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

Case Number: T 0083/15 - 3.3.02

Application Number: 07024538.6

Publication Number: 1942158

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:



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Case Number: T 0083/15 - 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 29 October 2014
revoking European patent No. 1942158 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 1 942 158.
- II. The patent was opposed under Article 100(a) and (b) EPC on the grounds that its subject-matter lacked novelty and inventive step, and the invention defined in the claims was not sufficiently disclosed.
- III. During opposition proceedings, *inter alia* the following evidence was cited:
- D1b: EP 1 862 511 A
- IV. With the statement of grounds of appeal the patent proprietor filed sets of claims as main request and first auxiliary request.
- V. With the reply to the statement of grounds of appeal the opponent submitted *inter alia* the following evidence:
- D36: US 8,215,764
D39: English translation of JP 2012092252
D40: Declaration of Dr. Engel dated May 2015
D40-2: Plot D50 versus R50

VI. With the letter of 30 November 2015 the patent proprietor submitted new sets of claim requests comprising a main request corresponding to the claims as granted, and first to fifth auxiliary requests as well as *inter alia* the following evidence:

D43: Horiba, "A guidebook to particle size analysis"

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. Therein, in view of similar cases T 880/17 and T 690/16 for which oral proceedings were scheduled to take place on the same dates, the parties were advised to be prepared to discuss any issue raised in the other two cases also in the present case. Furthermore, in providing a preliminary opinion with respect to novelty of claim 1 of the main request vis à vis D1b, the board referred to D55 and D56, on file as evidence in related case T 880/17, as being of particular relevance to the CV value recited in claim 1. The same numbering is employed in the present decision:

D55: Lab journal excerpt; and English language translation D55E (filed by the patent proprietor)

D56: Declaration of R Schneider dated 27 October 2017 (filed by the opponent)

VIII. Oral proceedings before the board were held on 14-15 October 2019. During oral proceedings in relation to the subject-matter of the main request and the first to fourth auxiliary requests, without submitting further observations, the parties merely referred to

their arguments submitted in respect of novelty over D1b in similar case T 880/17 (D6E in that case).

- 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 the first to fifth auxiliary requests filed with letter dated 30 November 2015.

The opponent requested dismissal of the appeal.

- X. Claim 1 as granted (main request) reads as follows:

"1. 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 μm , and the condition $R50/Z > 5$ is satisfied, wherein the particle size distribution CV value of the metal pigment as determined by the following equation is 60 or less:

Equation 1

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

Claim 1 of the first auxiliary request differs from claim 1 of the main request in the limitation of R50 to between 0.75 and 2 μm .

Claim 1 of the second auxiliary request differs from claim 1 of the main request by the specification that the standard deviation/average particle diameter is a value calculated from measurements made using a particle image analyser.

Claim 1 of the third auxiliary request differs from claim 1 of the second auxiliary request by the specification that the particle image analyser is a "flow type".

Claim 1 of the fourth auxiliary request differs from claim 1 of the second auxiliary request by the specification that the particle image analyser is an "FPIA-3000S flow type".

Claim 1 of the fifth auxiliary request is directed to an inkjet recording device containing an ink set comprising a plurality of ink compositions, wherein the ink compositions comprise a pigment dispersion, an organic solvent, and a resin, the pigment dispersion being defined as in claim 1 of the main request, with the following additional feature:

"wherein 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 particles, where $L \mu\text{m}$ is the nozzle diameter of an inkjet head of the inkjet recording device that

satisfies the condition of $L \geq 5W$, where W is the size of a mesh filter opening provided in an ink flow path".

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 D1b. D1b disclosed an ink composition comprising a pigment dispersion comprising a metal pigment and the application thereof to an inkjet recording device. The particles of example 4 displayed the further features of granted claim 1, namely, R50 and R50/Z values falling within the range recited. 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 D36 and D39, this was true even if one were to assume that claim 1 as granted referred solely to features calculated on a number basis and measured using an image analyser, while particles of example 4 of D1b were calculated on a volume basis using a laser diffraction device. This conclusion was supported by the data in D40 and D40-2. Furthermore, D56 demonstrated that in contrast to the information in D55, which was erroneous due to the use of the "normal distribution 50%" as the standard deviation, the CV value of the sample of example 4 of D1b fell within the claimed range of 60 or less.

First auxiliary request - Novelty, Article 54 EPC

The correlated R50 range of 0.89 to 0.95 μm for the particles of example 4 of D1b left no doubt that said particles had an R50 above the lower limit of 0.75 μm recited in claim 1. The subject-matter of claim 1 thus lacked novelty.

Second, third and fourth auxiliary requests - Novelty, Article 54 EPC

The same arguments applied as for claim 1 of the main request.

Fifth auxiliary request - Novelty, Article 54 EPC

In addition to the arguments provided for claim 1 of the main request, D1b disclosed both an inkjet recording device containing an ink set comprising a plurality of ink compositions, and the additional feature (as set out under point X, above).

The subject-matter of claim 1 thus lacked novelty.

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

The particles in example 4 of D1b failed to disclose the following features of claim 1 at issue:

- an R50 value of between 0.5 and 3 μm
- an R50/Z value of greater than 5

- a CV value of 60 or less.

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 D1b and the burden of proof to demonstrate the contrary lay with the opponent. D43, for example, demonstrated that there could be a big difference between size values calculated using on a number basis and on a volume basis. Although the d50 values (LMS-30 laser analyser) in D36 and D39 were similar to those of the example 4 of D1b, the size distribution characteristics were different, as demonstrated by D55. The subject-matter of claim 1 was consequently novel.

First auxiliary request - Novelty, Article 54 EPC

The narrowing of the range for R50 in claim 1 led to a increased probability that the R50 of the particles of example 4 of D1b did not fall within the range of claim 1. The subject-matter of claim 1 was consequently novel.

Second, third and fourth auxiliary requests - Novelty, Article 54 EPC

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

Fifth auxiliary request - Novelty, Article 54 EPC

In addition to the arguments submitted in respect of higher ranking requests, the particles in example 4 of D1b failed to disclose the additional feature (set out above under point X). Furthermore, D1b did not disclose an inkjet recording device containing an ink set

comprising a plurality of ink compositions. The subject-matter of claim 1 was consequently novel.

Reasons for the Decision

Main request (claims as granted)

1. Novelty, Articles 100(a) and 54 EPC
- 1.1 Claim 1 concerns a pigment dispersion comprising plate-like particles of a metal pigment exhibiting specific characteristics R50, R50/Z and a size distribution CV value (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 D1b.
- 1.3 The particles of example 4 of D1b display the following size characteristics (see table 1 of D1b, hereinafter "d" is used to replace "X" as contained in table 1):

d10: 0.53 µm
d50: 1.06 µm
d90: 2.17 µm
dmax: 4.24 µm
Z: 70 nm

These values were obtained using an LMS-30 laser analyser (D1b, paragraph [0064]). The CV value of said particles is not disclosed in D1b.

1.4 It was a matter of dispute whether the particles in example 4 of D1b display the following features of granted claim 1:

- an R50 value of between 0.5 and 3 μm
- an R50/Z value of greater than 5
- a CV value of 60 or less

1.5 The R50 and R50/Z values

1.5.1 The values disclosed in example 4 of D1b 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 D1b 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 D1b 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 the 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 D1b correspond to number-based R50 values within the ranges recited in granted claim 1.

- 1.5.5 In patent documents D36 and D39, 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 D1b (paragraph [0064]) to measure the particle sizes in example 4, while the 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 D36 and D39, it could be concluded that the particles of example 4 of D1b, if measured using an FPIA-3000S image analyser, would display the disputed features of granted claim 1.
- 1.5.6 According to D36, 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 μm and a dmax value of 4.9 μm (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 μm . The corresponding R50/Z value, given that the thickness Z of the tabular particle was 0.02 μm , was 44.5 (column 16, lines 31-45 of D36).
- 1.5.7 Similarly, according to D39, 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 μm and a dmax value of 5.1 μm (paragraph [0021]). The same particles were then measured using an FPIA-3000S image analyser and provided an R50 value of 0.95 μm . The corresponding R50/Z value, given that the thickness Z of the tabular particle was 0.023 μm , was 46.2 (paragraph [0022] of D39).

1.5.8 This data can be summarised in tabular form (the corresponding CV values for the relevant particles of D36 and D39 are also included; all values in μm , with the exception of the R50/Z and CV values):

	d50	dmax	R50	R50/Z	CV
D36	1.03	4.9	0.89	44.5	38.2
D39	1.2	5.1	0.95	46.2	41.3
D1b	1.06	4.24	0.89 - 0.95	12.7 - 13.57	

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 D1b. Thus, since the d50 (LMS-30) of 1.06 μm disclosed in D1b lies between the d50 of 1.03 μm disclosed in D36 and the d50 of 1.2 μm disclosed in D39, the corresponding R50 value for the particles in example 4 of D1b, if measured with an FPIA-3000S image analyser, must also lie between the 0.89 μm measured in D36 and the 0.95 μm in D39, and thus within the range of between 0.5 and 3 μm recited in claim 1 at issue. Having a thickness of 70 nm (D1b, table 1), the particles of example 4 of D1b 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.

1.5.9 The validity of this correlation is further supported by the experiments described in the declaration D40 and the resulting graph of d50 versus R50, depicted in D40-2. According to D40, three different aluminium effect PVD pigments differing in average thickness and size distribution (D40, 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 D40-2, show that essentially all samples having a d50 of below 4 μm 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 D1b having a d50 of 1.06 μm 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 D1b could not reasonably be correlated with those in D36 and D39. More specifically, the particle size distribution of the respective particles, characterised by the CV value in D1b on the one hand, and in D36 and D39 on the other hand were different and hence, the particle size characteristics d50 and d50/Z of D1b could not be correlated with the R50 and R50/Z values of D36 and D39. D55 was an excerpt from a lab book of the inventor of D1b and comprised data detailing the particle size analysis of the dispersion of the sample prepared in example 4 of D1b. Despite being 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 D36 and D39 respectively. The "normal distribution 50%" value used in D55 corresponded to the "standard deviation" and thus could be used to calculate the CV value. 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 D1b would have the same or similar R50 values as the samples of D36 or D39 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 in 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 D1b is 50, obtained according to D56. This CV value is similar to that recited in D36 and D39 (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 1 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 D36 and D39 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 D1b 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 D1b differs from that of the samples in D36 and D39 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 D43 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 D1b to number-based results led to errors (D43, page 9, "transforming results"; figure 13).

However, the board sees the disclosure of D43 as irrelevant to the validity of the correlation made above. D43 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 D36 and D39 with example 4 of D1b, 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 D36, D39 and D1b were not comparable since, having been prepared in different ways, the respective particle size distributions must also differ, with the consequence that the correlation (supra) did not necessarily hold true. Thus, in D1b 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 D36 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 D39 was similar to that described in D36.

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 D36, D39 and D1b of the CV values in view of D56 (supra).

- 1.6.5 Fifth, the patent proprietor argued that since the samples tested in D40 and D40-2 all post-dated the priority date of the patent, they did not mimic the sample of example 4 of D1b 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 D40 may have post-dated the priority date of the patent as irrelevant. The patent proprietor has not denied that the particles measured in D40 were similar in nature to those of D1b and the patent. D40 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, D40 and D40-2 serve to corroborate the validity of the correlation carried out between the samples of D36 and D39 with that of example 4 of D1b.

- 1.6.6 Finally, the patent proprietor submitted that the burden of proof in demonstrating that the sample of example 4 of D1b 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 (D36 and D39), the supporting evidence provided by D40 and D40-2 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 D1b 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 D1b display R50 and R50/Z values falling within the ranges recited in granted claim 1.

1.7 The CV value

1.7.1 As set out above, the particles of example 4 of D1b also display a CV value within the range of 60 or less recited in claim 1. According to D56, this was calculated to be 50, which is below the upper limit of claim 1. 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 D1b when the particle sizes are determined with a number-based method. Thus there can be no doubt that the particles of example 4 of D1b display a CV value of 60 or less as required by claim 1.

1.7.2 The subject-matter of claim 1 therefore lacks novelty pursuant to Article 54 EPC over example 4 of D1b with the consequence that the ground for opposition under Article 100(a) EPC prejudices the maintenance of the patent as granted.

First auxiliary request - Novelty, Article 54 EPC

2. Claim 1 of this request differs from claim 1 of the main request in the limitation of R50 to between 0.75 and 2 μm .
- 2.1 As set out above, the correlation drawn between D36 and D39 led to the conclusion that the R50 of the particles of example 4 of D1b fell within the range of between 0.89 and 0.95 μm . This range is sufficiently far removed from the lower and upper end of the range now claimed, namely 0.75 μm and 2 μm , for there to be no doubt that the particles of example 4 of D1b fall within the range recited in granted claim 1.
- 2.2 The subject-matter of claim 1 of the first auxiliary request consequently lacks novelty pursuant to Article 54 EPC.

Second, third and fourth auxiliary requests - Novelty, Article 54 EPC

3. Claim 1 of the second auxiliary request differs from claim 1 of the main request by the specification that the standard deviation/average particle diameter is a value calculated from measurements made using a particle image analyser. Claim 1 of the third auxiliary request specifies that the particle image analyser is a "flow type", while claim 1 of the fourth auxiliary request further specifies that the particle image analyser is an "FPIA-3000S flow type".
- 3.1 The conclusion of the board set out above with respect to claim 1 of the main request is based on the assumption that the standard deviation and average particle diameter is a value calculated from

measurements made using an FPIA-3000S flow type particle image analyser. Consequently, the conclusions set out for claim 1 of the main request also apply to the respective claim 1 of the second, third and fourth auxiliary requests.

- 3.2 It follows that the subject-matter of claim 1 of the second, third and fourth auxiliary requests lacks novelty pursuant to Article 54 EPC.

Fifth auxiliary request - Novelty, Article 54 EPC

Claim 1 of the fifth auxiliary request is directed to an inkjet recording device containing an ink set comprising a plurality of ink compositions, wherein the ink compositions comprise a pigment dispersion, an organic solvent, and a resin, the pigment dispersion being defined as in claim 1 of the main request, with the following additional feature:

"the number of plate-like particles where the average particle diameter R μm 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 particles, where L μm is the nozzle diameter of an inkjet head of the inkjet recording device that satisfies the condition of $L \geq 5W$, where W is the size of a mesh filter opening provided in an ink flow path" (emphasis added).

Hereinafter the board refers to the underlined section above as the "L/5 condition".

- 3.3 As set out above, the R50, R50/Z and the CV values are disclosed in example 4 of D1b.

3.4 It is a matter of dispute whether D1b discloses

- the L/5 condition; and
- an inkjet recording device containing an ink set comprising a plurality of ink compositions.

3.5 The "L/5 condition"

3.5.1 According to the opponent, since the particles of example 4 of D1b had a d_{max} (LMS-30) of 4.24, the L/5 condition was necessarily fulfilled, since the nozzle diameter in D1b (paragraph [0069]) was 25 μm .

3.5.2 The patent proprietor argued that since the data for example 4 of D1b was measured on a volume basis, it was not possible to conclude that the particle size distribution in example 4 of D1b satisfied the L/5 condition when measured on a number basis with an image analyser.

3.5.3 The L/5 condition is fulfilled by the disclosure of D1b. In particular, since the particles of example 4 of D1b display a d_{max} value (measured on a volume basis) of 4.24 μm , then less than 5% of the total number of particles must satisfy the condition $R > (L/5)$, i.e. have a particle diameter of 5 μm or greater (nozzle diameter L of 25 μm , paragraph [0069] of D1b, divided by 5), independently of which method of measurement is employed. While the patent proprietor 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 D36 and D39 as well as the measurements depicted in D40-2 all indicate that volume-based measurements at d_{50} tend to

correspond to smaller values measured using a number base (R50). Thus the d_{max} value of 4.24 μm measured by laser analysis in example 4 of D1b must correspond to a lower value for the maximum particle size when measured on a number basis using image analysis.

It follows that the L/5 condition does not render the subject-matter of claim 1 novel over D1b.

3.6 "An inkjet recording device containing an ink set comprising a plurality of ink compositions"

The opponent was of the opinion that D1b disclosed this feature, while the patent proprietor disagreed. The board, to the benefit of the patent proprietor, in the following assumes that D1b does not disclose an ink set comprising a plurality of ink compositions.

3.7 The subject-matter of claim 1 is therefore novel pursuant to Article 54 EPC.

Fifth auxiliary request - Inventive step, Article 56 EPC

3.8 During oral proceedings it was noted that the subject-matter of claim 1 was similar to claim 1 of auxiliary request 9 in case T 880/17. In that request, claim 1 was distinguished from the closest prior art D1b (then D6E) *inter alia* in the presence, in the former, of an ink set comprising a plurality of ink compositions. In that case the patent proprietor argued in favour of the presence of inventive step based on a different distinguishing feature not comprised in present claim 1, namely the differing concentrations of metal pigment in each respective ink composition, and conceded that the provision of an ink set comprising a plurality of ink compositions per se was known to the skilled person

at the priority date. No further defence of inventive step with respect to this feature was submitted in the present case.

3.9 Consequently the skilled person, wishing to provide an alternative inkjet device to that provided in D1b, would have merely applied common general knowledge, i.e. would have used an ink set comprising a plurality of ink compositions. He would thereby have arrived at the solution provided by claim 1 without exercising inventive skill.

3.10 It follows that the solution provided by claim 1 does not involve an inventive step in view of D1b in combination with the common general knowledge of the skilled person.

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

Conclusion

4. 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