

**Internal distribution code:**

- (A) [ - ] Publication in OJ
- (B) [ - ] To Chairmen and Members
- (C) [ - ] To Chairmen
- (D) [ X ] No distribution

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

**Case Number:** T 0880/17 - 3.3.02

**Application Number:** 10016140.5

**Publication Number:** 2336249

**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:**

EPC Art. 54, 56

**Keyword:**

Novelty - (no)  
Inventive step - (no)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

Boards of Appeal of the  
European Patent Office  
Richard-Reitzner-Allee 8  
85540 Haar  
GERMANY  
Tel. +49 (0)89 2399-0  
Fax +49 (0)89 2399-4465

Case Number: T 0880/17 - 3.3.02

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

**Appellant:** Seiko Epson Corporation  
(Patent Proprietor) 4-1, Nishishinjuku 2-chome,  
Shinjuku-ku  
Tokyo 163-0811 (JP)

**Representative:** Miller Sturt Kenyon  
9 John Street  
London WC1N 2ES (GB)

**Respondent:** ECKART GmbH  
(Opponent) Güntersthal 4  
91235 Hartenstein (DE)

**Representative:** Walcher, Armin  
Louis, Pöhlau, Lohrentz  
Patentanwälte  
Postfach 30 55  
90014 Nürnberg (DE)

**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 9 February 2017  
revoking European patent No. 2336249 pursuant to  
Article 101(3) (b) 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 patent proprietor lies from the decision of the opposition division to revoke European patent 2 336 249.
- II. The patent 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:
- D6E: EP 1 862 511 A
  - D16: US 8,215,764
  - D19-2: plot D50 versus R50
  - D24: Declaration of Dr. Engel dated May 2015
  - D31E: English translation of JP 2012092252
  - D33: Horiba, "A guidebook to particle size analysis"
- IV. With the statement of grounds of appeal the patent proprietor filed a set of claims as main request (corresponding to the claims as granted) and sets of claims of nine auxiliary requests, as well as the following:
- D55: Lab journal excerpt; and English language translation D55E

V. With the reply to the statement of grounds of appeal the opponent submitted the following:

D56: Declaration of R Schneider dated  
27 October 2017

VI. With the letter of 19 June 2018 the patent proprietor submitted sets of claims of auxiliary requests 5 to 9 to replace auxiliary requests 5 to 9 filed with the statement of grounds of appeal.

VII. 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.

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

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

The patent proprietor requested that the decision under appeal be set aside and the patent be maintained as granted, i.e. that the opposition be rejected, 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 4 submitted with the statement setting out the grounds of appeal, or on the basis of one of the sets of claims of auxiliary requests 5 to 9 submitted with the letter of 19 June 2018.

The opponent requested dismissal of the appeal.

X. Claim 1 as granted reads as follows:

*"1. An ink composition comprising a pigment dispersion comprising a metal pigment, wherein the metal pigment contains 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 further when applied to an inkjet recording device that satisfies the condition of  $L \geq 5W$  where L  $\mu\text{m}$  is the nozzle diameter of an inkjet head and W  $\mu\text{m}$  is the size of a mesh filter opening provided in an ink flow path, the number of plate-like particles where the average particle diameter R  $\mu\text{m}$  of a corresponding circle determined from the surface area in the X-Y plane of the plate-like particles satisfies the condition  $R > (L/5)$  is no more than 5 % of the total number of plate-like particles; and wherein the ink composition further comprises an organic solvent and a resin".*

Claim 1 of auxiliary request 1 differs from that of the main request by the additional feature

*"wherein the particle size distribution CV value of the metal pigment as determined by the following equation is 60 or less*

*Equation*

*CV value = standard deviation of particle size distribution/average particle diameter x 100."*

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

Claim 1 of auxiliary request 3 differs from claim 1 of the main request by the limitations introduced into the respective claim 1 of auxiliary requests 1 and 2.

The respective claim 1 of auxiliary requests 4, 5 and 6 are formulated as claims directed to the use of an ink composition in an inkjet recording device, but otherwise comprises the same technical features as the respective claim 1 of the main request and auxiliary requests 1 and 3.

The respective claim 1 of auxiliary requests 7 and 8 are formulated as claims directed to an ink composition in an inkjet recording device, but otherwise comprise the same technical features as the respective claim 1 of the main request and auxiliary request 3.

Claim 1 of auxiliary request 9 is formulated as a claim directed to an inkjet recording device containing an ink set comprising a plurality of ink compositions, wherein each of the ink compositions has a different concentration of metal pigment. This claim also comprises the same technical features as claim 1 of auxiliary request 3.

XI. The opponent's arguments, insofar as relevant to the present decision, may be summarised as follows:

Main request (claims as granted) - Novelty,  
Articles 100(a) and 54 EPC

The subject-matter of granted claim 1 lacked novelty over the disclosure in D6E. D6E disclosed an ink composition comprising a pigment dispersion comprising a metal pigment and the application thereof to an inkjet recording device which satisfied the condition of  $L \geq 5W$ . In view of the comparisons drawn between measurements using an LMS-30 laser particle distribution analyser (hereinafter: LMS-30 laser analyser) and a particle size image analyser FPIA-3000S (hereinafter: FPIA-3000S image analyser) in D16 and D31E and the CV data provided in D56, the particles of example 4 of D6E displayed the further features of granted claim 1, namely, R50 and R50/Z values falling within the range recited. In the context of the CV value, the calculation provided by the patent proprietor in D55 was erroneous. Specifically, the term "normal distribution" used in D55 was not an accepted alternative to the term "standard deviation", required for the calculation of the CV, and its use as the latter was questionable. In D56, a recalculation of the CV value from the data provided in D55 was performed according to the rules of statistics (D56, table), and yielded a CV value of 50. The value of 154.7 calculated in D55 was thus incorrect and the particle size distributions of the relevant particles in D16, D31E and D6E were similar.

Furthermore, the condition that the number of particles where the average particle diameter  $R \mu\text{m}$  of a



corresponding circle determined from the surface area in the X-Y plane of the plate-like particles satisfies the condition  $R > (L/5)$  is no more than 5 % of the total number of plate-like particles (hereinafter: "the L/5 condition"), was met.

Auxiliary request 1 - Novelty, Article 54 EPC

D56 demonstrated that in contrast to the value provided in D55, the CV value of the sample of example 4 of D6E fell within the claimed range. The subject-matter of claim 1 thus lacked novelty.

Auxiliary request 2 - Novelty, Article 54 EPC

The correlated R50 range of 0.89 to 0.95  $\mu\text{m}$  for the particles of example 4 of D6E left no doubt that said particles had an R50 above the lower limit of 0.75  $\mu\text{m}$  in claim 1. The subject-matter of claim 1 thus lacked novelty.

Auxiliary request 3 - Novelty, Article 54 EPC

The same arguments applied as for the respective claim 1 of the main request and auxiliary requests 1 and 2.

Auxiliary request 4 - Novelty, Article 54 EPC

With respect to the L/5 condition, the same argument applied as for claim 1 of the main request.

Auxiliary requests 5, 6, 7 and 8 - Novelty,  
Article 54 EPC

The same arguments applied as for the respective  
claim 1 of the higher ranking requests.

Auxiliary request 9 - Inventive step, Article 56 EPC

The presence of more than one ink composition in an  
inkjet recording device was standard in the art of  
printing. Furthermore, providing ink compositions with  
different concentrations of metal pigment was part of  
the skilled person's common general knowledge. No  
surprising technical effect had been achieved, and the  
subject-matter of claim 1 consequently did not involve  
an inventive step.

XII. The patent proprietor's arguments, insofar as relevant  
to the present decision, may be summarised as follows:

Main request (claims as granted) - Novelty,  
Articles 100(a) and 54 EPC

D6E disclosed an ink composition comprising a pigment  
dispersion comprising a metal pigment and the  
application thereof to an inkjet recording device which  
satisfied the condition of  $L \geq 5W$ .

The particles in example 4 of D6E failed to exhibit the  
following features of claim 1 at issue:

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

In order for a claim to lack novelty, the subject-matter thereof was to be clearly and directly derivable from the prior art disclosure. This requirement was not met for D6E and the burden of proof to demonstrate the contrary lay with the opponent. D33 demonstrated that there could be a big difference between size values calculated on the basis of a number- or a volume-average. Although the d50 values (LMS-30 laser analyser) in D16 and D31E were similar to those of the example 4 of D6E, the size distribution characteristics were different, as demonstrated by D55, such that said comparison could not be validly drawn. Furthermore, it was not possible to conclude that the particle size distribution in example 4 of D6E satisfied the L/5 condition. The subject-matter of claim 1 was consequently novel.

Auxiliary request 1 - Novelty, Article 54 EPC

D55 demonstrated that the CV of the particles in D6E was far above the upper limit of 60 recited in the claim, thereby rendering the subject-matter of claim 1 novel over D6E.

Auxiliary request 2 - Novelty, Article 54 EPC

The narrowing of the range for R50 in claim 1 led to an increased probability that the R50 of the particles of example 4 of D6E did not fall within the range of claim 1.

Auxiliary request 3 - Novelty, Article 54 EPC

The combination in claim 1 of both the CV feature and the narrower range for R50 rendered it less probable that the particles of example 4 of D6E possessed the

claimed features, such that the subject-matter of the claim was novel.

Auxiliary request 4 - Novelty, Article 54 EPC

Claim 1 was directed to the use of an ink composition and as such, the L/5 condition was a limiting feature. The same arguments applied as for claim 1 of the main request.

Auxiliary requests 5, 6, 7 and 8 - Novelty, Article 54 EPC

The same arguments applied as for the respective claim 1 of the higher ranking requests.

Auxiliary request 9 - Inventive step, Article 56 EPC

The prior art failed to teach the presence of a plurality of ink compositions each having a different concentration of metal pigment. The technical problem was the provision of an inkjet recording device with improved metallic gloss effect printing. The effect was demonstrated in the patent and there was no evidence that the achievement thereof was routine for the skilled person. Consequently, the subject-matter of claim 1 involved an inventive step.

## Reasons for the Decision

Main request (claims as granted)

1. Novelty, Articles 100(a) and 54 EPC
  - 1.1 Claim 1 concerns an ink composition comprising plate-like particles of a metal pigment exhibiting specific characteristics R50, R50/Z and L/5 (for a definition of these characteristics, see point X, above).
  - 1.2 Novelty of the subject-matter of claim 1 was disputed in view of the disclosure of example 4 of D6E.
  - 1.3 The particles of example 4 of D6E display the following size characteristics (see table 1 of D6E, hereinafter "d" is used to replace "X" as contained in table 1):

d10: 0.53  $\mu\text{m}$   
d50: 1.06  $\mu\text{m}$   
d90: 2.17  $\mu\text{m}$   
dmax: 4.24  $\mu\text{m}$   
Z: 70 nm

These values were obtained using an LMS-30 laser analyser (D6E, paragraph [0064]).

- 1.4 It was a matter of dispute whether the particles in example 4 of D6E display the following features of granted claim 1:
  - an R50 value of between 0.5 and 3  $\mu\text{m}$
  - an R50/Z value of greater than 5
  - the L/5 condition.

- 1.5 The R50 and R50/Z values
  - 1.5.1 The values disclosed in example 4 of D6E for d50 and d50/Z lie within the ranges provided in claim 1 for the corresponding values R50 and R50/Z.
  - 1.5.2 The patent proprietor submitted that the d50 and d50/Z values in D6E and the corresponding values for R50 and R50/Z of claim 1 could not be compared with each other. The values in claim 1 were by nature necessarily number-based values derived from measurements taken from a particle image analyser, while the values of D6E were volume-based values obtained using a diffraction method.
  - 1.5.3 The board notes that claim 1 does not stipulate that the R50 value is to be calculated on a number basis using an image analyser. Nevertheless, for the purpose of this assessment, and to the benefit of the patent proprietor, it is assumed in the following that the values recited in claim 1 are to be calculated on a number basis using an image analyser.
  - 1.5.4 The question is therefore whether the volume-based particle size values provided for the sample of example 4 of D6E correspond to number-based R50 values within the ranges recited in granted claim 1.
  - 1.5.5 In patent documents D16 and D31E, measurements of specific pigment dispersions were taken both with an LMS-30 laser analyser **and** with an FPIA-3000S image analyser. An LMS-30 laser analyser was also used in D6E (paragraph [0064]) to measure the particle sizes in example 4, while an FPIA-3000S image analyser was used in the patent to measure R50 (paragraph [0111]).

According to the opponent, on the basis of a correlation between the results using both measurement techniques for the same particles in D16 and D31E, it could be concluded that the particles of example 4 of D6E, if measured using an FPIA-3000S image analyser, would display the disputed features of granted claim 1.

1.5.6 According to D16, a metal pigment dispersion containing tabular particles was prepared (column 16, lines 21-24). The particle size distribution of the metal pigment dispersion was measured with an LMS-30 laser analyser, providing a d50 value of 1.03  $\mu\text{m}$  and a dmax value of 4.9  $\mu\text{m}$  (column 16, lines 25-30). The same particles were then measured using an FPIA-3000S image analyser and provided an R50 value of 0.89  $\mu\text{m}$ . The corresponding R50/Z value, given that the thickness Z of the tabular particle was 0.02  $\mu\text{m}$ , was 44.5 (column 16, lines 31-45 of D16).

1.5.7 Similarly, according to D31E, the particle size distribution of the metal particle "flakes dispersion" was measured with an LMS-30 laser analyser, providing a d50 value of 1.2  $\mu\text{m}$  and a dmax value of 5.1  $\mu\text{m}$  (paragraph [0021]). The same particles were then measured using an FPIA-3000S image analyser and provided an R50 value of 0.95  $\mu\text{m}$ . The corresponding R50/Z value, given that the thickness Z of the tabular particle was 0.023  $\mu\text{m}$ , was 46.2 (paragraph [0022] of D31E).

1.5.8 This data can be summarised in tabular form (the corresponding CV values for the relevant particles of D16 and D31E are also included; all values in  $\mu\text{m}$ , with the exception of the R50/Z and CV values):

	<b>d50</b>	<b>dmax</b>	<b>R50</b>	<b>R50/Z</b>	<b>CV</b>
<b>D16</b>	1.03	4.9	0.89	44.5	38.2
<b>D31E</b>	1.2	5.1	0.95	46.2	41.3
<b>D6E</b>	1.06	4.24	0.89 - 0.95	12.7 - 13.57	

1.5.9 The board can follow the argument of the opponent according to which these results can be correlated in order to draw conclusions with regard to the R50 value of the particles of example 4 of D6E. Thus, since the d50 (measured with an LMS-30 laser analyser) of 1.06  $\mu\text{m}$  disclosed in D6E lies between the d50 of 1.03  $\mu\text{m}$  disclosed in D16 and the d50 of 1.2  $\mu\text{m}$  disclosed in D31E, the corresponding R50 value for the particles in example 4 of D6E if measured with an FPIA-3000S image analyser must also lie between the 0.89  $\mu\text{m}$  measured in D16 and the 0.95  $\mu\text{m}$  in D31E, and thus within the range of between 0.5 and 3  $\mu\text{m}$  recited in claim 1 at issue. Having a thickness of 70 nm (D6E, table 1), the particles of example 4 of D6E therefore must also have an R50/Z value of between 12.7 (0.89/0.07) and 13.57 (0.95/0.07), thus lying within the range defined by  $R50/Z > 5$  as stipulated in granted claim 1.

1.5.10 The validity of this correlation is further supported by the experiments described in the declaration D24 and the resulting graph of d50 versus R50, depicted in D19-2. According to D24, three different aluminium effect PVD pigments differing in average thickness and size distribution (D24, 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 an FPIA-3000S image analyser and a "Cilas 1064" device, an alternative laser granulometer to the LMS-30 laser analyser. The results, represented graphically in D19-2, show that essentially all samples having a d50 of below 4  $\mu\text{m}$  displayed an R50 value measured by image analysis falling within the claimed size range. These tests confirm therefore that metallic (aluminium) effect pigments similar to those of example 4 of D6E having a d50 of 1.06  $\mu\text{m}$  must exhibit an R50 value within the range recited in granted claim 1.

- 1.6 On the other hand, the patent proprietor's counter-arguments failed to convince the board:
  - 1.6.1 First, the patent proprietor argued, based on D55, that the results in D6E could not reasonably be correlated with those in D16 and D31E. More specifically, the particle size distribution of the respective particles, characterised by the CV value in D6E on the one hand, and in D16 and D31E on the other hand were different and hence, the particle size characteristics d50 and d50/Z of D6E could not be correlated with the R50 and R50/Z values of D16 and D31E. D55 was an excerpt from a lab book of the inventor of D6E and comprised data detailing the particle size analysis of the dispersion of the sample prepared in example 4 of D6E. Despite having been measured with an LMS-30 laser analyser and therefore representing a volume-based measurement, the CV value of 154.7 calculated in D55 was very far above the figures of 38.2 and 41.3 provided for the dispersions of D16 and D31E respectively. The "normal distribution 50%" value used in D55 corresponded to the "standard deviation" and thus could be used to calculate the CV (c.f. claim 5 at issue). The large

disparity in the respective CV values meant that the particle size distribution in the various samples was different. The conflicting value for the CV provided by the opponent in D56 was erroneous. Specifically, the raw data in the table of D55 used by the opponent in its calculation was not sufficiently complete to permit accurate calculation of the CV value. Consequently, it could not be expected that the sample of example 4 of D6E would have the same or similar R50 values as the samples of D16 or D31E when measured on a number basis.

On the one hand, the board sees no reason to doubt the correctness of the recalculation of the CV value submitted by the opponent with D56. Since no other data was available, it was reasonable and acceptable for the opponent to recalculate the CV value directly from the raw data supplied in D55. Consequently, the correct calculated CV value of the particles of example 4 of D6E is 50, obtained according to D56. This CV value is similar to that recited in D16 and D31E (38.2 and 41.3 respectively). On the other hand, the board does not accept the patent proprietor's calculation of the CV value of 154.7 according to D55. The term "standard deviation" required to calculate the CV (c.f. claim 5 at issue) is a well known and established statistical term. Thus there is no reason why the value labelled "normal distribution" in D55, used in the calculation according to D55, should be understood as being synonymous with the "standard deviation". Consequently, the CV value calculated in D55 using the normal distribution value must be incorrect. The argument of the patent proprietor that the CV value in D55 is in any case based on a volume-based measurement and thus not comparable with the values provided in D16 and D31E is also not convincing in view of D56 (page 4, final paragraph), according to which an even lower CV [than

the value calculated in D56] can be expected for the sample of example 4 of D6E when the particles sizes are determined with a number-based method. It follows that it has not been demonstrated that the particle size distribution of the sample of example 4 of D6E differs from that of the samples in D16 and D31E to the extent that the correlation drawn above is rendered invalid, or unreasonable.

- 1.6.2 Second, the patent proprietor argued on the basis of D33 that although it was accepted to convert image analysis (number-based) results to volume-based results, converting volume-based results from laser diffraction as disclosed in D6E to number-based results led to errors (D33, page 9, "transforming results"; figure 13).

However, the board sees the disclosure of D33 as irrelevant to the validity of the correlation made above. D33 refers to conversion of number-based values to volume-based values and vice versa based on mathematical calculations, and not to the comparison of values in practice based on experimental results, to which the present considerations are directed.

- 1.6.3 Third, the patent proprietor submitted that the results provided by laser analysis (diffraction) methods were not comparable with those provided by image analysis-based methods due to the assumption made in the former that all particles were spherical. For example, if two separate samples of flat particles having the same diameter of a corresponding circle, but different thicknesses were compared, image analysis would provide the same R50 for both particles, while a laser analysis measurement would provide different results. This was due to different light scattering patterns on the edges

of the particles in the diffraction method. Thus there was a significant element of doubt in comparing the samples of D16 and D31E with example 4 of D6E, since a correlation which held good for one particular thickness may not for another.

There is however no evidence on file that the patent proprietor's submissions in this regard reflect the actual situation. At the same time, as argued by the opponent, in laser diffraction methods, the contribution of the scattered rays from the edges of flat particles can be assumed to be minimal compared to the scattering from the larger areas, to the extent that the result would not vary significantly with differences in thickness. Hence, the board finds this argument unconvincing.

- 1.6.4 Fourth, the patent proprietor submitted that the samples of D16, D31E and D6E were not comparable since, having been prepared in different ways, the respective particle size distributions also differed, with the consequence that the correlation (supra) did not necessarily hold true. Thus, in D6E a polyvinyl butyral resin layer coating solution was spin coated to a PET film (paragraphs [0059] and [0061]) and stripped with IPA, dispersing for 72 hours (example 4), while, in D16 a bar coating process was performed (column 16, lines 1-3), and the resin was stripped with diethylene glycol diether and dispersed for 12 hours (column 16, lines 9-15). The method in D31E was similar to that described in D16.

In the absence of any evidence to the contrary, the board fails to see the relevance of the method of preparation of the various dispersion samples in view of the above correlated values for R50 as well as the

similarity in D16, D31E and D6E of the CV values in view of D56 (supra).

- 1.6.5 Fifth, the patent proprietor argued that since the samples tested in D24 all post-dated the priority date of the patent, they did not mimic the sample of example 4 of D6E and therefore did not conclusively demonstrate that it displayed the technical features of granted claim 1.

The board considers the fact that the samples of D24 may have post-dated the priority date of the patent as irrelevant. The patent proprietor has not denied that the particles measured in D24 were similar in nature to those of D6E and the patent. D24 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. Thus, D24 serves to corroborate the validity of the correlation carried out between the samples of D16 and D31E with that of example 4 of D6E.

- 1.6.6 Finally, the patent proprietor submitted that the burden of proof in demonstrating that the sample of example 4 of D6E fell within the scope of granted claim 1 lay with the opponent, and had not been sufficiently discharged.

The board agrees that the burden of proof, in the first place, lies with the opponent to demonstrate that the subject-matter of granted claim 1 lacks novelty. However, to support its position, the opponent filed evidence in the form of the correlations between measurements on a volume basis and a number basis (D16 and D31E), the supporting evidence provided by D24 and D19-2 which corroborate the validity of said

correlation, and the recalculation of the CV value according to D56. In view of this evidence, the burden of proof has duly been discharged by the opponent. It was therefore for the patent proprietor to demonstrate that the particles of example 4 of D6E do not fall within the scope of granted claim 1.

1.6.7 In view of the foregoing, it follows that the particles of the sample of example 4 of D6E display R50 and R50/Z values falling within the ranges recited in granted claim 1.

1.7 The "L/5 condition"

1.7.1 The "L/5 condition" refers to the feature of claim 1 at issue according to which where  $L \mu\text{m}$  is the nozzle diameter of an inkjet head, the number of plate-like particles where the average particle diameter  $R \mu\text{m}$  of a corresponding circle determined from the surface area in the X-Y plane of the plate-like particles satisfies the condition  $R > (L/5)$  is no more than 5 % of the total number of plate-like particles.

1.7.2 The particles of example 4 of D6E have a  $d_{\text{max}}$  of  $4.24 \mu\text{m}$  (measured on a volume basis). The nozzle diameter of the EM-930C printer used in D6E ("L" in the terminology of claim 1) was  $25 \mu\text{m}$  (paragraph [0069]). Using this data, the condition that no more than 5% of the particles have an average diameter of  $R > (L/5)$  is fulfilled. If not, then more than 5 % of particles would be required to have a diameter of greater than  $5 \mu\text{m}$ , which in view of the  $d_{\text{max}}$  value of  $4.24 \mu\text{m}$  is not possible.

1.7.3 The patent proprietor argued that since the data for example 4 of D6E was measured on a volume basis, it was

not possible to conclude that the particle size distribution in example 4 of D6E satisfied the L/5 condition when measured on a number basis with an image analyser.

1.7.4 This is not convincing. In particular, since the particles of example 4 of D6E display a  $d_{max}$  value of  $4.24 \mu\text{m}$ , then less than 5% of the total number of plate-like particles must satisfy the condition  $R > (L/5)$ , i.e. have a particle diameter of  $5 \mu\text{m}$  or greater (nozzle diameter L of  $25 \mu\text{m}$ , paragraph [0069] of D6E, divided by 5), independently of which method of measurement is employed. While the patent proprietor has argued that the L/5 condition may not be fulfilled when using an image analyser to measure and calculate on a number basis, no evidence has been submitted in this regard. Furthermore, the correlations (supra) in D16 and D31E as well as the measurement depicted in D19-2 all indicate that volume-based measurements at  $d_{50}$  tend to correspond to smaller values measured using a number base ( $R_{50}$ ). Thus the  $d_{max}$  value of  $4.24 \mu\text{m}$  measured by laser analysis in example 4 of D6E must correspond to a lower value for the maximum particle size when measured on a number basis using image analysis.

1.7.5 Irrespective of the above, the board notes that claim 1 is not directed to a process of ejecting an ink composition with a nozzle. Claim 1 is an ink composition product claim and as such, the nozzle diameter L of any nozzle which may be used to eject the claimed ink composition does not restrict the definition of the composition. Consequently, the L/5 condition, which depends on the nozzle diameter, is not a limiting feature of granted claim 1, and thus cannot

distinguish the claimed subject-matter from the disclosure in D6E.

- 1.8 It follows from the foregoing that example 4 of D6E discloses all of the features of claim 1 at issue.
- 1.9 The subject-matter of claim 1 therefore lacks novelty pursuant to Article 54 EPC with the consequence that the ground for opposition under Article 100(a) EPC prejudices the maintenance of the patent as granted.

Auxiliary request 1 - Novelty, Article 54 EPC

2. Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that it is further specified that the particle size distribution CV value is 60 or less (for the definition of the CV value, see point X).
- 2.1 D6E does not disclose the CV value of the particles of example 4 thereof. As set out above, it must be assumed in view of D56 that the particles of example 4 of D6E have a CV value of 50, which is below the upper limit of claim 1. Furthermore, as equally set out above, in view of D56 (page 4, final paragraph), an even lower CV value than 50 can be expected for the sample of example 4 of D6E when the particle sizes are determined with a number-based method. Thus there can be no doubt that the particles of example 4 of D6E display a CV value of 60 or less as required by claim 1.
- 2.2 This feature consequently cannot establish novelty with respect to example 4 of D6E.

The subject-matter of claim 1 of auxiliary request 1 consequently lacks novelty pursuant to Article 54 EPC.



Auxiliary request 2 - Novelty, Article 54 EPC

3. Claim 1 of this request differs from claim 1 of the main request in the limitation of R50 to between 0.75 and 2  $\mu\text{m}$ .
- 3.1 As set out above, the correlation drawn between D16 and D31E led to the conclusion that the R50 of the particles of example 4 of D6E fell within the range of between 0.89 and 0.95  $\mu\text{m}$ . This range is sufficiently far removed from the lower and upper end of the range now claimed, namely 0.75  $\mu\text{m}$  and 2  $\mu\text{m}$ , for there to be no doubt that the particles of example 4 of D6E fall within the narrower range now recited in claim 1.

The subject-matter of claim 1 of auxiliary request 2 consequently lacks novelty pursuant to Article 54 EPC.

Auxiliary request 3 - Novelty, Article 54 EPC

4. Claim 1 of this request comprises the amendment to claim 1 of auxiliary request 1 (the addition of the CV feature) and claim 1 of auxiliary request 2 (the narrower range for R50).
- 4.1 Since the board concluded in relation to auxiliary requests 1 and 2 that neither of these features render the subject-matter of the respective claim 1 novel, the same applies to claim 1 of this request comprising both features.

It follows that the subject-matter of claim 1 of auxiliary request 3 lacks novelty pursuant to Article 54 EPC.

Auxiliary request 4 - Novelty, Article 54 EPC

5. Claim 1 of auxiliary request 4 is formulated as a claim directed to the use of an ink composition in an inkjet recording device, but otherwise comprises the same technical features as claim 1 of the main request.

5.1 The patent proprietor argued that the subject-matter of claim 1 differed from example 4 of D6E in that the latter did not disclose particles having R50 and R50/Z values within the claimed range and fulfilling the L/5 condition.

5.2 In contrast to claim 1 of the main request which is directed to an ink composition *per se* (supra), the L/5 condition is now limitative for use claim 1. Nevertheless, as concluded above with respect to claim 1 of the main request, the particles of example 4 of D6E display the L/5 condition. Furthermore, as concluded for claim 1 of the main request, example 4 of D6E discloses particles having R50 and R50/Z values falling within the claimed range.

It follows that the subject-matter of claim 1 of auxiliary request 4 lacks novelty pursuant to Article 54 EPC.

Auxiliary request 5 - Novelty, Article 54 EPC

6. Claim 1 of auxiliary request 5 differs from that of auxiliary request 4 in the addition of the CV feature from granted claim 5.

6.1 Since as noted in respect of claim 1 of auxiliary request 1, the CV feature is disclosed by the particles

of example 4 of in D6E, it cannot render the subject-matter of claim 1 novel.

It follows that the subject-matter of claim 1 of auxiliary request 5 lacks novelty pursuant to Article 54 EPC.

Auxiliary request 6 - Novelty, Article 54 EPC

7. Claim 1 of auxiliary request 6 differs from that of auxiliary request 4 in the addition of the CV feature from granted claim 5, and the limitation to the range for R50 introduced into claim 1 of auxiliary request 2.

7.1 As noted in respect of claim 1 of auxiliary requests 1 and 2, these features are disclosed in example 4 of D6E, and therefore cannot render the subject-matter of claim 1 novel.

It follows that the subject-matter of claim 1 of auxiliary request 6 lacks novelty pursuant to Article 54 EPC.

Auxiliary request 7 - Novelty, Article 54 EPC

8. Claim 1 of auxiliary request 7 is formulated as a claim directed to an ink composition in an inkjet recording device, but otherwise comprises the same technical features as claim 1 of the main request.

8.1 In defending novelty the patent proprietor merely referred to arguments submitted in respect of higher ranking requests. Since the board concluded that the respective claim 1 of all higher ranking requests lacked novelty (supra), the same applies to claim 1 of this request.

It follows that the subject-matter of claim 1 of auxiliary request 7 lacks novelty pursuant to Article 54 EPC.

Auxiliary request 8 - Novelty, Article 54 EPC

9. Claim 1 of auxiliary request 8 differs from claim 1 of auxiliary request 7 in that it includes the CV feature from granted claim 5.

9.1 Since as noted in respect of claim 1 of auxiliary request 1, the CV feature is disclosed in example 4 of D6E, it therefore cannot render the subject-matter of claim 1 novel.

It follows that the subject-matter of claim 1 of auxiliary request 8 lacks novelty pursuant to Article 54 EPC.

Auxiliary request 9 - Inventive step, Article 56 EPC

10. Claim 1 of auxiliary request 9 is formulated as a claim directed to an inkjet recording device containing an ink set comprising a plurality of ink compositions, wherein each of the ink compositions has a different concentration of metal pigment. This claim also comprises the same technical features as claim 1 of auxiliary request 3.

10.1 It was common ground between the parties that claim 1 differed from the disclosure in D6E in the presence, in the former, of said ink set comprising a plurality of ink compositions, wherein each of the ink compositions has a different concentration of metal pigment.

- 10.2 The patent proprietor, referring to the patent (paragraphs [0076] and [0093] and table 10), argued that the technical effect of these differences was an improvement in metallic gloss printing, since providing a plurality of inks with differing concentrations of metallic pigment allowed areas of different glossy metallic finishes on a single recording medium. Although the provision of an ink set providing a plurality of ink compositions per se was known to the skilled person, it was the differing concentrations of metal pigment in each respective ink composition which led to the technical effects underlying the claim. The technical problem underlying the subject-matter of claim 1 was thus the provision of an inkjet recording device with improved metallic gloss effect printing, i.e. printing of areas having different gloss on one and the same recording medium.
- 10.3 Assuming, to the benefit of the patent proprietor, the technical problem to be that set out above, the following applies. In the absence of any indication or explanation to the contrary, it must be considered trivial and commonly accepted that the extent of any final metallic effect on a recording medium depends on the concentration of the metal pigment comprised in any individual ink composition printed on that recording medium. Consequently, in order to solve the technical problem set out above, i.e. to obtain areas of differing metallic gloss, the skilled person, without exercising inventive skill, would have used inks with different concentrations of metal pigment in the ink recording device and thereby would have arrived at the subject-matter of claim 1.
- 10.4 In this situation, in contrast to the view expressed by the patent proprietor during oral proceedings, it was

not the task of the opponent to present evidence confirming what was commonly accepted, namely that metallic gloss depends on the concentration of the metal pigment. On the contrary, it was the task of the patent proprietor to demonstrate that the skilled person would not have expected it to hold good for the ink compositions recited in claim 1. Furthermore, the patent proprietor's defence of inventive step on the basis of an improved metallic gloss effect was submitted for the first time during oral proceedings before the board. It would thus have gone against the principle of fairness to require the opponent to file relevant evidence disproving the patent proprietor's allegation, even before this allegation had been made.

- 10.5 It follows that the solution provided by claim 1 does not involve an inventive step in view of D6E in combination with the common general knowledge of the skilled person.

Consequently, the subject-matter of claim 1 of auxiliary request 9 does not involve an inventive step pursuant to Article 56 EPC.

#### Conclusion

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

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:



N. Maslin

M. O. Müller

Decision electronically authenticated