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# Datasheet for the decision of 9 July 2009

**Case Number:** T 1877/06 - 3.2.07

**Application Number:** 99953254.2

**Publication Number:** 1131473

**IPC:** C23C 14/00

**Language of the proceedings:** EN

**Title of invention:**
Process for making metal flakes

**Patentee:**
AVERY DENNISON CORPORATION

**Opponent:**
BASF Specialty Chemicals Holding GmbH

**Headword:**
-

**Relevant legal provisions:**
EPC Art. 100 (c), 123 (2), 56

**Relevant legal provisions (EPC 1973):**
EPC Art. 57a

**Keyword:**
"Allowability of amendments (main request - no, auxiliary request Ib-yes)";
"Inventive step (auxiliary request Ib-no)";
"Admissibility of remaining auxiliary requests (no-defining only alternatives of the subject-matter of claim 1 of auxiliary request Ib)"

**Decisions cited:**
-

**Catchword:**
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

**Case Number:** T 1877/06 **-** 3.2.07

# D E C I S I O N
**of the Technical Board of Appeal 3.2.07**
**of 9 July 2009**

| | |
|---|---|
| **Appellant:** (Opponent) | BASF Specialty Chemicals Holding GmbH<br>Klybeckstraße 141<br>CH-4057 Basel (CH) |
| **Representative:** | - |
| **Respondent:** (Patent Proprietor) | AVERY DENNISON CORPORATION<br>150 North Orange Grove Boulevard<br>Pasadena, CA 91103 (US) |
| **Representative:** | Heselberger, Johannes<br>Patent- und Rechtsanwälte<br>Bardehle . Pagenberg . Dost . Altenburg . Geissler<br>Galileiplatz 1<br>D-81679 München (DE) |
| **Decision under appeal:** | **Interlocutory decision of the Opposition Division of the European Patent Office posted 15 November 2006 concerning maintenance of European patent No. 1131473 in amended form.** |

**Composition of the Board:**

**Chairman:** H.-P. Felgenhauer
**Members:** H. Hahn
I. Beckedorf

## Summary of Facts and Submissions

I. The opponent (appellant) lodged an appeal against the interlocutory decision of the Opposition Division to maintain European patent No. 1 131 473 in amended form and requested that the decision be set aside and the patent be revoked.

II. For this decision the following documents of the opposition proceedings are of relevance:

D1 = US-A-4 269 916
D2 = US-A-4 168 986
D3 = US-A-5 135 812
D5 = V. Svorcik et al., J. Mat. Sci. Letters 16 (1997), pages 1564-1566
D6 = US-A-4 321 087
D7 = EP-A-0 826 745
D13= WO-A-02 094945
P1 = J.P. Rettker, USPTO Rule 132 Declaration concerning laboratory experiments, dated 6 June 2001

III. An opposition had been filed against the patent in its entirety under Article 100(a) EPC, for lack of novelty and inventive step, and under Article 100(c) EPC, that the patent extended beyond the content of the application as originally filed.

IV. The Opposition Division did not allow document D10 (WO-A-96 31571) into the proceedings for being late filed (Article 114(2) EPC). It held that claims 19, 20, 21, 25, 29 and 30 of the main request (i.e. the patent as granted) contravened Article 123(2) EPC and therefore rejected the main

request. The Opposition Division held that the auxiliary request as filed at the oral proceedings of 17 October 2006 [i.e. an amended set of claims 1 to 25 based on the claims as granted from which the objected claims or at least part thereof had been deleted] meets the requirements of Articles 123(2) and (3) EPC. It further considered that the subject-matter of claim 1 of the auxiliary request involved an inventive step with respect to the closest prior art D2, or with respect to combinations of D6 and either D1 or D2, or D7 and D1.

V. Claim 1 as maintained by the Opposition Division reads as follows:

"1. A process for making flakes, comprising the steps of:
(a) depositing flake material from a vacuum deposition source inside an evacuated vacuum deposition chamber and release coat material from a release coat source inside said vacuum deposition chamber onto a surface of a transport device inside said vacuum deposition chamber to provide alternate layers of said release coat material from the release coat source and said vapour deposited flake material from the vacuum deposition source to the transport device in sequence such that a multi-layer sandwich of alternate layers of flake material and intervening release coating material is obtained, wherein the release coat material includes a solvent-soluable [sic] and dissolvable polymeric material that forms a smooth continuous barrier layer and support surface on which the flake material layers can be formed;

(b) removing said multi-layer sandwich from said vacuum deposition chamber;
(c) applying a solvent to the multi-layer sandwich to separate the release coat from the flake material layer; and
(d) disintegrating said flake material into flakes."

VI. With a communication annexed to the summons dated 27 March 2009 the Board summoned to oral proceedings and gave its preliminary opinion based on claims 1-25 of the auxiliary request as filed during the oral proceedings before the Opposition Division on 17 October 2006 (i.e. claims 1-25 as maintained with the impugned decision).

It stated amongst others that claims 1 and 18 seemed to contravene Article 123(2) EPC.

With respect to the discussion of inventive step it remarked that starting from the closest prior art and taking account of the problem to be solved - which would be based on the effect of the distinguishing features - it would need to be discussed whether or not the available prior art rendered the subject-matter claimed obvious when either combined with another teaching in the prior art or the common general knowledge of the person skilled in the art.

In this context the Board noted the following points:

It appeared that the object to be solved cannot be restricted to the manufacturing of metal flakes having high aspect ratio and being highly reflective since the subject-matter of claim 1 - taking account of column 1,

lines 7 and 8 of the patent in suit - relates to a process for the production of metal, metal compounds, non-metal or clear flakes.

No evidence appears to be on file that the products resulting from the process of claim 1 have improved properties compared to those of the metal flakes according to e.g. D3, D6 or the inorganic compounds according to e.g. D1 or D2.

It needs to be discussed whether or not all the polymeric materials as used in the examples of the patent in suit produce the desired high-reflectivity, high aspect ratio metal flakes.

The description of the patent in suit has not been adapted to claim 1 and appears to comprise many embodiments which are no longer covered by claim 1 as granted (Article 84 EPC).

VII. With letter dated 9 June 2009 the respondent submitted sets of claim 1 as auxiliary requests Ia, Ib, IIa and IIb in combination with arguments concerning the allowability of the amendments made in claim 1 of the main request and the amendments made in these auxiliary requests as well as the patentability of the respective claims 1, taking account of the Board's communication. Furthermore, two post-published documents were submitted.

VIII. Oral proceedings before the Board were held on 9 July 2009.

The appellant requested that the decision under appeal be set aside and that the patent be revoked.

The respondent requested that the appeal be dismissed (main request), or, in setting aside the decision under appeal the patent be maintained in amended form on the basis of one of the sets of claims filed as auxiliary requests Ia, Ib, IIa and IIb with letter dated 9 June 2009.

At the end of the oral proceedings the Board announced its decision.

IX. Process claim 1 of auxiliary request Ia differs from claim 1 of the main request (see point V above) in that the part of feature (a) "… wherein the release coat material includes a solvent soluable or dissolvable polymeric material …" has been amended to read: "the release coat material includes a**n organic** solvent solu**[a]**ble **or** dissolvable polymeric material" (amendments in bold with deletions in brackets; emphasis added by the Board).

X. Process claim 1 of auxiliary request Ib differs from claim 1 of auxiliary request Ia in that the said part of feature (a) (see point IX above) has been amended to read "the release coat material includes an organic solvent soluble **and** dissolvable polymeric material" (emphasis added by the Board).

XI. Process claim 1 of auxiliary request IIa differs from claim 1 of auxiliary request Ia in that features (b) to (d) have been amended to read:
"(b) removing said multi-layer sandwich from said vacuum deposition chamber **and breaking apart the layers that are separated by the release coat material into individual layers by either**
(c) applying **directly** a solvent to the **[multi-layer sandwich] layered material** to separate the release coat from the flake material layer**s**
**or**
**subjecting the multi-layer sandwich to grinding beforehand; and optionally**
(d) **[disintegrating said flake material into flakes] further sizing and homogenizing said flake material layers**" (amendments in bold with deletions in brackets; emphasis added by the Board).

XII. Process claim 1 of auxiliary request IIb differs from claim 1 of auxiliary request IIa in that a part of feature (a) (see point IX above) has been amended to read "the release coat material includes an organic solvent soluble **and** dissolvable polymeric material" (emphasis added by the Board).

XIII. The appellant argued essentially as follows:

Claim 1 of the main request contains the feature "solvent soluble and solvent dissolvable" in step (a), and the combination of steps (c) and (d), the latter defining "disintegrating said flake material layer into flakes" which contravene Article 100(c) EPC for the reasons as given in the Board's communication annexed to the summons. According to the application as

originally filed (corresponding to the published WO-A-00 24946) the flakes are already produced by the mere application of the solvent (see page 3, lines 2 to 4 and 8 to 10), i.e. in the same manner as is described with respect to the prior art Metalure$^{R}$ process (see page 1, lines 32 to 35). This treatment with solvent produces smaller entities or flakes which have about the size readily to be used. Two alternatives of stripping the multi-layer sandwich into flakes are disclosed in the application as originally filed: either by adding a solvent, or by crushing and grinding or scraping (see Figure 5, page 7, lines 1 to 19). According to the latter one rough flakes are produced which are then treated with the solvent to remove the release coat material. Since step (c) already generates the flakes from the flake material layer the added step (d) defining "disintegrating said flake material layer" makes no sense since such a layer is no longer present in the solvent. Furthermore, the term "disintegrating" ("zerkleinern") is nowhere disclosed and is also not equivalent with "grinding" ("mahlen") as alleged by the respondent. Furthermore, Figure 5 is directed to a drum embodiment as the transport device which implies a different treatment for separating the individual layers than if a carrier sheet would have been used. Therefore claim 1 of the main request is not allowable.

Claim 1 of auxiliary request Ib is no longer objected under Article 123(2) EPC with respect to the feature "an organic solvent soluble and dissolvable polymeric material". The other objections with respect to features (c) and (d) of claim 1 are, however, maintained.

The subject-matter of claim 1 of auxiliary request Ib lacks inventive step over a combination of D6 and D2. Process claim 1 of auxiliary request Ib is distinguished from the process according to D6 in that the polymeric release material is applied in a vacuum chamber and that a multi-layer sandwich is produced. As can be derived from the patent in suit the application of the release material in vacuum does not produce better flake properties (see paragraph [0078] and example 4). The ACS-readings of the Metalure$^{R}$ flakes and the flakes of example 1 in accordance with claim 1 of the patent in suit are relatively similar and it is not known what has been compared in this example. The comparison according to P1 is not relevant since the vacuum deposited polymeric material (Dow 685D styrene, and acrylic 2009) is compared with NaF release material which is hygroscopic and which therefore may have a surface which is less smooth than that of the polymeric material. Thus it has not been proven that the process results in better flakes, particularly Al-flakes as compared to D6 which flakes are comparable with those of the similar Metalure$^{R}$ process, since both apply the polymeric release material from a solution of a polymer. According to the patent in suit the objective technical problem is to reduce the number of manufacturing steps and the resulting cost of making high aspect ratio, highly reflective metal flakes (see paragraph [0006]). Since this problem can only be considered if it is solved it has to be considered that the patent in suit discloses several experiments which did not produce said desired metal flakes (see examples 6 and 7). From these experiments it can be concluded that the problem is not solved over the entire scope of claim 1 since

not all polymeric materials and not all thicknesses of metal flakes give the desired result of improved metal flakes. Therefore claim 1 lacks inventive step.

With respect to the second partial problem of improving the productivity compared to D6 it has to be considered that claim 1 of auxiliary request Ib includes the simple double layer embodiments according to example 5, constructions 1-3. Since D6 teaches to coat both sides of the carrier sheet with the polymeric release material no improvement of the productivity can be seen with respect to said embodiment having one polymeric release layer with an Al layer thereon. In any case the increase of productivity is rendered obvious by a combination of D6 and D2. D2 teaches to apply the release material and the flake material by vacuum techniques and to deposit alternating layers of release material and flake material (see column 3, lines 13 to 17; column 4, lines 38 to 52; column 5, lines 5 to 11). The application of the release material according to D2 represents an alternative of the process of D6. It belongs to the common general knowledge of the person skilled in the art that Al-flakes are not compatible with water since it would change the characteristic properties of the Al-flakes (see e.g. D7, column 2, lines 27 to 32; or D13, page 3, lines 2 to 22; see also WO-A-00 24946, page 9, lines 24 to 38). Likewise it is known that vacuum deposition can be used for applying polymeric coatings (see e.g. D5, page 1564, left-hand column, second paragraph). Therefore the solution to said second partial problem involves no inventive step and the subject-matter of claim 1 of auxiliary request Ib thus lacks an inventive step.

Auxiliary requests Ia and IIa contravene Article 123(3) EPC due to the "or" alternative, i.e. that the polymeric release material is only "solvent soluble" since this alternative now encompasses the non-soluble polymers such as described in the patent in suit (see column 6, lines 17 to 20). Furthermore, the feature "and breaking apart the layers that are separated by the release coat material into individual layers by …" has no basis in the application as originally filed and thus contravenes Article 123(2) EPC. The auxiliary requests Ia, IIa and IIb should therefore not be admitted into the proceedings.

XIV. The respondent argued essentially as follows:

With respect to feature (a) of claim 1 as granted it is argued that there are several disclosures of combinations of "solvent soluble" and "solvent dissolvable" in the context of different release materials in the application as originally filed. It is not important whether a specific release material is "soluble" or "dissolvable" and the aim is to essentially completely dissolve the release coat layers, i.e. without residues (see claim 1 as originally field). Therefore a generalisation is allowable in view of the entire disclosure of the application as originally filed. Thus "soluble" has the general meaning of allowing to separate the individual layers through the solvent without requiring any specific solvent. It is, however, admitted that there exists a difference between "soluble" and "dissolvable", the latter definition includes the former but not the other way

round. With respect to feature (c) of claim 1 there exist two possibilities (alternatives) as to how the multi-layer sandwich can be treated to separate the layers (see page 3, lines 8 to 10). According to the first one the multi-layer sandwich is treated with a solvent whereby the flake material layer is essentially maintained and which is only thereafter broken into flakes. Hence the wording of feature c) is correct. The second possibility resides in first grinding the multi-layer sandwich and then treating the rough flakes with solvent to remove the release material (see page 5, lines 1 to 19). Although the term "disintegrating" of step d) is not explicitly disclosed in the application as originally filed the terms "crushing", "grinding", "air-milling", centrifuging" etc. are disclosed in the context of the stripping of the release layer. Thus the generalisation is justified and allowable since it is clear to the skilled person that no specific stripping process is necessary for separating the individual layers and for producing flakes. The skilled person would have understood that both interpretations of the passage at page 3, lines 8 to 10 are possible even if there are no further steps indicated for the treatment with the solvent. It does not matter how the stripping is done. Therefore claim 1 of the main request complies with Article 100(c) and 123(2) EPC.

Principally the same arguments are valid with respect to claim 1 of auxiliary request Ib wherein the feature concerning the dissolvability in an organic solvent (see page 5, lines 21 to 23) has been inserted to overcome the Board's objection under Article 123(2) EPC.

The subject-matter of claim 1 of the main request involves an inventive step. When starting from D6 as closest state of the art quite a few things have to be taken as granted as belonging to the common general knowledge. However, specific prior art documents such as patents do not necessarily reflect the common general knowledge. D6 discloses the production of pigments, particularly of Al-flakes. Claim 1 is distinguished over D6 in that the release material is vacuum deposited and that a multi-layer is formed. In this respect it is admitted that claim 1 is intended to encompass the products of example 5, constructions 1 to 3. The objective technical problem is stated in paragraph [0006] of the patent in suit, i.e. the product shall be improved, the process should be simplified and the costs should be reduced. The vacuum deposited flakes of the patent in suit are improved as compared to those of the Metalure$^{R}$ process as proven by ACS-readings of example 1. Furthermore, P1 shows that the vacuum deposition of the polymeric release material is responsible for the smoother surface and the improved quality of the Al-flakes. This result can be transferred onto the flakes of D6 although it is stressed that the process according to D6 is not comparable with the Metalure$^{R}$ one. It is admitted that no evidence with respect to a comparison with flakes of D6 or with respect to the Metalure$^{R}$ flakes has been submitted. Due to the vacuum deposition of the release material and the metal flake material all disturbing effects of the environment are excluded which may be the reason for the smoother surface of the vacuum deposited polymers.

At least the process is improved compared to the Metalure$^{R}$ process but also the product is improved (see patent, paragraph [0057]). With respect to the poor results of examples 6 and 7 it needs to be considered that the patent does not only teach as to how such metal flakes can be successfully produced but also as to how it should not be made. This cannot be objected to and does not support the conclusion that the invention cannot be carried out over the entire range of claim 1. The person skilled in the art would not combine D6 and D2 since they are not compatible with each other due to the different release materials and solvents to be used. Thus the person skilled in the art would have to extract certain ideas out of D2, particularly to apply the release layer by vacuum deposition, but he has no reason to do so. There is no such hint neither in D2 nor in D6. It is also not evident that such an embodiment simplifies the process and reduces the costs, let alone that an improved flake material is obtained. Therefore claim 1 of auxiliary request Ib involves an inventive step.

The above arguments apply likewise with respect to the other documents cited by the appellant.

The auxiliary requests Ia, IIa and IIb were submitted in order to overcome the Board's objections under Article 123(2) EPC and define alternatives of the process. With respect to inventive step the above arguments would apply.

**Reasons for the Decision**

1. *Admissibility of amendments*
*(Articles 100(c), 123(2) and (3) EPC)*

*Main request*

1.1 Claim 1 of the main request comprises within step (a) the feature i) "a solvent soluable and dissolvable polymeric material", and the features "(c) applying a solvent to the multi-layer sandwich to separate the release coat from the flake material layer; and (d) disintegrating said flake material layer into flakes" (see point V above) which were objected to by the appellant under Article 100(c) EPC.

1.1.1 The Board interprets feature i) as meaning that the polymeric material in question is not only soluble in a suitable solvent but actually can essentially or totally be dissolved in a technically reasonable amount of this solvent (see claim 1 of the application as originally filed, corresponding to the published WO-A-00 24946).

It is evident that there exist polymeric materials which are soluble in a solvent only to a certain extent while other polymeric materials can be totally dissolved therein. Consequently, it can be concluded that a "solvent **dissolvable**" polymeric material - at the same time - is "solvent **soluble**" but not the other way round. This fact was admitted by the respondent at the oral proceedings.

As a consequence of the aforementioned conclusion it is clear that these two different definitions **cannot** be exchanged for each other as argued by the respondent.

1.1.2 There exists no explicit basis for feature i) in the application as originally filed. The passages quoted by the respondent as a basis for said feature i) either only disclose "a solvent **soluble** polymer organic material" (see page 3, lines 32 to 35), or generally disclose "a solvent **soluble** or **dissolvable** release coating " (see page 4, lines 36 and 37), or "the release coating is either solvent soluble or dissolvable" (see page 5, line 9).

There exists a single passage at page 5, lines 21 to 23, of the application as originally filed which discloses that "The release coating can be **a solvent soluble polymer**, preferably a thermoplastic polymer, **which is dissolvable in an organic solvent**". Hence it is clear that feature i) represents an unallowable intermediate generalisation of said passage which - due to the omission of the restriction to "an organic solvent" - does not comply with Article 123(2) EPC.

1.1.3 Consequently, the respondent's argument that it would not be important whether or not a specific release material is "solvent **soluble**" or "solvent **dissolvable**" cannot be accepted since these two different definitions actually cause a technical difference of the two processes in question. Taking further account of the fact that the application as originally filed also disclosed polymeric release materials which, while **not soluble**, will swell in a suitable solvent and separate from the metal (see page 5, lines 31 to 33),

or that the polymeric material could be a cross-linked material with weak bond strength that can be dissolved **by treating it with a de-polymerizing solvent material**, i.e. the solvent causes a de-polymerization of the polymer so that the resulting product then can be dissolved by the solvent (see claim 11 as originally filed), it is clear that there exists no basis for a generalisation that any "solvent **soluble** polymeric material" is a "solvent **dissolvable** polymeric material" as argued by the respondent.

1.2 The combination of said step (c) with step (d) "disintegrating said flake material layer into flakes" of said features (c) and (d)(see point 1.1 above) has no explicit basis in the application as originally filed. The application as originally filed nowhere explicitly discloses "**disintegrating** the flake material layer" as admitted by the respondent.

1.2.1 The application as originally filed discloses two alternatives of breaking the multi-layer sandwich - which contains the flake material layer or layers - into flakes:

a) either by introducing the multi-layer sheet directly into a solvent (i.e. by adding a solvent), or
b) by crushing and grinding or scraping (see page 3, lines 8 to 11; page 7, lines 1 to 19 and Figure 5).

1.2.2 According to the first alternative the multi-layer sheet is "introduced directly into a solvent with or without suitable agitation to produce flakes" (see page 3, lines 8 and 9; page 7, lines 10 to 12), i.e. the individual flakes are already produced from the

flake material layer by the mere application of the solvent without any agitation. Thus the flakes are produced in the same manner as is described in the application as originally filed with respect to the prior art Metalure$^{R}$ process wherein the stripping operation with e.g. acetone solvent breaks the continuous layer of the multi-layer sheet into particles contained in a slurry (see page 1, lines 32 to 35; and page 4, lines 8 to 11). These flakes have about the size which may then be used. The production of the smaller entities or flakes from the flake material layer during said step (c) - wherein solvent is applied to the multi-layer sandwich - is considered by the Board to be equivalent to "disintegrating said flake material layer".

1.2.3 Taking account of said passage "The multi-layer sheet is then introduced directly into a solvent with or without suitable agitation to produce flakes" it is evident that the argument of the respondent - namely that it would be clear to the person skilled in the art that the treatment of the multi-layer sheet and thus of the flake material layer with a solvent would substantially maintain the flake material layer which is only thereafter broken into flakes - cannot hold.

To the contrary, it is clear to the person skilled in the art - because there are no further steps indicated for the said treatment with the solvent at said passage at page 3, lines 8 to 10 of the application as originally filed - that the mere introduction into the solvent without any agitation can produce the flakes. The Board further remarks that the non-indication of further process steps cannot support a proposed

amendment concerning the presence of a further process step, let alone that the proposed amendment is derivable in a direct and unambiguous manner from the application as originally filed as required by the longstanding practice of the Boards of Appeal (see Case Law of the Boards of Appeal of the European Patent Office, 5th edition 2006, chapter III.2.1).

1.2.4 According to the second alternative rough flakes are produced, e.g. by grinding the multi-layer sandwich at 56, which are then treated with a solvent to remove the release coat material from the multi-layer sheet flakes (see Figure 5).

Thus the order of the steps for reducing the particle size of the multi-layer sheet (and thus of the flake material layer or layers) and for applying a solvent is reversed compared to the said first alternative and is therefore not in line with those of steps (c) and (d) as defined in claim 1 of the main request.

Furthermore, the more general term "disintegrating" ("zerkleinern") of step (d) has no explicit basis in the application as originally filed and it is also neither equivalent with the disclosed specific treatment "grinding" ("mahlen") as alleged by the respondent nor with the other specific treatments of "crushing" or "scraping". Thus the Board holds that a generalisation of this specific size reducing treatments to "disintegrating" would amount to a violation of Article 123(2) EPC.

However, the second alternative for producing rough multi-layer sheet flakes is clearly excluded from the

subject-matter of claim 1 of the main request for the reasons already indicated.

1.2.5 Taking account of the above consideration the Board thus concludes that applying a solvent according to step (c) of claim 1 of the main request implicitly causes disintegrating of the flake material layer of the multi-layer sheet, so that consequently step (d) takes place about simultaneously with step (c) without any need for a subsequent step of grinding, crushing or scraping action. Based on this understanding of fact the features (c) and (d) of claim 1 of the main request are considered to comply with Article 123(2) EPC.

1.2.6 Considering point 1.1.2 above the Board concludes that claim 1 of the main request does not comply with Article 123(2) EPC. Consequently, the main request is not allowable.

*Auxiliary request Ib*

1.3 In claim 1 of auxiliary request Ib the omitted feature concerning the dissolvability in an organic solvent has been inserted (see point X above). Claim 1 is thus based on claim 1 in combination with page 5, lines 21 to 23; and page 7, lines 4 to 6 and lines 10 to 12 of the application as originally filed.

1.3.1 The appellant's arguments that the drum embodiment of figure 5 would imply a different treatment for separating the individual layers than if a carrier sheet would have been used cannot hold in view of the disclosure with respect to figures 8 and 9 of the application as originally filed, namely that the multi-

layered coating sandwich built up on the polyester carrier film is introduced into an organic solvent stripping process to remove the sandwich material from the PET film (see page 7, line 37 to page 8, line 22).

1.3.2 The Board therefore concludes that claim 1 of auxiliary request Ib complies with Article 123(2) EPC. Since the subject-matter of claim 1 as granted has been restricted by defining the organic solvent soluble and dissolvable polymeric material the subject-matter of claim 1 of auxiliary request Ib also complies with Article 123(3) EPC.

2. *Novelty (Article 54 EPC)*

Novelty has not been disputed and the Board is satisfied that none of the cited documents discloses a process having all the features of claim 1 of auxiliary request Ib.

The subject-matter of claim 1 of auxiliary request Ib is thus novel (Article 54 EPC).

3. *Inventive step (Article 56 EPC)*

3.1 The Board comes to the conclusion that claim 1 of auxiliary request Ib lacks inventive step over the combined disclosures of D6 and D2 and the common general knowledge available to the skilled person for the reasons that follow:

3.2 D6 relates to a continuous process for making metallic flake particles including applying a release coating to at least one side of the carrier sheet, depositing a

metal film of from 350-450 angstroms thick onto the release coating, then stripping the release coating in a solvent, which is non-reactive with said metal, for solubilising it and removing the metal film in particulate form to produce the metal particles (see claim 1). Preferably said metal is aluminium and is vapour deposited in vacuum, said carrier sheet is formed of PET and said release coating includes polymers, such as polyvinylchloride, polystyrene, acrylic copolymers etc. (see claims 2 to 4; examples 3 and 4). The metallic film coated carrier sheet is passed through a solvent tank containing the solvent in which the release coating is solubilised; suitable solvents include acetone, chlorinated solvents such as methylene chloride, methyl ethyl ketone, toluene, butyl acetate and the like (see column 4, lines 29 to 35). The release coating can be applied by a roll-coater (see column 3, line 49 to column 4, line 13; and figures 1 and 2).

3.3 The subject-matter of process claim 1 of auxiliary request Ib differs from the process according to D6 in that the polymeric release material is applied in a vacuum chamber and that a multi-layer sandwich is produced.

3.3.1 The respondent argued that the technical problem to be solved by the patent in suit is the provision of an improved product and a simplified process with reduced costs (see patent, paragraph [0006]).

The Board cannot accept this definition of the technical problem for the following reasons:

3.3.2 First of all, the respondent admitted that the definition "multi-layer sandwich" of claim 1 is intended to encompass the products of example 5, constructions 1 to 3, i.e. simple double layer embodiments. Since D6 teaches to coat both sides of the carrier sheet with the organic solvent dissolvable polymeric release material no improvement of the productivity can be seen with respect to said double layer embodiment according to the patent in suit having one polymeric release layer with an Al layer thereon. Thus the partial problem of improving the productivity compared to D6 is not solved by claim 1.

3.3.3 Secondly, the vacuum deposited flakes of the patent in suit are not necessarily improved as compared to those of D6 or of the Metalure$^{R}$ process. The respondent admitted that no evidence with respect to a comparison with flakes of D6 or with respect to the Metalure$^{R}$ flakes has been submitted although this deficiency had been mentioned in the Board's communication annexed to the summons (see point VI above). Furthermore, from example 4 of the patent in suit it can be derived that the application of the release material in vacuum does not necessarily produce better flake properties: "The resulting flakes were similar in optical properties to Metalure flakes, in that they had similar brightness, particle size, opacity and aspect ratio" (see patent, paragraph [0078]).

According to said Metalure$^{R}$ process a solvent-based resin solution is applied as release material onto a moving polyester carrier sheet and after drying is metallised on both sides by vapour depositing an aluminium film. The resulting multi-layer sheet is then

stripped by dissolving the release material in acetone (see patent, paragraphs [0003] and [0012]). Thus the basic process steps of the Metalure$^{R}$ process are considered to correspond to those according to D6. Although the respondent stressed that the process according to D6 would not be comparable with the Metalure$^{R}$ one it failed to explain the essential differences between these two processes.

The respondent's argument that P1 would demonstrate that the vacuum deposition of the polymeric release material is responsible for the smoother surface and the improved quality of the Al-flakes according to the patent in suit cannot hold since the vacuum deposited polymeric material (Dow 685D styrene and acrylic 2009) is compared with NaF release material which is hygroscopic and which therefore can have a surface which is less smooth than that of the polymeric material.

The Board therefore concludes that it has not been proven by the respondent that the process of claim 1 results only in improved flakes, particularly Al-flakes as compared to D6 which flakes are considered to be comparable with those of the similar Metalure$^{R}$ process since both apply the polymeric release material from a solution of the polymer.

3.4 Therefore the objective technical problem is a less ambitious one, namely the provision of an alternative process for making flakes.

3.5 This problem is solved by the process as defined in claim 1. The process of claim 1 is, however, rendered obvious for the following reasons:

3.6 The person skilled in the art knows from D2 that the efficiency of a process for making lamellar pigments is improved by vacuum vaporizing the release material and the pigment-producing material and by depositing alternating layers of said release material and pigment-producing material (see D2, column 3, lines 13 to 17; column 4, lines 38 to 52; column 5, lines 5 to 11). Preferably the vaporization of the release material and the pigment-producing material is carried out within the same vacuum chamber (see column 3, line 67 to column 4, line 5).

3.6.1 Starting from D6 in applying the teaching of D2 the person skilled in the art has only to replace the continuous roll-coater, with which the release coating can be applied on the PET polyester carrier sheet by solubilising the polymeric release material in an organic solvent (see D6, column 3, lines 17 to 60), by a second vaporization source for the vaporizing the polymeric release material in the vacuum chamber. Thereby the drying step to remove the solvent from the coated carrier sheet is made redundant so that the apparatus and the process of D6 are further simplified.

In this context the Board considers that the person skilled in the art knows that vacuum deposition can generally be used for applying polymeric coatings (see e.g. D5, page 1564, left-hand column, second paragraph). Thus there exists no prejudice which would prevent him

from applying a vacuum vaporization technique with respect to the application of the release coat material.

3.6.2 The application of the release material according to said teaching of D2, i.e. to vapour deposit the release material and the pigment-producing materials in one vacuum chamber, represents an alternative of the process of D6 which is not restricted to said roll-coater embodiment ("application of the release coating **can** be performed …", see column 3, lines 49 to 54 and claim 1). This alternative of D6, however, would allow increasing the efficiency of the process by applying several alternating layers of polymeric release material and Al-flake layers on the PET carrier sheet. By combining said teaching of D2 with the process of D6 the person skilled in the art arrives at the subject-matter of claim 1 of auxiliary request Ib without inventive skill.

3.6.3 The respondent's arguments that the person skilled in the art would not combine D6 and D2 since they are not compatible with each other due to the different release materials and solvents to be used cannot hold for the following reasons.

It belongs to the common general knowledge of the person skilled in the art that Al-flakes are not compatible with water. Water as stripping solvent would change the characteristic properties of the Al-flakes (see e.g. D7, column 2, lines 27 to 32; D13, page 3, lines 2 to 22; see also the WO-A-00 24946, page 9, lines 24 to 38). Furthermore, the person skilled in the art knows already from D6 that the used solvent has to be non-reactive with the metallic pigment (see column 4,

lines 43 and 44). Consequently, it is clear to the person skilled in the art that the release material NaF and the solvent water, as disclosed by D2, represent no option for him when making Al-flakes.

3.6.4 According to the respondent the vacuum deposition of the polymeric release material would produce a smoother surface leading to improved Al-flakes. As admitted by the respondent this argument is not supported by any evidence, since no comparison had been made with respect to a polymeric material having been applied from a solution as e.g. disclosed by D6. Furthermore, the Board holds that even if this argument could be considered as concerning a proven fact then the person skilled in the art by applying both materials in one vacuum chamber would obtain such a smoother surface of the polymeric release layer as a *bonus effect* coming automatically with the vacuum deposition of the polymeric material. According to the established jurisprudence of the Boards of Appeal such a *bonus effect*, however, would not render the subject-matter of claim 1 of auxiliary request Ib inventive if, having regard to the state of the art, it would have been obvious for a skilled person to arrive at its subject-matter (see Case Law of the Boards of Appeal of the European Patent Office, 5th edition 2006, chapter I.D.9.7).

3.7 Claim 1 of auxiliary request Ib therefore does not involve an inventive step (Article 56 EPC).

4. *Admissibility of auxiliary requests Ia, IIa and IIb*

4.1 According to the established jurisprudence of the Boards of Appeal if the opponent is the sole appellant against an interlocutory decision by an Opposition Division maintaining the patent in amended form the patent proprietor/respondent is primarily restricted in the appeal proceedings to defending the patent as maintained. Amendments proposed by it could be rejected by the Board as inadmissible if they were neither appropriate nor necessary (see Case Law of the Boards of Appeal, 5th edition 2006, Chapter VII.D.6.1; G 9/92 and G 4/93, both OJ EPO 1994, 875).

4.1.1 Claim 1 of each of auxiliary requests Ia, IIa and IIb defines in addition to the subject-matter of claim 1 of auxiliary request Ib - which includes i) the organic dissolvable polymeric material, and ii) the application of solvent to the multi-layer sandwich to separate the release coat from the flake material; and iii) disintegrating said flake material layer into flakes - at least one further alternative:

Claim 1 of auxiliary requests Ia and IIa additionally defines in step (a) "an organic solvent soluble" polymeric material (i.e. this polymeric material must not be dissolvable; see points IX and XI above).

Claim 1 of auxiliary requests IIa and IIb additionally defines in step (c) "**or** subjecting the multi-layer sandwich to grinding beforehand; and **optionally** (d) further sizing and homogenizing said flake material layer"(see points XI and XII above).

4.1.2 The respondent stated at the oral proceedings that these three auxiliary requests represented an attempt to overcome Article 123(2) EPC objections raised by the Board in its communication and admitted that the said amendments related to alternatives.

4.1.3 The Board considers that the introduction of an alternative as well as the introduction of optional and thus non-limiting features into the subject-matter of an independent claim does not form an amendment which is occasioned by a ground for opposition under Article 100 EPC as required by Rule 57a EPC 1973. Consequently, these amendments do not comply with Rule 57a EPC 1973.

4.1.4 Furthermore, the proposed amendments of claims 1 of auxiliary requests Ia, IIa and IIb do **not** exclude any process for making flakes as arrived at by the combination of D6 and D2 and are thus *prima facie* not suitable for overcoming an inventive step objection based on D6 and D2.

4.2 Therefore the Board decides not to admit auxiliary requests Ia, IIa and IIb into the proceedings.

## Order

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

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

G. Nachtigall H.-P. Felgenhauer