled person would have read the examples in the patent in suit.

In the appellant's opinion it was filed in response to a change of opinion of the opposition division between the first preliminary opinion dated 12 April 2019 which was in the patentee's favour and the second preliminary opinion dated 21 September 2020, in which it was concluded that none of the pending requests met the requirements for sufficiency of disclosure.

2.2 This is not convincing, since the appellant had had ample time to react to that change of opinion, as illustrated by the filing of declaration D43 (renumbered D45 by the opposition division) with letter of 19 March 2021 (page 2, first full paragraph), oral proceedings taking place on 20 Mai 2021. Moreover, considering the content of declaration D53, there is nothing therein which would justify why it could not have been filed within the same period preceding the oral proceedings before the opposition division.

Moreover, D53 is a declaration made almost ten years after the filing date of the patent in suit, which can hardly be seen to address the knowledge of the skilled person at the date of filing of the patent in suit or the manner the skilled person would have interpreted the teaching of the patent in suit at that date.

2.3 Under these circumstances, the Board finds it appropriate to exercise its discretion under Article 12(6) RPBA 2020 by not admitting documents D53 into the proceedings.

Auxiliary request 13

*Introductory remark about the meaning of the CIE L*a*b* coordinates*

3. The coloured thermoplastic polymer composition defined in operative claim 1 is set out to meet certain conditions as to its a* and b* values in the CIE L*a*b* colour space. Dependent claim 2 defines the L* value of that composition in said colour space.

3.1 As illustrated by D28 and D44 the CIE L*a*b* colour space is a well-known colour appearance model designed to define and represent human perception of colour. It is based on the theory of human colour vision according to which the perception of colour is due to signals produced by three different types of light sensitive cells in the eye that respond to the spectrum of light by distinguishing between lightness and darkness, and between mutually exclusive zones of opposing colours, red-green and blue-yellow.

In this model, the colour is expressed with L*, a* and b* coordinates. The a* axis is relative to the green-red opposing colors, with negative values toward green and positive values toward red and the b* axis is relative to the blue-yellow opposing colors, with negative numbers toward blue and positive toward yellow. The lightness value L* which is the third dimension of that colour space defines black at 0 and white at 100.

3.2 This CIE L*a*b* colour space model is based on the earlier CIE 1931 XYZ colour space model defining a colour by tristimulus values (X, Y, Z) and the corresponding tristimulus values (X_n , Y_n , Z_n) of a

specified white stimulus (D44, page 1, second and sixth paragraphs and page 3; D28, point 3). These tristimulus values are calculated using colour-matching functions for describing the spectral sensitivity of the three types of light sensitive cells in the eye.

The L^* , a^* and b^* coordinates in the CIE $L^*a^*b^*$ model are mathematical functions of the tristimulus values (X, Y, Z) and the corresponding tristimulus values (X_n, Y_n, Z_n) of the white stimulus (D28, sections 1, 3 and 4).

3.3 As pointed out in D45 (point 10 of the statement), the a^* and b^* values of the CIE $L^*a^*b^*$ colour space are unbounded, but measurements covering human perceived colours typically are limited to values ranging from -128 to 127, reference being made to the web page corresponding to document D44, also submitted by the appellant.

3.4 Concerning the determination of the L^* , a^* and b^* values as defined in present claim 1 and 2 of auxiliary request 13, a source of light is directed on the sample to be measured, the reflected light (observed at 10° with specular reflectance) is detected and the different intensities of different light wavelengths are measured across the visible spectrum using a GretagMacBeth Color-Eye 7000A spectrophotometer, cool white fluorescent light source being used as white stimulus.

Sufficiency of disclosure

4. The objection is directed against claim 1 which concerns the production of a coloured thermoplastic polymer composition defined among others to comprise an

amount of colouring agent sufficient for the thermoplastic polymer composition to meet certain conditions as to its a^* and b^* values in the CIE $L^*a^*b^*$ colour space.

These conditions, defined by inequalities between the a^* and b^* values, define a portion of the CIE $L^*a^*b^*$ colour space delimited by line segments L, M, N and P (paragraph [0035] of the specification). That portion of the CIE $L^*a^*b^*$ colour space is shown in figure 2 of the patent in suit reproduced below. This definition does not comprise an additional restriction concerning the L^* value.

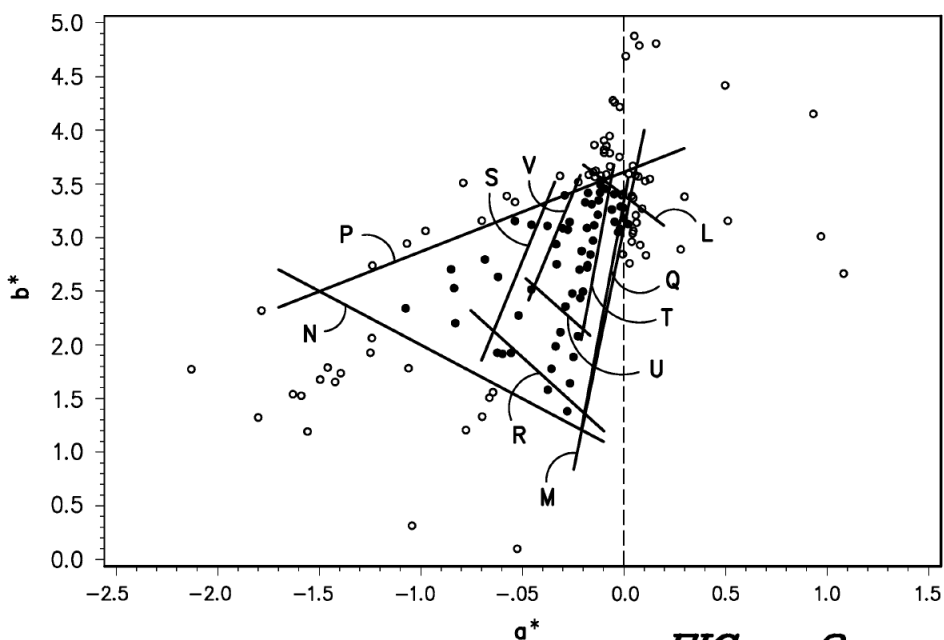


FIG. -2-

5. The method of claim 1 requires the use of (i) a polyolefin selected from polypropylene homopolymers, polypropylene random copolymers, and mixtures thereof, (ii) at least one clarifying agent in an amount of 100 to 5000 ppm selected from the list of compounds defined in claim 1 and a (iii) a coloring agent. The

composition produced by the method of claim 1 is not further structurally defined.

5.1 As illustrated by the experimental results contained in the specification, all thermoplastic compositions defined by the structural features of present claim 1 do not necessarily meet the inequalities (or parametric requirements) defined in that claim. It can be referred to samples 12 to 61 in tables 1 and 4, samples 82 to 107 in tables 2 and 5 and samples 135 to 155 in tables 3 and 6. A selection of certain variables within the structural definition of claim 1 is therefore necessary to produce a thermoplastic composition meeting the parametric definition of present claim 1.

5.2 Furthermore, while the patent in suit describes in the experimental part specific combinations of polyolefin, clarifying agent and colouring agents which meet the a* and b* definition of operative claim 1 (samples 1 to 11 in tables 1 and 4 ; samples 62 to 81 in tables 2 and 5; samples 108 to 134 in tables 3 and 6), it is undisputed that claim 1 is meant to cover further combinations of polyolefin, clarifying agent and colouring agents fulfilling that parametric definition.

As follows from the appellant's submissions, according to which the skilled person would be in the position to identify additional alternative colouring components to those identified by the patent in suit and adjust their amount if necessary with a small number of iterations to reach the desired colour space (see for example letter of 22 August 2023, sections 68 and 105), it is in particular undisputed that combinations based on colouring agents other than those successfully identified in the patent in suit, i.e. colouring agents other than Acid Blue 74, Acid Blue 9, Vat Blue 6,

Solvent Blue 97, Pigment Blue 63, Pigment Blue 29 and various mixtures of Pigment Violet 15 and Pigment Blue 29 or a mixture of Vat Blue 6 and Acid Blue 74, are meant to be encompassed by the subject-matter of claim 1.

- 5.3 With respect to this point, one of the main arguments brought up by the respondents in relation to sufficiency of disclosure concerns the ability for the skilled person to identify those other colouring agents and appropriate amounts thereof to fulfil the a* and b* parametric definition when used in combination with the polyolefin and clarifying agents as defined in claim 1, namely to identify the embodiments of claim 1 distinguished from the examples.
6. In accordance with the established jurisprudence of the Boards of Appeal of the EPO, the requirements of sufficiency of disclosure are met if a person skilled in the art, on the basis of the information provided in the patent specification can carry out the invention as defined by the terms of the claim under consideration over the whole scope of that claim, with reasonable effort, and, if necessary, using common general knowledge.
- 6.1 The requirement that the skilled person must be able to carry out the invention over the whole scope of the claim under consideration reflects the general legal principle that the protection sought must correspond to the technical contribution made by the disclosure of invention to the state of the art, which excludes the patent monopoly from being extended to subject-matter which, after reading the patent specification, would still not be at the disposal of the skilled person

(T 435/91, point 2.2.1 of the Reasons and T 409/91, point 3.5 of the Reasons).

Accordingly, the mere identification by the inventors of a narrow colour space which allegedly provides enhanced aesthetic properties in a thermoplastic polymer composition cannot itself be considered as a technical contribution sufficient to justify the patent monopoly, if the patent in suit does not allow the skilled person, in general, to prepare within the broad structural definition of claim 1, those thermoplastic compositions that fulfil the claimed inequalities which allegedly have enhanced aesthetic properties. Hence, the appellant's argument that the patent is not an invitation to carry out a research programme, because the work required to achieve the technical effect (aesthetic properties) has already been performed and the solution provided in the patent (the defined colour space) (letter of 28 July 2022, page 5, point 28) is not convincing.

6.2 When an invention is defined in terms of a technical result, as it includes a functional or parametric definition, the level of information given in the patent in suit must enable the skilled person to achieve the envisaged result within the whole ambit of the claim containing the respective functional or parametric definition without undue difficulty, which means that the disclosure is only sufficient if the skilled person can reasonably expect that substantially all embodiments of a claimed invention which this skilled person would envisage on the basis of the corresponding disclosure and the relevant common general knowledge can be put into practice (T 435/91, point 2.2.3 of the Reasons). This is also expressed by the idea that the specification must provide a

technical concept fit for generalisation which makes available to the skilled person the host of variants encompassed by said respective functional or parametric definition (Case Law of the Boards of Appeal of the EPO, 10th edition 2022, II.C.5.4, in particular T 435/91, point 2.2.1 of the Reasons).

This question can only be decided on the basis of the facts of each individual case, taking into account the teaching provided in the patent in suit, the common general knowledge and the amount of experimental work necessary.

Explicit teaching provided in the specification

7. A description of the colouring agents is given in paragraph [0018] of the description. Those are defined to include, and explicitly indicated not to be limited to, pigments, dyes, polymeric colorants, and mixtures thereof. The term "polymeric colorant" is defined to refer to a colorant comprising a chromophore and at least one oligomeric or polymer constituent bound to the chromophore. Suitable polymeric colorants are defined to include, and also explicitly indicated not to be limited to, the polymeric colourants sold by the appellant. The dyes are stated to be any suitable dye, such as an acid dye, a solvent dye, a vat dye, or mixtures thereof.

Suitable dyes are stated in paragraph [0018] "*to include, but are not limited to, Acid Blue 9, Acid Blue 74, Solvent Blue 97, Vat Blue 6, and mixtures or combinations thereof. For example, in certain embodiments, the coloring agent can comprise a mixture of Vat Blue 6 and Acid Blue 74*". Concerning the use of pigment, it is also stated in this paragraph "*In*

certain possibly preferred embodiments, the coloring agent comprises a pigment. Suitable pigments include, but are not limited to, Pigment Blue 29, Pigment Blue 63, Pigment Violet 15, and mixtures thereof".

Apart from the indication of those broad classes of colouring agents and those specific colouring agents, which correspond to those successfully tested in the patent in suit in the context of a particular thermoplastic polymer and a particular clarifying agent (see point 5.2 above), the specification does not contain any additional information as to how to select colouring agents fulfilling the parametric desiderata defined in claim 1, let alone a set of explicit instructions indicating how to select such colouring agents from the above mentioned general classes of available colouring agents, in order to produce necessarily and immediately with a limited number of experimentation the thermoplastic coating compositions which fulfill said desiderata.

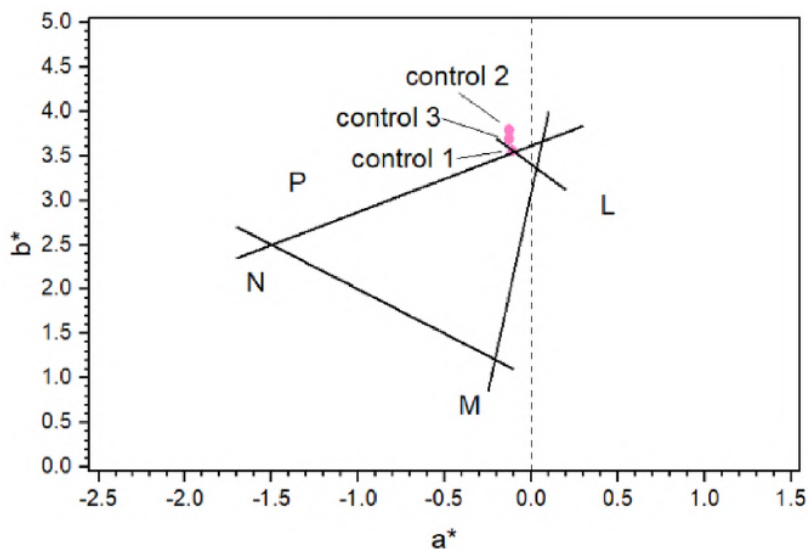
Implicit teaching provided in the specification

8. In the experimental part of the patent in suit, the colour measurements for all coloured samples do not only include a measurement of the a^* and b^* coordinates, but also a comparison of those coordinates with the respective coordinates of the same composition, but without colouring agent, expressed as Δa^* and Δb^* values. Having regard to the apparent correlation in the experimental part between those changes of a^* and b^* coordinates as defined in granted claim 1 and the definition of a^* and b^* coordinates expressed in granted claim 2, there is no doubt for the skilled person that the coordinates of the composition without the presence of the colouring agent, i.e.

comprising the polymer itself and the clarifying agent, even if corresponding to low a^* and b^* absolute values is to be taken into account in order to fulfil the parametric requirement of operative claim 1.

In this respect, it can be agreed with the appellant that the colour (or coordinates) of the polypropylene homopolymer or the polypropylene random copolymer composition comprising a clarifying agent as defined in claim 1 and possibly additional additives, as taught in paragraphs [0024] and [0025] of the specification, but no colouring agents, should be within the usual limits for the production of polypropylene homopolymer or polypropylene random copolymer compositions. The appellant's argument that a certain degree of yellowing during the preparation of polypropylene homopolymers or polypropylene random copolymers inevitably occurs at the high temperatures associated with the polymerisation process due to oxidative degradation is also undisputed.

Such yellowing, although not explicitly addressed in the patent in suit, is shown by the b^* values of the control samples (controls 1 to 3) used in the experimental part of the patent in suit, i.e. the basis composition to which the various colouring agents are added. These control samples are indicated to be a Ziegler-Natta catalyzed polypropylene random copolymer having a melt flow rate of 11. They comprise a clarifying agent and a stabilization package. A reproduction of figure 2 by the appellant on page 18 of the statement of grounds in which the a^* and b^* coordinates of the control samples are highlighted and illustrate the yellowing of said basis composition is shown below:



In view of this and in agreement with the appellant's position, the inequalities presented in claim 1 take implicitly into account the contribution to the CIE L*a*b* values of both the thermoplastic polymer per se and its additives.

9. In view of

- (i) the theory of colour vision underlying the determination of colours in the CIE L*a*b* space, in which blue-yellow is taken as an opponent pair,
 - (ii) the implicit teaching that the a* and b* coordinates of the thermoplastic polymer comprising its additives without the colouring agent are to be taken into account,
 - (iii) the yellowing of the polypropylene homopolymer or polypropylene random copolymers inherent to their preparation, illustrated by the control samples and
 - (iv) the presence of a blue component in all colouring agents successfully tested in the experimental part of the patent in suit,
- it can be agreed with the appellant that, when searching for other colouring agents, which used in an

appropriate amount would allow to meet the parametric desiderata of operative claim 1, the skilled person would be implicitly guided by the teaching of the patent in suit to try colouring agents having a blue component. The patent in suit, however, does not provide any implicit teaching going beyond that.

Common general knowledge

10. The appellant did not cite any literature concerning the common general knowledge in the art about the achievement of a certain colour space, let alone when that colour space is extremely limited, as it is the case for operative claim 1. As indicated in point 3.3 above, the a^* and b^* values of the CIE $L^*a^*b^*$ colour space covering human perceived colours typically are limited to values ranging from -128 to 127.

Instead, the appellant submitted declaration D45, which, however, does not refer to any known published documentation in this respect.

Declaration D45 is signed by an employee of the appellant, who is not an inventor of the patent in suit, but is said to be familiar with the development work leading to the claimed invention. Moreover, that declaration is dated 16 March 2021, i.e. more than 9 years after the date of filing of the patent in suit. That declaration cannot, therefore, be considered to reflect the view of the skilled person at the filing date of the patent in suit.

In any event, that declaration rather underlines the difficulty for the skilled person in attempting to put generally into practice the method defined in operative claim 1. It is referred to point 7 of D45 in which it

is highlighted that the colour space defined in granted claims 1 and 2 of the patent in suit (whereby the colour space defined in granted claim 2 corresponds to that of operative claim 1, see points 1.2 and 1.4 above) would define a very subtle degree of coloration, while a wide range of "strengths" (i.e. different coloring power for a given mass of coloring agent) are exhibited by different colouring agents.

11. Concerning the selection of colouring agents other than those identified in the experimental part of the patent in suit (see point 5.2 above), the appellant submits in sections 56 to 66 of their letter of 22 August 2023 that the skilled person has experience in colour matching plastics, including translucent plastics. In their opinion, the skilled person would be familiar with the properties of the different colorants employed in plastics, including their relative colours, strengths, and compatibility with base polymer compositions. Moreover, the appellant contends that the colour matching laboratory in which the skilled person works would have records and/or a database on a variety of different colorants and how those colorants affect the colour of a plastic to which they are added. The appellant also affirmed that the skilled colourist would have already used many such colorants of the required colour and that they would have detailed records of the properties of compositions obtained using particular combinations of polymers and colorants. The appellant added also during the oral proceedings that on the basis of the experiments comprised in the specification which would show a relationship between the a^* and b^* coordinates and the concentration of colouring agent, that a similar relationship would be expected by the skilled person for other colouring agents. This would guide the

skilled person towards the selection of the appropriate colouring agents in order to meet the criteria set out in operative claim 1 on the basis of the known a^* and b^* values for these colouring agents at higher concentrations.

These arguments are not convincing.

- 11.1 As pointed out in paragraph [0019] of the specification, the compositions in the invention contain a relatively small amount of the coloring agent, as opposed to compositions in which a colouring agent is used to impart substantial and perceptible colour to the composition and any article made therefrom. It is emphasized in the same paragraph that the amount of colouring agent present in the thermoplastic polymer compositions is sufficiently low that most observers would describe the polymer composition or any article made therefrom as being not substantially coloured and that the hue imparted to the polymer composition or an article made therefrom by the colouring agent may be perceptible only after the polymer composition is compared to a composition that does not contain the colouring agent.

On that basis, it is not apparent to the Board how a colourist whose task is to impart substantial and perceptible colour to a polymer composition, i.e. using significant amounts of colouring agents, would be aware of L^* , a^* and b^* coordinates resulting from the use of colouring agents in an amount which does not impart perceptible colour to a polymer composition, as is the case for compositions meeting the desiderata defined in operative claim 1.

11.2 Secondly, no evidence has been provided that the skilled person would have knowledge about L^* , a^* and b^* coordinates resulting from the addition of colouring agents in general to polypropylene homopolymers or polypropylene random copolymers, when used in amount which do not impart a perceptible colour. Even if some data might be known in some laboratories, this is irrelevant to the question of sufficiency of disclosure, as no evidence has been provided that such knowledge would be available to the notional skilled person, let alone be part of the common general knowledge.

11.3 Thirdly, the appellant's argument that there is a steady and predictable change in colour space as one increases the amount of colouring agent and that the skilled person could readily work other amounts of this coloring agent and fall within the defined colour space, relates to some specific colouring agents and their amounts as used in the experimental part of the patent used, once those colouring agents and their amounts have been identified. There is, however no indication, not even any evidence in that respect, that a similar trend is generally to be expected for the broad class of colouring agents whose use is disclosed in the specification to be suitable for the present invention, i.e. pigments, dyes, polymeric colorants, and mixtures thereof, let alone over a range of concentration which extends from the concentration needed to impart substantial and perceptible colour to a polymer composition which might be known to a colorist to much lower concentrations needed to meet the desiderata of operative claim 1.

Despite the fact that the CIE $L^*a^*b^*$ colour space model was already known for nearly 35 years at the date of

filing of the patent in suit, no evidence about the common general knowledge at that date in relation to the effect of the dilution of colouring agents on the $L^* a^* b^*$ coordinates, let alone in a polymeric material, in particular polypropylene homopolymers or polypropylene random copolymers, has been submitted.

Neither did the appellant provide technical explanations which would link the concentration of a colouring agent and the coordinates in the CIE $L^*a^*b^*$ colour space model of a material in which it is comprised. In particular, the appellant did not address related tristimulus values (X, Y, Z) and (X_n, Y_n, Z_n) or the colour matching functions, on the basis of which the $L^* a^* b^*$ coordinates in the CIE $L^*a^*b^*$ colour space model are based (see point 3.2 above). An indication of the variation of $L^* a^* b^*$ coordinates in the CIE $L^*a^*b^*$ colour space model as a function of the concentration of colouring agent is also not provided in declaration D45.

As far as the broad class of pigments, dyes, polymeric colorants, and mixtures thereof having a blue component is concerned, there is therefore no reason to consider that a decrease of the amount of colouring agent would necessarily lead to a decrease in absolute value for each of a^* and b^* , let alone in a linear manner as a function of the concentration, over the whole range of concentration contemplated, i.e. from concentrations giving substantial and perceptible colour down to concentrations at which the colouring agent may be perceptible only after the polymer composition is compared to a composition that does not contain the colouring agent. There is also not the slightest indication that a^* and b^* would change in the same manner as a function of their concentration.

Amount of experimentation

12. The appellant's argument that the skilled person would need only a small number of iterations to reach the desired colour space which defines the method of operative claim 1 is, in the absence of any substantiated facts and corroborating evidence showing that this would be generally the case over the whole scope intended, a mere speculation which cannot convince the Board. The scope intended includes polypropylene homopolymers or polypropylene random copolymers in general with any of the clarifying agents defined in claim 1 and possibly nucleating agents, antioxidants, acid scavengers, slip agents, antistatic agents, optical brighteners, and polymer processing aids as taught in paragraphs [0024] and [0025] of the specification. There is no reason to expect that these thermoplastic compositions whose preparation is generally considered by the appellant do not present a certain degree of variation as to their colour in the CIE L*a*b* colour space.

The argument that only a small number of iterations would be required to reach the desired colour space lacks credibility. The need for only a few experiments requires the existence of a known methodology which would guide the skilled person towards the proper selection of the group of colouring agents having a blue component, as a function of the starting thermoplastic composition, whose colour is expected to vary over the full scope intended for the latter, while the very narrow color space defined in claim 1 is fixed. This methodology for selecting a colouring agent having a blue component, however, does not emerge from the patent in suit, as indicated above.

In the absence of an indication of suitable common general knowledge which would allow the skilled person to fill the gap between the teaching of the patent in suit and that which would be needed to provide a method over the whole scope for which protection is sought, the skilled person is left for a large part of those methods using colouring agents other than those successfully identified in the patent in suit to develop such missing methodology or to find out by trial and error which methods from the innumerable methods corresponding to the broad structural teaching of the patent in suit meet the desiderata set out in claim 1. This amounts in both situations to an undue burden for the skilled person.

13. Accordingly, the requirement that the skilled person must be able to carry out the invention over the whole scope intended is not fulfilled for present claim 1 and as a consequence, the ground of opposition under Article 100(b) EPC prejudices the maintenance of the patent in the form of auxiliary request 13. Auxiliary request 13 is therefore to be refused.

14. On that basis, the additional separate objections raised by the respondents in relation to sufficiency of disclosure which concern the consistency of the control measurements, the reproducibility of the experiments, the timing of the CIE L*a*b measurements, the use of aluminium 2,2'-methylene-bis-(4,6-ditert-butylphenyl) phosphate as a clarifying agent and the availability of the spectrophotometer can be left unanswered.

Auxiliary request 14

15. Claim 1 of auxiliary request 14 differs from claim 1 of auxiliary request 13 only in that the L* value of the thermoplastic polymer composition is defined to be 88 or greater. This amendment does not compensate for the lack of a methodology in the patent in suit for appropriately selecting the colouring agent and its amount for preparing a thermoplastic composition meeting the a* and b* values defined in claim 1 of auxiliary request 13. To the contrary, that method imposes an additional requirement on the thermoplastic composition to be obtained, which can only result in an additional amount of experimental work by trial and error. Consequently, the objection under Article 100(b) EPC holds also against auxiliary request 14 and that request also has to be refused.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



D. Hampe

D. Semino

Decision electronically authenticated