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**D E C I S I O N**  
**of 18 February 2004**

**Case Number:** T 0072/02 - 3.4.3

**Application Number:** 96930384.1

**Publication Number:** 0794556

**IPC:** H01J 61/44

**Language of the proceedings:** EN

**Title of invention:**  
Light source

**Applicant:**  
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.

**Opponent:**  
-

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 56

**Keyword:**  
"Inventive step (yes - after amendments)"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 0072/02 - 3.4.3

**D E C I S I O N**  
of the Technical Board of Appeal 3.4.3  
of 18 February 2004

**Appellant:** MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.  
1006, Oaza-Kadoma  
Kadoma-shi  
Osaka 571-8501 (JP)

**Representative:** Grünecker, Kinkeldey  
Stockmaier & Schwanhäusser  
Anwaltssozietät  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 6 August 2001  
refusing European application No. 96930384.1  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** R. K. Shukla  
**Members:** V. L. P. Frank  
J. P. B. Seitz

## Summary of Facts and Submissions

I. The appeal lies from the decision of the Examining Division dated 6 August 2001 refusing the European patent application No. 96 930 384.1. The grounds for the refusal were that the claims were not concise (Article 84 EPC) as they comprised two independent claims directed both towards a light source and that the subject-matter of independent device claim 1 did not involve an inventive step in the sense of Article 56 EPC having regard to the following prior art document:

D1: JP-A-58 225 552

II. The appellant (applicant) lodged an appeal against the above decision on 15 October 2001, paying the appeal fee the same day. The statement setting out the grounds of appeal was filed on 6 December together with amended claims 1 to 14 forming appellant's main request.

III. In response to a communication from the Board under Rule 11(1) RPBA accompanying the summons to oral proceedings the appellant submitted claims 1 to 14 according to a first auxiliary request and a full translation of document D1.

IV. During the oral proceedings before the Board which took place on 18 February 2004, the appellant replaced his previous requests by a new main request, requesting the grant of a patent with the following patent application documents:

- Claims:** 1 to 12, filed during the oral proceedings
- Description:** pages 1 to 54, filed during the oral proceedings
- Drawings:** Sheet 1/25, filed on 16 February 2001  
Sheet 2/25 to 25/25, as originally filed.

The wording of the independent claim is as follows:

"1. A light source for lighting having major light emitting bands in ranges from 530 to 580 [nm] and from 600 to 650 [nm], with correlated color temperature of the lamp light color in a range from 3392 to 4467 [K] and with DUV in a range from 16.3 to 42.3."

Claims 2 to 11 of this request are directed to preferred embodiments of the light source according to claim 1. Claim 12 is directed to the use of a light source according to any one of the previous claims in tunnel lighting, road lighting, street lighting or outdoor lighting.

V. In the decision under appeal the Examining Division argued:

- (i) That the presence of two independent claims both directed towards a light source having major emitting bands in ranges from 530 to 580 nm and from 600 to 650 nm conflicted with the conciseness requirement of Article 84 EPC.

(ii) That the subject-matter of claim 1 did not involve an inventive step, since having regard to the disclosure of Figures 18 and 19 of the application in suit, the technical effects of high light efficiency and colour rendering was not achieved over the entire range claimed of DUV values from 14 to 70.

(iii) The auxiliary request submitted during the oral proceedings before the Examining Division and directed to a light source with a correlated colour temperature from 3392 to 4500 K and with DUV from 16.3 to 45 was, however, considered to be allowable.

VI. The arguments of the appellant can be summarized as follows:

The object of the present invention is to provide a light source having a high efficiency while ensuring at the same time a minimum level of colour reproduction. Within the range of correlated colour temperatures and DUV values specified in the independent claim a very good recognition of the colour red is achieved, cf. Figure 19 of the application in suit. This effect is of particular importance, since the colour red is generally used in order to indicate danger when used in traffic signs. Good red colour recognition, however, is not possible with DUV values lower than about 16, as for example the DUV values of 12.5 and 6.7 disclosed in document D1.

Moreover, the light sources disclosed in this document have an efficiency of 68 lm/W and 73 lm/W. In contrast,

the light source according to the present invention has an efficiency as high as 110 lm/W (cf. column 12, line 6 of the published application). This is achieved by the higher DUV values as claimed, since light having a stronger green component, and consequently a higher DUV, requires a larger ratio of green phosphor. Green phosphors, however, have a higher efficiency than red phosphors.

### **Reasons for the Decision**

1. The appeal is admissible.
  
2. *Clarity and amendments*

As the claims comprise only a single independent claim directed to a light source, the objection of the Examining Division as to lack of conciseness no longer applies. Moreover, the description has been brought in concordance with the amended claims, so that the claims are consistent with the description and supported by the latter.

The correlated colour temperature and DUV ranges specified in the independent claim 1 are disclosed in Figures 18 and 19 of the application in suit.

The Board is, therefore, satisfied that the application as amended fulfils the requirements of Articles 84 and 123(2) EPC.

3. *Inventive step*

- 3.1 The Board concurs with the Examining Division in that document D1 is the closest state of the art, disclosing a fluorescent lamp emitting light in a wavelength band from 530 to 570 nm and 600 to 640 nm. The colour temperature of this lamp is from 3000 to 3500 K (cf. Abstract). The two embodiments of the fluorescent lamp disclosed in this document have colour coordinates of  $x=0.4362$ ,  $y=0.4361$  and  $x=0.4418$ ,  $y=0.4231$  which, as acknowledged by the appellant, correspond to DUV values of 12.5 and 6.7, respectively.

The fluorescent lamp disclosed in document D1 is to be used as replacement for the incandescent lamps usually employed in household environments and should, in particular, reproduce the natural look of the human skin (cf. page 2, 2nd paragraph of the English translation).

- 3.2 The light source according to claim 1 differs, therefore, from the lamp disclosed in document D1 in that it has a DUV range from 16.3 to 42.3.

According to the application in suit, a light source emitting light in this DUV range allows a good categorical colour recognition of red (cf. Figure 19). Categorical colour recognition is a way of measuring the subjective perception of a colour under a given illumination. This measurement technique has already been used in the state of the art (cf. column 13, lines 8 to 27 of the published application). As the appellant pointed out, recognition of red is particularly important when the light source is used for tunnel or street illumination, as red is usually used for signaling danger.

3.3 The objective technical problem addressed by the application in suit having regard to the light source disclosed in document D1 is, therefore, the provision of a light source having a high efficiency and allowing good recognition of red.

3.4 Document D1, however, does not suggest that recognition of the colour red is improved by a light source of higher DUV values. The experimental results shown in Figure 19 of the application in suit show that for the DUV range specified in claim 1 the probability of evaluation as good is above 50% for red, whereas for a light source with a DUV value of about 12, ie similar to the value of the light source disclosed in document D1, the probability is of about 40%.

3.5 For these reasons, in the Board's judgment, the subject-matter of claim 1 involves an inventive step in the sense of Articles 56 EPC.

The dependent claims 1 to 11 concern further particular embodiments of the invention which are patentable for the same reasons.

The use of the light source as specified in claim 12 involves an inventive step, since the use of a new and inventive device cannot be obvious.



**Order**

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

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent with the following documents:

Claims 1 to 12 filed during the oral proceedings, on 18 February 2004.

Description pages 1 to 54 filed during the oral proceedings, on 18 February 2004.

Figure 1 as filed on 16 February 2001.

Figures 2 to 25 as originally filed.

The Registrar:

The Chairman:

D. Meyfarth

R. K. Shukla