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**Datasheet for the decision  
of 8 April 2025**

**Case Number:** T 0586/23 - 3.3.10

**Application Number:** 14814288.8

**Publication Number:** 2937402

**IPC:** C09K19/38, C09D11/10,  
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C09K19/20, C09K19/52

**Language of the proceedings:** EN

**Title of invention:**

USE OF A LIQUID CRYSTAL COMPOSITION AS AN INK OR AS A COLORANT

**Patent Proprietor:**

Huizhou Foryou Optical Technology Co. Ltd.

**Opponents:**

Sicpa Holding SA  
BASF SE

**Headword:**

**Relevant legal provisions:**

EPC Art. 56, 123(2)

EPC R. 139

**Keyword:**

Inventive step - main request (no) - obvious alternative

Amendments - auxiliary request - correction of errors under  
Rule 139 EPC (no)

**Decisions cited:**

G 0003/89, G 0011/91

**Catchword:**



**Beschwerdekammern**

**Boards of Appeal**

**Chambres de recours**

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**Case Number:** T 0586/23 - 3.3.10

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.10**  
**of 8 April 2025**

**Appellant:**  
(Opponent 1)

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**Appellant:**  
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**Representative:**

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**Respondent:**  
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**Decision under appeal:**

**Interlocutory decision of the Opposition**  
**Division of the European Patent Office posted on**  
**20 January 2023 concerning maintenance of the**  
**European Patent No. 2937402 in amended form.**

**Composition of the Board:**

<b>Chairman</b>	P. Gryczka
<b>Members:</b>	M. Kollmannsberger
	T. Bokor

## **Summary of Facts and Submissions**

- I. Both opponents appealed the Opposition Division's decision to maintain European Patent No. EP 2 937 402 in amended form pursuant to Article 101(3)(a) EPC based on the patent proprietor's main request as submitted during oral proceedings before the Opposition Division.
- II. The patent deals with liquid crystal containing compositions and their use as an oil ink or as a colourant.
- III. The patent had been opposed under Articles 100(a) to (c) EPC for lack of novelty (Article 54 EPC), lack of inventive step (Article 56 EPC), insufficient disclosure (Article 83 EPC) and unallowable amendments (Article 123(2) EPC). The Opposition Division concluded that the patent in amended form as defined by the patentee's main request filed during oral proceedings complied with the relevant provisions of the EPC. In particular, the claimed uses involved an inventive step starting from D1 as the document representing the closest prior art, also when combined with D7.
- IV. The following documents are referred to in this decision:
- D1: WO 2011/120620 A1
- D7: English translation of JP 2004/99861
- V. Claim 1 of the patent as upheld is worded as follows:
- "The use of a liquid crystal composition as an oil ink or as a colorant, said liquid crystal composition*

*comprising the following components in their respective mass percentages:*

*8%-50% of a polymerizable liquid crystal monomer;  
1%-30% of a chiral reagent;  
0.1%-5% of a photoinitiator;  
30%-70% of an organic solvent,  
0.1%-1% of an antioxidant; and  
0.01%-0.1% of an assistant;*

*wherein after being cured, the liquid crystal composition exhibits visual angle dependent optical effect;*

*it is characterized in that the liquid crystal composition comprises no liquid crystal microcapsules and no pigment particles*

*wherein the antioxidant is any one of hydroquinone, methoxyhydroquinone, p-benzoquinone, mono-tert-butylhydroquinone, pyrocatechol, p-tert-butylpyrocatechol, benzoquinone, 2,5-di-tert-butylhydroquinone, 2,5-dimethyl-p-benzoquinone, anthraquinone, and 2,6-di-tert-butyl-p-cresol; and the assistant is at least one of a fluorocarbon surfactant or an organosilicon surfactant."*

VI. The appellants submitted that the Opposition Division erred in attributing the claimed uses an inventive step starting from D1 as the closest prior art document. The division held that the choice of antioxidants and surfactants as defined in the claim was not rendered obvious by the cited prior art. The appellants also contested other findings of the Opposition Division. These other findings are not relevant for this decision.

VII. The respondent (patent proprietor) defended the Opposition Division's decision. They also filed an auxiliary request together with their reply to the

appellants' statement of the grounds of appeal, for maintenance of the patent in amended form.

VIII. Claim 1 of this auxiliary request reads as follows (amendments with respect to claim 1 of the patent as upheld are shown by underscore and ~~strike through~~):

*"The use of a liquid crystal composition as an oil ink or as a colorant, it is characterized in that said liquid crystal composition comprising comprises the following components in their respective mass percentages:*

*~~8%-50% of a polymerizable liquid crystal monomer;~~  
8%-20% of mono-functional liquid crystal monomers;  
20%-30% of bi-functional liquid crystal monomers;  
1%-30% of a chiral reagent;  
0.1%-5% of a photoinitiator;  
30%-70% of an organic solvent,  
0.1%-1% of an antioxidant; and  
0.01%-0.1% of an assistant;*

*wherein the mono-functional liquid crystal monomers and the bi-functional liquid crystal monomers are polymerizable liquid crystal monomers;  
after being cured, the liquid crystal composition exhibits visual angle dependent optical effect;  
~~it is characterized in that the liquid crystal composition comprises no liquid crystal microcapsules and no pigment particles~~  
wherein the antioxidant is any one of hydroquinone, methoxyhydroquinone, p-benzoquinone, mono-tert-butylhydroquinone, pyrocatechol, p-tert-butylpyrocatechol, benzoquinone, 2,5-di-tert-butylhydroquinone, 2,5-dimethyl-p-benzoquinone, anthraquinone, and 2,6-di-tert-butyl-p-cresol; and the assistant is at least one of a fluorocarbon surfactant or an organosilicon surfactant."*

IX. Oral proceedings were held on 8 April 2025, in the presence of appellant 1 and the respondent. In a communication under Article 15(1) RPBA, the Board had previously informed the parties of its preliminary view that the claimed uses lacked an inventive step over D1, and that the respondent's auxiliary request contained unallowable amendments under Article 123(2) EPC.

X. The parties' final requests were the following:

Appellant-opponent 1 requested that the decision under appeal be set aside and the patent be revoked. They further requested not to admit the respondent's auxiliary request into appeal proceedings.

Appellant-opponent 2 requested in writing that the decision under appeal be set aside and the patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed, as main request. In the alternative, they requested that the patent be maintained on the basis of auxiliary request 1 filed with the proprietor's response to the opponents' grounds of appeal. They further requested that the new documents filed by the appellants in appeal proceedings should not be admitted.

Both appellant 1 and the respondent requested several lines of arguments made to support (lack of) inventive step not to be admitted to appeal proceedings.

XI. The decision was announced at the end of the oral proceedings.



## **Reasons for the Decision**

1. The appeals are admissible.

*The patent as maintained by the Opposition Division*

2. Inventive step, Article 56 EPC

- 2.1 The Opposition Division came to the following conclusions:

- 2.1.1 D1 was the document representing the closest state of the art to the claimed invention. D1 disclosed colouring solutions based on solvent based polymerizable liquid crystal compositions. These solutions were printed on substrates and were thus used as oil inks and colourants.

- 2.1.2 The difference of claim 1 with respect to D1, in particular with respect to solution A on page 28, lay in the choice of the specific antioxidants and surfactants defined at the end of the amended claim.

- 2.1.3 Since no unexpected effects had been relied on or substantiated with respect to D1 the technical problem to be solved starting from D1 was the provision of alternative compositions that could be used as colourants or oil inks.

- 2.1.4 All this was essentially undisputed.

- 2.2 The disputed issue was whether the claimed solution to the technical problem defined above, i. e. the provision of a composition characterized by the choice (and possibly concentration) of the specific

antioxidants and surfactants defined in the claim, would have been obvious for a skilled person.

- 2.2.1 The Opposition Division came to the conclusion that several selections had to be made to arrive at the claimed subject-matter. Such selections were not rendered obvious by either D1 or D7, cited as a secondary document. Also the respondent argued that the selection of antioxidants and surfactants was not rendered obvious by the prior art.
- 2.2.2 The appellants submitted that to arrive at an alternative, as a rule, no specific motivation for a certain choice was needed. Furthermore, the antioxidants and surfactants defined in the claim were known from D1 and D7 to be useful in compositions directed to the same use.
- 2.3 The Board agrees with the appellants, for the reasons that follow.
- 2.3.1 D1 discloses that the mentioned compositions may contain antioxidants as stabilizers in order to prevent premature polymerization, and surfactants in order to control the surface tension of the compositions, see page 21 lines 17-36. Solution A, cited above, contains both, "Irganox 1076" as an antioxidant and an unspecified surfactant.

The general passage on page 21, lines 31-36 discloses that any kind of stabilizers may be used. Two specific antioxidants are named, one of them being BHT. BHT corresponds to "2,6-di-tert-butyl-p-cresol" defined in present claim 1.

The choice of surfactants is likewise not presented as important in D1; this is already clear from the fact that in the examples the type of surfactant is not specified.

2.3.2 Thus, a skilled person, when looking for alternative compositions, would have learned from D1 that antioxidants and surfactants may be advantageously present in the compositions disclosed in D1. Choosing suitable antioxidants and surfactants in suitable concentrations does not go beyond the skilled person's routine work. This applies in particular in the present case where the skilled person also knows from D1 which purpose these additives should serve. The claimed compositions are clearly inside the teaching of D1. A skilled person would have arrived at them without any inventive activity.

2.4 The respondent's arguments have been considered but the Board does not find them convincing, irrespective of the question of their admittance.

2.4.1 The respondent argued that starting from D1 the problem to be solved was not merely the provision of alternative compositions that could be used as colourants or oil inks, but rather the provision of a colourant or an oil ink with visual (viewing) angle dependent properties. However, also the compositions disclosed in D1 have visual angle dependent properties, see page 2 lines 19 to 24. Thus, formulating the problem in the way the respondent proposes does not change the above assessment of inventive step over D1.

2.4.2 The respondent argued that the appellants' argumentation using D1 alone was newly submitted late in appeal, namely during oral proceedings only, and

should not be admitted into the proceedings under Article 13(2) RPBA. The decision of the Opposition Division dealt with inventive step combining D1 and D7. However, no matter whether any of the appellants argued inventive step over D1 alone in their initial submissions in appeal, this argument was made by the Board in its communication under Article 15(1) RPBA, see point 11.3.4 there. It has thus not been submitted only in oral proceedings before the Board, but was already part of the appeal proceedings earlier.

- 2.4.3 The respondent argued that the explicit absence of microcapsules in claim 1 was a technically significant difference to the disclosure of D1. However, the absence of microcapsules is no distinguishing feature over D1. Neither does D1 mention the presence of microcapsules in the compositions disclosed therein, nor has the presence of such microcapsules been established by the respondent.
- 2.4.4 The respondent argued that D1 was silent as to the specific antioxidants used, and that the antioxidants defined in the claim were not only selected for their stabilizing properties, but also for their contribution to the long term stability of the cured film. However, as outlined above, D1 proposes BHT as an antioxidant for the compositions disclosed therein. Even if D1 proposes the antioxidants for the prevention of premature polymerisation only (page 21, lines 31-36) a skilled person would know from D1 that BHT is a suitable antioxidant for use in liquid crystal compositions such as the ones defined in D1 and in the claims.
- 2.4.5 The respondent argued that D1 did not teach the nature or functions of the surfactants in its compositions.

The fluorocarbon or organosilicon surfactants defined in the claims were included in the compositions for their ability to reduce surface tension without disturbing the alignment of the liquid crystal molecules. The disclosure of fluorocarbon surfactants in D7 could not lead the skilled person to employing them in compositions such as the claimed ones, since D7 was directed to LCD displays in which visual angle dependent optic effects would be unwanted. A skilled person would thus not have combined D1 and D7 at all.

However, D1 does mention the function of surfactants in its compositions, namely the control of surface tension, see page 21 lines 27-29. As mentioned above, D1 does not give any importance to the nature of the surfactant used. A skilled person could thus choose any surfactant known to him. That fluorocarbon surfactants have been used in liquid crystalline compositions, as in D7, is merely a further hint for a skilled person that such compounds may be particularly suitable. It has not been established that the nature of the surfactant plays any role for the optical properties of the cured compositions, and therefore a skilled person would have considered the surfactant used in D7 to be unsuitable for the uses defined in the claim.

- 2.4.6 Finally, the respondent argued that the synergy between the selected antioxidants, surfactant systems and the exclusion of microcapsules resulted in compositions that exhibited superior optical properties. However, no such synergy or any improved optical properties compared to compositions of D1 have been substantiated during the proceedings. Such alleged effects thus cannot be taken into consideration.

- 2.5 In summary, a skilled person would have found the claimed compositions obvious in view of the teaching of D1.

*The respondent's auxiliary request*

3. Amendments, Article 123(2) EPC.
- 3.1 The appellant requested the respondent's auxiliary request not to be admitted into the appeal proceedings under Articles 12(4) (6) RPBA. However, since the claims of this request are anyway not allowable under Article 123(2) EPC, see below, the question of admittance need not be decided.
- 3.2 The amendment in claim 1 of the auxiliary request concerns the definition of mono- and bifunctional liquid crystal monomers in the compositions as well as ranges for their concentration. The amendment is meant to overcome the inventive step objection.
- 3.3 It is undisputed that claim 1 of the auxiliary request has no literal basis in the originally filed application documents. The claim defines the amount of mono-functional liquid crystal monomers as being from 8 to 20% per weight and the amount of bi-functional liquid crystal monomers as being from 20 to 30% by weight, whereas the corresponding passage in the description as originally filed (page 8, lines 1-2) discloses the opposite.
- 3.4 In order to justify the concentration ranges defined in the amended claim, the respondent relies on the correction of an obvious error under Rule 139 EPC. It is submitted that the concentration ranges defined for these two components in the original application

documents had been inverted by error and should be reversed. According to the respondent the obviousness of this error is clearly apparent from example compositions 1-3, 5 and 6 which all have a monomer distribution inside the ranges now defined in the claim. The monomer distribution shown for example 4 was incorrect. Thus, the amended claim, based on the concentration ratios in the description as corrected under Rule 139 EPC should be allowed.

3.5 In order for a correction concerning the description, claims or drawings to be allowed under Rule 139 EPC two requirements need to be fulfilled. Firstly, it must be evident that an error occurred, see G 03/89 (reasons points 3 and 5) and G 11/91 (reasons point 2). Secondly the proposed correction must be obvious in the sense that it is "*immediately evident that nothing else would have been intended than what is offered as the correction*".

3.5.1 However, it is neither immediately evident that the original disclosure is erroneous, nor that the proposed correction is the only way to correct such an error, should it have occurred.

3.5.2 In fact, even assuming that the concentration ranges given on page 8 of the original description would have been recognized as being in contradiction with what is shown in the example compositions, it is by no means evident that the proposed correction is the only possible one for such an error. Different ranges than the proposed one would as well be compatible with the disclosure of the examples. Alternatively, also the concentrations shown in the examples may be erroneous instead of the concentration range given in the

description. The requirements for the correction of an obvious error under Rule 139 EPC are not fulfilled.

3.5.3 Therefore the proposed correction of the description cannot be allowed under Rule 139 EPC. Consequently, the amended claim extends beyond the original disclosure and cannot be allowed under Article 123(2) EPC.

4. To summarize, the patent can neither be maintained in amended form following the patent proprietor's main request, nor in amended form according to the auxiliary request. In the absence of an allowable request for maintenance of the patent in amended form the patent has to be revoked, Article 101(3) (b) EPC.

## **Order**

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

The decision under appeal is set aside.

The patent is revoked.

The Registrar:

The Chairman:



C. Rodríguez Rodríguez

P. Gryczka

Decision electronically authenticated