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**Datasheet for the decision  
of 15 October 2019**

**Case Number:** T 0690/16 - 3.3.02

**Application Number:** 11001190.5

**Publication Number:** 2365038

**IPC:** C09D11/00

**Language of the proceedings:** EN

**Title of invention:**

Pigment dispersion, ink composition, inkset, and recording device

**Patent Proprietor:**

Seiko Epson Corporation

**Opponent:**

ECKART GmbH

**Headword:**

**Relevant legal provisions:**

**Keyword:**

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
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Case Number: T 0690/16 - 3.3.02

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.02**  
**of 15 October 2019**

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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on  
15 February 2016 rejecting the opposition filed  
against European patent No. 2365038 pursuant to  
Article 101(2) EPC.**

**Composition of the Board:**

**Chairman** M. O. Müller  
**Members:** P. O'Sullivan  
M. Blasi

## Summary of Facts and Submissions

- I. The appeal of the opponent lies from the decision of the opposition division to reject the opposition.
- II. European patent 2 365 038 was opposed under Article 100(a), (b) and (c) EPC on the grounds that its subject-matter lacked novelty and inventive step, the invention defined in the claims was not sufficiently disclosed, and the subject-matter of the patent extended beyond the content of the application as filed.
- III. During opposition proceedings, *inter alia* the following evidence was cited:

D5b	EP 1 862 511 A
D37	Declaration of Dr. Engel dated May 2015
D37-2	Plot D50 versus R50

- IV. With the statement of grounds of appeal the opponent filed *inter alia* the following evidence:

D45	"Navigating the digital ink jungle", SGIA Journal, third quarter 2005, pages 5 - 11
D46	Océ imaging supplies, monthly tip sheet, November 2006, issue 4
D47	Declaration of Mr Volker Jordan (undated)
D56	Product brochure of Byk-Gardener GmbH, "Das objektive Auge"

V. With the reply to the statement of grounds of appeal the patent proprietor submitted as main request the set of claims as granted and auxiliary requests 1 to 5, as well as *inter alia* the following evidence:

D65a	Translation of the cover and page 216 of the EM-930C printer manual
D68a	Translation of JP 2006-037020

VI. A communication of the board pursuant to Article 15(1) RPBA was sent in preparation of oral proceedings, scheduled in accordance with the corresponding requests of the parties.

VII. Oral proceedings before the board were held on 14-15 October 2019.

VIII. The requests of the parties relevant for the decision were as follows:

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

The patent proprietor requested dismissal of the appeal, or alternatively that the patent be maintained in amended form on the basis of one of the sets of claims of auxiliary requests 1 to 5 filed with the reply to the statement of grounds of appeal.

IX. Granted claim 1 reads as follows:

" 1. *An inkjet recording method comprising printing an ink composition to a recording medium not having an ink reception layer, wherein the recording medium is heated and printed,*

*said ink composition comprising a pigment dispersion containing a metal pigment, an organic solvent, and a resin, and said metal pigment containing plate-like particles, and in the case where the longitudinal diameter on the planar surface of the plate-like particle is X, the lateral diameter is Y, and the thickness is Z, the 50% average particle diameter R50 of a corresponding circle determined from the surface area in the X-Y plane of the plate-like particle is between 0.5 and 3  $\mu\text{m}$ , and the condition  $R50/Z > 5$  is satisfied, wherein an image is formed where the measurement values for the specular gloss of the recording medium at angles of 20°, 60°, and 85° as defined by JIS Z 8741 are simultaneously no less than 200, 200, and 100 by spraying the ink composition containing the metal pigment to the recording medium."*

Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that it is specified that an image is formed by "*... spraying droplets of the ink composition containing the metal pigment and causing these droplets to adhere to the recording medium*" (underlined text added with respect to claim 1 of the main request).

Claim 1 of auxiliary request 2 differs from claim 1 of auxiliary request 1 by the additional specification that the concentration of the metal pigment in the ink composition is 0.1 to 3.0 wt%.

Claim 1 of auxiliary request 3 differs from claim 1 of auxiliary request 1 in the limitation of R50 to between 0.75 and 2  $\mu\text{m}$ .

Claim 1 of auxiliary request 4 differs from claim 1 of auxiliary request 1 by the addition of the feature

*"wherein the particle size distribution CV value of the metal pigment as determined by the equation  
CV Value = standard deviation of particle size  
distribution/average particle diameter x 100 is 60 or less"*

Claim 1 of auxiliary request 5 is identical to claim 1 of the main request.

- X. The opponent's arguments, insofar as relevant to the present decision, may be summarised as follows. Where no arguments are provided below, the party merely made reference to its earlier submissions with respect to a higher ranking request:

Main request (claims as granted) - Novelty,  
Article 100(a) EPC

The subject-matter of granted claim 1 lacked novelty over the disclosure in D5b. D5b disclosed an ink recording method and an ink composition comprising a pigment dispersion comprising a metal pigment and the application thereof to an inkjet recording device. The particles of example 1 used in the ink composition printed on a recording medium not having a reception layer (paragraph [0105] of D5b) also displayed the further features of granted claim 1, namely, R50 and R50/Z values falling within the range recited.

Main request - Inventive step, Article 100(a) EPC

The subject-matter of claim 1 lacked inventive step in view of D5b in combination with *inter alia* D45 or D46. The technical problem underlying claim 1 in view of the disclosure of D5b was the provision of a more efficient inkjet recording method for printing to a recording medium not having an ink reception layer. The achievement of improved specular gloss in the recorded medium was a mere bonus effect.

Auxiliary request 3 - Inventive step, Article 56 EPC

In view of in particular D37-2, the R50 of the particles of example 1, used in D5b in the PVC recording method, fell within the claimed range (D5b, paragraph [0105]). The subject-matter of claim 1 consequently did not involve an inventive step.

- XI. The patent proprietor's arguments, insofar as relevant to the present decision, may be summarised as follows. Where no arguments are provided below, the party merely made reference to its earlier submissions with respect to a higher ranking request.

Main request (claims as granted) - Novelty,  
Articles 100(a) EPC

Claim 1 was novel over D5b. D5b did not disclose a heating step of the recording medium, nor the formation of an image having specular gloss values within the claimed range. Furthermore, the recording method to a medium not having an ink reception layer, disclosed in D5b, paragraph [0105], employed the particles of example 1. Those particles failed to display an R50



value of between 0.5 and 3  $\mu\text{m}$  and an R50/Z value of greater than 5.

Main request - Inventive step, Article 100(a) EPC

The technical effect of heating the recording medium was an improvement in gloss. The effect was demonstrated in paragraph [0114] and table 6 of the patent. The technical problem underlying the subject-matter of claim 1 was the provision of an inkjet recording method for printing to a recording medium not having an ink reception layer wherein the specular gloss of the recorded medium is improved.

Auxiliary request 3 - Inventive step, Article 56 EPC

The narrowing of the range for R50 in claim 1 led to a increased probability that the R50 of the particles of example 1 of D5b did not fall within the range of claim 1. There was no teaching in D5b to change the particle size to fall within the new range claimed.

Auxiliary request 4 - Novelty, Article 54 EPC

The CV feature in claim 1 was not disclosed in D5b for the particles of example 1.

## **Reasons for the Decision**

Main request (claims as granted)

1. Novelty, Articles 100(a) and 54 EPC
  - 1.1 Claim 1 concerns an inkjet recording method comprising printing an ink composition to a recording medium not having an ink reception layer, wherein the recording

medium is heated and printed, the ink composition comprising plate-like particles of a metal pigment exhibiting specific values for R50 and R50/Z (for a definition of these characteristics, see point IX, above). The claim also specifies that an image is formed having specific specular gloss values.

- 1.2 Novelty of the subject-matter of claim 1 was disputed in view of the disclosure of D5b.
- 1.2.1 D5b discloses a pigment dispersion comprising a metal pigment containing plate-like particles (D5b, page 3, lines 1-2), and its use in an inkjet recording method comprising printing an ink composition to a recording medium not having an ink reception layer, namely a PVC recording medium ("Viewcal 2000", D5b, paragraph [0105]).
- 1.2.2 The embodiment of paragraph [0105] of D5b employs "ink composition 14". This composition is prepared according to example 10 (paragraphs [0092] and [0093]), which employs pigment particles prepared by the same operation as example 1. The particles of example 1 of D5b display the following size characteristics (see table 1 of D5b, hereinafter "d" is used to replace "X" as contained in table 1):

- d10: 2.04  $\mu\text{m}$
- d50: 3.64  $\mu\text{m}$
- d90: 6.52  $\mu\text{m}$
- dmax: 11.79  $\mu\text{m}$
- Z: 70 nm

These values were obtained using an LMS-30 laser analyser (D5b, paragraph [0064]).

1.3 It was a matter of dispute whether the embodiment of D5b, paragraph [0105] discloses an inkjet recording method - to a recording medium not having an ink reception layer - comprising the following features of granted claim 1:

- a metal pigment having an R50 value of between 0.5 and 3  $\mu\text{m}$  and R50/Z value of greater than 5 (submitted in the written phase of appeal proceedings only)
- heating of the recording medium
- wherein an image is formed displaying the specular gloss values recited in claim 1

1.4 The R50 and R50/Z values

1.4.1 The d50 value of 3.64  $\mu\text{m}$  for the particles of example 1 (supra) falls outside the range of R50 of 0.5 to 3  $\mu\text{m}$  recited in claim 1.

The patent proprietor submitted that the R50 and R50/Z values in claim 1 was a number-based value derived from measurements taken from a particle image analyser, while the d50 particle sizes provided in D5b was a volume-based value obtained by a diffraction method.

The question to be answered was thus whether the volume based value d50 of 3.64  $\mu\text{m}$  corresponds to a number based value R50 within the claimed range of 0.5 to 3  $\mu\text{m}$ .

1.4.2 According to D37, three different aluminium effect PVD pigments differing in average thickness and size distribution (D37, table) were miniaturised by ultrasound treatment. Samples were removed at specific time intervals during a 2 hour period. The particle

size distribution for each sample was measured using both a "Cilas 1064" device, i.e. a laser diffraction device giving volume based values and an FPIA-3000S image analyser, i.e. an image analyzer giving number based values. The results, represented graphically in D37-2 show that all samples tested in D37, including those having a d50 of above 4  $\mu\text{m}$ , displayed an R50 value measured by image analysis falling comfortably within the claimed size range. Thus, in the absence of any evidence to the contrary, it must be concluded that the particles of example 1 of D5b having a d50 of 3.64  $\mu\text{m}$  display an R50 falling within the claimed range (0.5 to 3  $\mu\text{m}$ ). Having a thickness of 70 nm (D5b, table 1), the particles of example 4 of D5b therefore must have an R50/Z value of at least 7.14 (0.5/0.07), thus lying within the range defined by  $R50/Z > 5$  as stipulated in granted claim 1.

- 1.4.3 The patent proprietor argued that the samples tested in D37 all post-dated the priority date of the patent.

The board considers the fact that the samples of D37 may have post-dated the priority date of the patent as irrelevant. The patent proprietor has not denied that the particles measured in D37 were similar in nature to those of D5b and the patent. D37 thus serves as valid evidence that for several such particles subjected to ultrasonication, the particle sizes in the resultant pigment dispersion fell within the claimed range.

- 1.5 Feature related to heating of the recording medium and forming an image displaying the specular gloss values recited in claim 1

To the benefit of the patent proprietor, the board assumes in the following that this feature is not disclosed in D5b.

- 1.6 The subject-matter of claim 1 of the main request is consequently novel pursuant to Article 54 EPC.

2. Inventive step, Articles 100(a) and 56 EPC

- 2.1 Closest prior art and technical problem solved

- 2.1.1 The parties agreed that D5b represents the closest prior art, and the board sees no reason to differ.

- 2.1.2 The subject-matter of granted claim 1 is distinguished from the disclosure in D5b in that the latter does not disclose a method wherein the recording medium is heated, nor a resultant image having the gloss values recited in claim 1.

- 2.1.3 The patent proprietor submitted that the technical effect of the distinguishing feature of heating the recording medium over the disclosure of D5b was the improvement in gloss. The effect was demonstrated in paragraph [0114] and table 6 of the patent. Thus the technical problem underlying claim 1 was the provision of an inkjet recording method for printing to a recording medium not having an ink reception layer wherein the specular gloss of the recorded medium is improved.

2.1.4 As will be apparent from the following, the achievement of specular gloss as referred to by the patent proprietor is an effect which is inevitably obtained when carrying out the measures which the skilled person would implement in order to print to a recording medium not having an ink reception layer, and hence, represents a so-called bonus effect. Thus, the provision of specular gloss cannot be taken into account in the formulation of the objective technical problem. More specifically, wishing to apply the teaching of D5b to print on a PVC sheet, the skilled person knew from common general knowledge represented by the disclosures D45 and D46, that a heating step should be applied.

2.1.5 To summarise the disclosures of D45 and D46:

D45 is a general review article entitled "navigating the digital ink jungle" and sets out to aid the reader in the choice of inkjet ink options available (page 5, left hand column, second paragraph). Water-based, oil-based and solvent-based inks are discussed in turn (pages 7-9). Solvent-based inks are described as falling into two groups, "mild" and "aggressive". A mild solvent (also known as a "soft" or "eco" solvent) is said to generally use very slow drying liquids as the carrier fluid, and generally contain glycol ethers or glycol ester ethers. D45 teaches that printers using these inks have several heaters fitted to aid with drying, and the faster the machine prints, the more heat is required (D45, page 8, right hand column, second and third full paragraphs). Dipropylene glycol mono-methyl ether is identified as one such type of mild solvent (page 9, left hand column, final paragraph).

D46 is a "monthly tip sheet" from Océ imaging supplies, a provider of ink products, and is entitled "Getting the most from solvent printers". It addresses quality, productivity and colour of printing with solvent or "ecosolvent" (equivalent to "mild" according to D45) printers. It is stated therein that to improve print quality, these printers use heaters to warm the media (PVC is mentioned specifically) to anywhere from 40 to 70°C. Heating is said to open up the molecular structure of the media so it can better absorb ink, and to evaporate the solvent quickly so the ink will not spread out on the media (first page, paragraph beginning "Heat it up"). In the following paragraph it is stated that the heaters on solvent and ecosolvent printers are the key to quality, productivity and colour.

2.1.6 In D5b, printing on PVC sheets (paragraph [0105]) is performed using the ink composition of example 10. This composition comprises as solvents propylene glycol, diethylene glycol diethyl ether and dipropylene glycol monomethyl ether (D5b, paragraph [0093]). It was not disputed by the patent proprietor that these solvents were to be considered as "mild" solvents in the context of D45.

2.1.7 The board considers D45 and D46 to provide evidence that the skilled person starting from paragraph [0105] of D5b and wishing to print on PVC with inks comprising "mild" solvents, would have known from common general knowledge that a step of heating the recording medium should be implemented. By applying this heating step, the skilled person would have arrived at the subject-matter of claim 1.

2.1.8 Since according to the patent proprietor it is the heating step which leads to the specular gloss effect as defined in claim 1, the achievement of said effect would have inevitably followed from the heating step which the skilled person would have implemented anyway starting from D5b (paragraph [0105]). The achievement of specular gloss values within the range defined in claim 1 is consequently to be considered as a bonus effect.

2.2 The counter-arguments of the patent proprietor are not convincing for the following reasons:

2.2.1 The patent proprietor argued that D5b taught away from heating of the PVC recording medium and towards the use of a fixing resin in the composition (paragraph [0092]).

However, as conceded by the patent proprietor during oral proceedings, the fixing resin was a binder and did not have the same function as, nor replace, a heating step. Hence the presence of a binder in the composition used in paragraph [0105] of D5b is irrelevant.

2.2.2 Citing D68a, the patent proprietor argued that it was not necessarily the case that ink compositions comprising mild solvents were always to be heated. D68a for example disclosed printing an ink to a PVC layer without an ink reception layer (page 1, first paragraph) and taught the use of mild solvents including those taught in D5b (D68a, paragraphs [0023] and [0024]), as well as the use of a fixing resin (paragraph [0041]). The compositions thereof were thus similar to those of D5b, and yet a heating step was not applied when printing (paragraph [0071]). Therefore, even if it was common general knowledge to heat to



remove mild solvents, the skilled person would not have gone against the specific teaching in D5b, also shown in D68a, not to heat the medium.

However, while the board acknowledges that the method of D68a lacks a heating step, the disclosure of a single specific patent document cannot overturn the general teachings representing the common general knowledge of the skilled person provided by D45 and D46. Furthermore, although it was concluded (supra) in the assessment of novelty that D5b did not explicitly nor implicitly disclose a step of heating the recording medium, the board does not agree with the patent proprietor that paragraph [0005] of D5b necessarily excludes any kind of heat treatment. In describing the prior art under paragraph [0003], D5b concludes that the very high heat required led to the disadvantage that the nature of the print medium was extremely limited. Paragraph [0005] then recites as an object of the invention an inkjet recording method without limitation to the printing media, because "heat treatment and the like are unnecessary". Consequently, "heat treatment" in this context must be understood, for any specific recording medium, to mean heating of that medium to a temperature which would damage the recording medium in question. D5b does thus not necessarily exclude, for example, heating an appropriate PVC sheet to 40 °C or above, as long as said sheet would not be negatively affected by the heat applied.

- 2.2.3 Similarly to the above, the patent proprietor argued that the skilled person starting at D5b would not have applied heat since, as noted in D45 (paragraph bridging pages 8 and 9), certain media are prone to "cockle" under heat.

It is however within the routine ability of the skilled person, depending on the medium to which printing is desired, to select the appropriate heating temperature to avoid cockling or other such heat-related damage to the printing medium in question.

- 2.3 Incidentally, it is noted that even if the R50 and R50/Z values were additional distinguishing features, they would not contribute to inventive step. For the same reason as given below for auxiliary request 3, the selection of R50 and R50/z values as claimed could only be seen as an arbitrary adjustment of those values, which cannot support acknowledgement of inventive step.
- 2.4 The subject-matter of claim 1 consequently lacks inventive step in view of D5b as closest prior art in combination with the common general knowledge supported by D45 and D46.
- 2.5 It follows that the ground for opposition under Article 100(a) in conjunction with Article 56 EPC prejudices the maintenance of the patent as granted.

Auxiliary request 1 - inventive step, Article 56 EPC

3. The changes to claim 1 of this request (supra) compared to claim 1 of the main request consisted of the amendment of the text "spraying the ink composition containing the metal pigment to the recording medium" to "spraying droplets of the ink composition containing the metal pigment and causing the droplets to adhere to the recording medium" (emphases added).
- 3.1 These amendments were intended to overcome an objection of added subject-matter pursuant to Article 123(2) EPC

(c.f. reply to the statement of grounds of appeal, page 5, second paragraph). They do not change the assessment and conclusions provided above with regard to whether the subject-matter of claim 1 of the main request involves an inventive step. That the same conclusions apply to claim 1 of this request was also not disputed by the patent proprietor.

- 3.2 It follows that for the same reasons as provided for claim 1 of the main request, the subject-matter of claim 1 of auxiliary request 1 lacks inventive step pursuant to Article 56 EPC.

Auxiliary request 2 - inventive step, Article 56 EPC

4. The subject-matter of claim 1 differs from claim 1 of auxiliary request 1 by the addition of the text "wherein the concentration of the metal pigment in the ink composition is 0.1 to 3.0 wt%".
- 4.1 The patent proprietor during oral proceedings did not defend inventive step of the claimed subject-matter on the basis of the newly added feature.
- 4.2 In the view of the board, the range does not represent a further distinguishing feature with respect to the disclosure in D5b, example 10, the composition of which comprises aluminium pigment (as a solid content) of 1 wt%. Furthermore, even if it were a distinguishing feature, the specification of a specific weight percentage range for the concentration of the metal pigment would be nothing more than an arbitrary adjustment of the claimed subject-matter.
- 4.3 It follows that for the same reasons as provided for claim 1 of the main request, the subject-matter of

claim 1 of auxiliary request 2 lacks inventive step pursuant to Article 56 EPC.

Auxiliary request 3 - inventive step, Article 56 EPC

5. The subject-matter of claim 1 differs from claim 1 of auxiliary request 1 in the limitation of the range for R50 to between 0.75 and 2  $\mu\text{m}$ .

5.1 The patent proprietor argued that as a result of the limitation to R50, the particles of example 1 of D5b, having a d50 of 3.64  $\mu\text{m}$  (supra), possessed a corresponding R50 value outside of the claimed range.

5.2 However, even if it were to be concluded that the limited particle size range now recited in claim 1 were not disclosed by the particles used in paragraph [0105] of D5b - which is not necessarily true in view of D37 and D37-2 (supra) - the following applies. There is no indication in the patent of any technical effect associated with the range for R50 defined in claim 1 of auxiliary request 3. As a consequence, such a limitation can only be seen as an arbitrary adjustment of the particle size employed in paragraph [0105] of D5b, and cannot support the acknowledgement of inventive step.

5.3 It follows that for this reason, in addition to the reasons provided for claim 1 of the main request, the subject-matter of claim 1 lacks inventive step pursuant to Article 56 EPC.

Auxiliary request 4 - inventive step, Article 56 EPC

6. Claim 1 of auxiliary request 4 differs from claim 1 of auxiliary request 1 by the limitation to a particle

size distribution CV value of the metal pigment of 60 or less.

6.1 D5b does not disclose the CV value of the particles of example 1, which were employed in the printing of PVC according to paragraph [0105] thereof. In the same way as for claim 1 of auxiliary request 3 (supra) there is no indication in the patent of any technical effect associated with the CV defined in claim 1 of auxiliary request 4. As a consequence, the limitation of the CV value can only be seen as an arbitrary adjustment of the particle size distribution employed in paragraph [0105] of D5b, and cannot support the acknowledgement of inventive step.

6.2 It follows that the subject-matter of claim 1 of auxiliary request 4 lacks inventive step pursuant to Article 56 EPC.

Auxiliary request 5 - inventive step, Article 56 EPC

7. Claim 1 of this request is identical to claim 1 of the main request.

7.1 It follows that for the same reasons as provided for claim 1 of the main request, the subject-matter of claim 1 of auxiliary request 5 lacks inventive step pursuant to Article 56 EPC.

Conclusion

8. None of the sets of claim requests on file are allowable.

**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:



N. Maslin

M. O. Müller

Decision electronically authenticated