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**D E C I S I O N**  
**of 10 July 2001**

**Case Number:** T 0407/99 - 3.2.5

**Application Number:** 93100467.5

**Publication Number:** 0551894

**IPC:** B41M 5/00

**Language of the proceedings:** EN

**Title of invention:**

Receiving element for use in thermal dye transfer

**Patentee:**

EASTMAN KODAK COMPANY

**Opponent:**

- (01) Mobil Oil Corporation  
(02) Hoechst AG  
(03) Felix Schoeller Jr. GmbH & Co. KG

**Headword:**

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**Relevant legal provisions:**

EPC Art. 54, 56

**Keyword:**

"Novelty (yes)"  
"Inventive step (yes)"

**Decisions cited:**

-

**Catchword:**



Case Number: T 0407/99 - 3.2.5

**D E C I S I O N**  
**of the Technical Board of Appeal 3.2.5**  
**of 10 July 2001**

**Appellant I:**  
(Opponent 02)

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**Decision under appeal:** Interlocutory decision of the Opposition Division  
of the European Patent Office posted 8 March 1999  
concerning maintenance of European patent  
No. 0 551 894 in amended form.

**Composition of the Board:**

**Chairman:** A. Burkhart  
**Members:** W. R. Zellhuber  
M. Tardo-Dino

## Summary of Facts and Submissions

- I. The appellants I and II (opponents 02 and 03) lodged an appeal against the interlocutory decision of the Opposition Division maintaining European patent No. 0 551 894 in amended form.
- II. Oppositions were filed against the patent as a whole and based on Article 100(a) EPC (lack of novelty and inventive step).

The Opposition Division decided not to admit amended claims filed as a main request in the course of oral proceedings before the Opposition Division, pursuant to Rule 71a EPC, but held that the grounds for opposition cited in the Article 100(a) EPC did not prejudice the maintenance of the patent as amended on the basis of the documents filed as fourth auxiliary request during oral proceedings held on 11 February 1999.

- III. The respondent (patentee) lodged an appeal against the decision not to have admitted the amended claims filed as main request.
- IV. Oral proceedings were held before the Board of Appeal on 10 July 2001.
- (i) The appellants I and II and the party to the appeal proceedings as of right (opponent 01) requested that the decision under appeal be set aside and the patent be revoked.
- (ii) The respondent withdrew his appeal and requested that the appeals of the opponents be dismissed.

V. Claim 1 of the patent in suit as maintained by the Opposition Division reads as follows:

"A dye-receiving element for thermal dye transfer comprising a base having thereon a dye image-receiving layer, wherein the base comprises a composite film laminated to a support, the dye image-receiving layer being on the composite film side of the base, and the composite film comprising a microvoided thermoplastic core layer and at least one substantially void-free thermoplastic surface layer, said composite film being made by coextrusion of said core and surface layer(s), followed by biaxial orientation, the thickness of said composite film being from 30 to 70  $\mu\text{m}$ , and said core layer of said composite film comprising from 30 to 85% of the thickness of said composite film."

VI. The following documents have been referred to in the appeal procedure:

S3: EP-A-0 439 049; and

S4: US-A-4 377 616.

VII. Appellant I argued essentially as follows:

(i) Document S3 disclosed a dye-receiving element comprising all the features of claim 1 of the patent in suit as amended, in particular, the features which had been under dispute, namely that

(a) the base comprised a composite film laminated to a support and that

(b) the composite film comprised at least one

substantially void-free thermoplastic surface layer.

With regard to the above-mentioned feature (a) document S3 disclosed that the dye receiving element might contain, in addition to the composite film, a backing layer and thus a support.

Furthermore, in the English language, the term "laminated" also was used in connection with coextruded layers and the term "support" was not further specified in claim 1. Thus, the subject-matter of claim 1 also encompasses an element according to comparative example 4 of document S3 because it comprised a plurality of coextruded layers. Consequently, claim 1 of the patent in suit as amended did not differ in that point from the prior art.

With regard to the above-mentioned feature (b), document S3 disclosed examples of dye receiving elements, comparative example 4 included, wherein the surface layers comprised 3% calcium carbonate, from which the respondent concluded that these surface layers were not void-free.

However, the addendum calcium carbonate in a polymer layer might have two functions; firstly, providing a surface roughness which allowed a proper handling of the films (antiblocking), and, secondly, the function of a voiding agent.

Document S3 did not disclose that the calcium carbonate included in the surface layers should

function as a voiding agent. On the contrary, a person skilled in the art would recognize that calcium carbonate was added to the surface layer in order to achieve the desired surface roughness. A large number of indications in document S3 showed that the surface layers disclosed in document S3 were void-free, even though they comprised 3% calcium carbonate:

- Document S3 made reference to a porous core layer but did not mention the surface layer being porous;
- it suggested surface layers containing 0% to 5% by weight of an inorganic fine powder;
- it referred to a surface layer containing substantially no inorganic fine powder for improving surface smoothness without impairing cushioning properties;
- it taught that if the surface layer was too thick, the compressibility of the support was decreased; and,
- in Figure 2, a composite film was shown wherein microvoids only were present in the core layer.

Furthermore, the presence of an incompatible powder material in a polymeric film was a necessary, but not a sufficient prerequisite for the creation of microvoids by stretching of the film biaxially. Further parameters, like temperature and speed of the stretching process, the particle size and the nature of the powder material, and the properties of the polymeric material had to be properly selected in order to create microvoids.

Thus, it was clear, that, with comparative example 4, document S3 disclosed a dye receiving element wherein the surface layers were substantially void-free. Moreover, the thicknesses of the core layer and the surface layers fell within the range indicated in claim 1 of the patent in suit as amended. Thus, the subject-matter of claim 1 was not novel with regard to the prior art as disclosed in document S3.

- (ii) Furthermore, the subject-matter of claim 1 did not involve an inventive step with regard to the general teaching of document S3.

The closest prior art was represented by the general teaching of document S3 rather than by any specific examples described in document S3.

Document S3 disclosed a dye receiving element comprising a support and a composite film consisting of a microvoided thermoplastic core layer and void-free surface layers (0% powder material). The dye-receiving elements according to the invention as disclosed in document S3 comprised composite films laminated to a support wherein the thicknesses of the surface layers of the composite films were between 0.3 and 1.5  $\mu\text{m}$ .

The subject-matter of claim 1 differed from the general teaching of document S3 only in that the surface layers were thicker.

The objective underlying the patent in suit could be seen in seeking the most favourable parameters knowing and taking into account the positive and



negative effects that a variation in a specific parameter might have.

The effects of thicker surface layers were known from document S3, namely a higher smoothness of the surface and a decrease of compressibility and thus of the colour density.

However, a person skilled in the art, seeking to optimize a product, would also consider a modification of a parameter, which might result, in one aspect, in a less favourable property of a product, in particular, as he knew about the effect of such a variation.

Thus, it was obvious to provide a dye receiving element with thicker surface layers, in particular as the thicknesses of surface layers indicated in document S3 (1.5  $\mu\text{m}$ ) differed only slightly from the minimum thickness (2.25  $\mu\text{m}$ ) of the surface layers as claimed in claim 1 of the patent in suit as amended.

VIII. With regard to the question of lack of novelty, appellant II added that it had to be taken into further consideration that the patent in suit comprised a number of examples wherein the surface layers were pigmented, but void-free films. The inclusion of pigments in a thermoplastic film thus did not inevitably result in the creation of voids.

With regard to the question of lack of inventive step, appellant II argued essentially as follows:

The closest prior art was represented by application

example 2 of document S3 from which the subject-matter of claim 1 of the patent in suit as amended only differed in that the surface layers had a greater thickness.

The problem underlying the patent in suit could not be seen in an improvement of the prior art, in particular of application example 2 of document S3. The embodiment of the patent in suit as granted (receiver D), which had shown the best results with regard to colour density, mottle and curl, had been cancelled, because it fell no longer within the scope of the amended claims. This embodiment, however, was very similar to application example 2 of document S3, now constituting the closest prior art.

A problem underlying the patent in suit therefore might be seen in providing an alternative dye receiving element.

However, it did not require an inventive step to suggest a dye receiving element having less favourable properties, in particular when taking into account the narrow gap between the thickness of the surface layers indicated in document S3 and the minimum thickness of the surface layers as claimed in claim 1 of the patent in suit as amended, and that document S3 makes mention of the use of thicker surface layers.

IX. The party to the appeal proceedings as of right argued essentially as follows:

The subject-matter of claim 1 was not novel with regard to the prior art as disclosed in document S3.

The surface layers of the dye receiving element according to document S3 were void-free. The situation within a thin surface layer was completely different to that of a thick core layer and the inclusion of powder material in these layers might result in the creation of voids in one layer but not necessarily in the other layer. The purpose of powder material in surface layers was the generation of a specific microroughness of the surface layers. The patent in suit as well as document S3 suggested surface layers comprising the same type of powder material.

With regard to the generic disclosure of document S3, the subject-matter of claim 1 did not meet the criterion for a selection of being novel, because claim 1 neither claimed a narrower range nor did its subject-matter have a useful purpose. The claimed selection did not lead to better results.

Furthermore, the subject-matter of claim 1 did not involve an inventive step with regard to the prior art as disclosed in document S3 alone or in combination with document S4.

Document S3 represented the closest prior art. However, in view of the fact that claim 1 concerned alternative elements which were worse in comparison to those of the prior art, no specific problem could be defined. By suggesting thicker surface layers, the patent in suit as amended was directed to alternatives which were obvious.

Moreover, document S4 disclosed composite films having the features of claim 1 of the patent in suit wherein it was explicitly taught that the skin layers of such

composite films should not be too thin.

X. The respondent argued essentially as follows:

The subject-matter of claim 1 was novel, because document S3 neither disclosed that the composite film according to the comparative example 4 of document S3 was laminated to a support, nor that the surface layers of the comparative example 4 were substantially void-free.

Document S3 taught that the supports according to the invention as disclosed in document S3 may comprise a backing layer. This suggestion did not concern comparative example 4.

No evidence was produced that the term "laminated" was used in connection with coextruded films. If there was any unclarity, then the specification of the patent in suit could be taken into consideration which clearly described the meaning of the term "laminated to a support".

As could be seen from table 1 of document S3, the surface layers of comparative example 4 comprised 3% CaCO<sub>3</sub>, which was a known voiding agent. The content of voiding agent in these surface layers was 30% of that in the core layer. Thus, the level of void initiating agent in the surface layers was substantial and therefore, document S3 did not teach composite films comprising substantially void-free surface layers.

The subject-matter of claim 1 also involved an inventive step.

Document S3, in particular application example 2, represented the closest prior art. It disclosed dye transfer type printing sheets comprising composite films wherein the surface layers of the composite films had a thickness of between 0.3 and 1.5  $\mu\text{m}$ . The thicknesses of the core layers indicated in the examples, which represent the invention according to document S3, were above 95% of the thickness of the respective composite film. Furthermore, in all these examples, the surface layers had voids because they comprised 3% of the voiding agent  $\text{CaCO}_3$ .

The problem underlying the patent in suit was to provide alternative dye receiving elements which exhibited low curl, good gloss characteristics and yet maintained good colour density and gradation.

The patent in suit concerned dye receiving elements comprising a composite film having thicker and substantially void-free surface layers and a thinner core layer.

This approach was not suggested by document S3. Document S3 showed with comparative example 4 that the use of thicker surface layers did not produce acceptable results. It led away from such an approach by expressly stating that with thicker surface layers the compressibility would be reduced and the recording sheet would have a reduced colour density.

Document S4 belonged to a technical field different from that of the patent in suit and did not disclose a dye-receiving element for thermal dye transfer.

## Reasons for the Decision

### 1. *Novelty*

With regard to the question of novelty, it has to be examined whether a dye-receiving element having all the features of claim 1 of the patent in suit as amended is disclosed as such in the documents representing the prior art. Accordingly, the following has to be considered:

Document S3 describes, on the one hand, a group of embodiments representing the invention according to document S3, and, on the other, a group of embodiments representing comparative examples. These are two different groups and, consequently, any combination of a feature or statement disclosed with regard to one of these groups with a feature or statement disclosed with regard to the other of these groups goes beyond the disclosure of document S3, if that feature or statement is disclosed only with regard to one of these groups.

- 1.1 Comparative example 4 of document S3 concerns a three-layer coextruded composite film wherein the thickness of the core layer comprises 50% of the total thickness of that composite film. It thus falls within the range indicated in claim 1 of the patent in suit as amended as far as the proportion between the thickness of the core layer and that of the composite film is concerned. Comparative example 4 is the only example among the composite films disclosed in document S3, which meets that requirement.

However, document S3 does not disclose the composite film of comparative example 4 of document S3 being

laminated to a support. Such an option is disclosed in document S3 only with regard to composite films according to the invention as disclosed in document S3. That option therefore does not apply to the comparative examples described in document S3, in particular comparative example 4.

The term "a composite film laminated to a support" used in claim 1 also has a clear technical meaning. Claim 1 of the patent in suit as amended specifies that the dye-receiving element comprises a base wherein the base comprises a composite film laminated to a support. In the following, reference is made to the composite film side of the base, and the composite film is defined as being made by coextrusion of a core and surface layers. The base of the dye-receiving element according to claim 1 of the patent in suit as amended thus comprises two different elements, namely the composite film and the support. Accordingly, the support cannot be construed as being a part of the composite film, in particular, as being one of the core or surface layers forming the composite film.

- 1.2 Furthermore, document S3 does not disclose that the surface layers of comparative example 4 are substantially void-free thermoplastic surface layers.

These surface layers comprise 3% of the known voiding agent  $\text{CaCO}_3$ , which represents 30% of the amount of  $\text{CaCO}_3$  comprised in the core layer.

According to the statements of appellant I and the party as of right, the formation of microvoids depends not only on the fact that a voiding agent was present. It also depends on material and process parameters.

Document S3, however, neither explicitly discloses that the surface layers of comparative example 4 are substantially void-free, nor is that assumption directly and unambiguously derivable from the indication of the material and process parameters in document S3.

Furthermore, it cannot be concluded from the physical properties of the various embodiments indicated in table I of document S3, that in particular the surface layers of comparative example 4 were substantially void-free.

Since the extent to which the powder material included in the core layer and the powder material included in the surface layers effectively contribute to the creation of voids in these layers is not disclosed in document S3, it is not possible to conclude definitely from the physical properties indicated in table I of document S3 that, in particular, the powder material in the surface layers did not create voids and that these layers were substantially void-free.

Moreover, the thickness of the surface layers of comparative example 4 differs significantly from that of all other examples, which makes it difficult to draw further precise conclusions from a comparison of the physical properties indicated in table I of document S3 with regard the various examples. Such considerations were made by the parties but led to divergent conclusions.

Consequently, it is not directly and unambiguously derivable from the disclosure of document S3 that the surface layers of the dye-receiving element according



to comparative example 4 are substantially void-free.

1.3 Document S4 does not concern a dye-receiving element for thermal dye transfer. The composite films disclosed therein do not comprise a dye image-receiving layer.

1.4 Therefore, the subject-matter of claim 1 of the patent in suit as amended is novel with respect to the disclosure of documents S3 and S4. The same applies to the subject-matter of dependent claims 2 to 8 and 10 and of process claim 9. The latter includes the use of a dye-receiving element as defined in claim 1 of the patent in suit as amended.

## 2. *Inventive step*

### 2.1 Closest prior art

Document S3, which represents the closest prior art, discloses, in general form, a dye-receiving element comprising a base having thereon a dye image-receiving layer. The base comprises a composite film, which may be laminated to a backing layer. That composite film comprises a porous microvoided thermoplastic core layer containing an inorganic fine powder and a thermoplastic surface layer having a thickness of from 0.3 to 1.5  $\mu\text{m}$ . The composite film is made by coextrusion of said core and surface layers, followed by biaxial orientation.

The thermoplastic resin used for forming the surface layers contains substantially no inorganic fine powder (0 to 5% by weight); the thermoplastic resin used for forming the core layer contains 15 to 45% by weight of an inorganic fine powder.

Document S3 does not teach, in a general form, a specific relationship between the thickness of the core layer and the total thickness of the composite film. In the examples 1 to 9 (cf. page 8, table I of document S3), which illustrate the invention as disclosed in document S3, thicknesses of the core layers (57, 58, 59 and 148  $\mu\text{m}$ , respectively) and those of the surface layers (1.5, 1.0, 0.5  $\mu\text{m}$ ) are indicated. According to these figures, the thickness of the core layer comprises more than 95% of the thickness of the composite film.

The subject-matter of claim 1 of the patent in suit as amended differs from the prior art as represented by the general teaching of document S3 in that the core layer of said composite film comprises from 30 to 85% of the thickness of said composite film and that the surface layers of such a composite film are substantially void-free.

## 2.2 Problem-Solution

The object of the invention is to provide a base that is planar both before and after printing, yields an image of high uniformity and dye density, has a photographic look and is inexpensive to manufacture; thus to provide a base for a thermal dye-transfer receiver which exhibits low curl and good uniformity and provides for efficient dye-transfer (cf. page 2b of the patent in suit as amended).

The object is accomplished in accordance with the invention as defined in claim 1 of the patent as amended (cf. page 2c, lines 1 to 14 of the patent in suit as amended). That statement in the patent

specification was not in dispute.

Admittedly, it has not been shown that the dye-receiving elements according to the patent in suit as amended give rise to an improvement in comparison with the elements disclosed in the prior art, and some of the embodiments disclosed in the specification of the patent in suit as granted, which had been cancelled, appear to show better results.

However, the subject-matter of the claims of the patent in suit as amended has to be examined with regard to the prior art, and, in accordance with established case law, an improvement of the prior art is not a necessary prerequisite for involving an inventive step.

Thus, the problem to be solved also may be seen in providing alternative embodiments of dye receiving elements accomplishing the above-mentioned objectives.

## 2.3 Obviousness

2.3.1 Consequently, the question to be answered is, whether it was obvious for a person skilled in the art, in view of the above-mentioned objectives, to provide a dye-receiving element with a composite film, wherein the core layer comprises 85% or less of the thickness of the composite film, and wherein the surface layers are substantially void-free.

This question has to be answered independently of the question whether the dye-receiving element thus suggested yields better or worse results in comparison with dye-receiving elements as disclosed in the prior art.

2.3.2 Document S3 suggests, in the form of some specific examples, composite films wherein the core layer comprises 95% and more of the thickness of the composite film. It further teaches, in particular, the use of surface layers having a thickness of from 0,3 to 1,5  $\mu\text{m}$  (cf. page 3, line 37 and claim 1) and mentions that "if the outermost surface layer is too thick, ... the void (porosity) of the support is decreased to reduce compressibility, and the resulting recording sheet has a reduced colour density" (cf. page 4, lines 24 to 26).

Document S3 thus leads the person skilled in the art in a different direction and does not suggest the use of a composite film comprising thicker surface layers or, in other words, of a composite film wherein the core layer comprises less than 95%, in particular, less than 85% of the thickness of the composite film. Comparative example 4 further shows that the use of thicker surface layers apparently does not produce acceptable results.

Furthermore, in view of the indications in document S3 that, on the one hand, the compressibility of the element is reduced, if the surface layers are too thick, and, on the other, that the compressibility is determined by the amount of microvoids within the layers of the composite films, the use of thicker, but nevertheless substantially void-free surface layers does not appear to be obvious.

2.3.3 To sum up, in order to solve the problem of providing alternative dye-receiving elements, the person skilled in the art, firstly, would have to consider modifying the thickness of the surface layers of the known dye receiving elements, secondly, would have to decide to

go in a direction which is against the teaching of the prior art, and, thirdly, would have to decide to keep the surface layers substantially void-free, despite their greater thickness.

- 2.3.4 Document S4 does not concern a dye-receiving element having thereon a dye image-receiving layer and there is nothing in the disclosure of document S4 which would suggest to the person skilled in the art that the composite films disclosed therein would be of benefit in providing alternative embodiments of dye-receiving elements and in solving the problems arising from that specific application.

Document S4 suggests that the skin layers of a composite film should be sufficiently thick. However, a similar remark can be found in document S3, where it is noted: "If the thickness of the outermost surface layer is less than 0.3  $\mu\text{m}$ , the Beck's smoothness is reduced due to the influence of the inorganic fine powder projected on the surface of base layer" (cf. page 4, lines 26 to 29). The fact, that the limit is set at a rather low level of 0.3  $\mu\text{m}$ , does not hint towards the use of surface layers having a significantly greater thickness, in particular a thickness exceeding that of the upper limit of 1.5  $\mu\text{m}$  suggested in document S3.

- 2.3.5 Thus, the subject-matter of claim 1 of the patent in suit as amended involves an inventive step with regard to the prior art as disclosed in documents S3 and S4 and therefore meets the requirements of Article 56 EPC. The subject-matter of claims 2 to 10 similarly involves an inventive step.

## **Order**

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

The appeals are dismissed.

The Registrar:

The Chairman:

M. Dainese

A. Burkhart