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**Datasheet for the decision  
of 6 July 2016**

**Case Number:** T 0843/13 - 3.3.01

**Application Number:** 05025981.1

**Publication Number:** 1669415

**IPC:** C09B67/00, D06P3/66, D06P1/38

**Language of the proceedings:** EN

**Title of invention:**  
Dye mixture and the use thereof

**Patent Proprietor:**  
Everlight USA, Inc.

**Opponent:**  
Huntsman Advanced Materials (Switzerland) GmbH

**Headword:**  
Disazo dyes/EVERLIGHT

**Relevant legal provisions:**  
EPC Art. 54, 56

**Keyword:**  
Novelty - auxiliary request (yes)  
Inventive step - auxiliary request (yes)

**Decisions cited:**

**Catchword:**



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

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Case Number: T 0843/13 - 3.3.01

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.01**  
**of 6 July 2016**

**Appellant:** Huntsman Advanced Materials (Switzerland) GmbH  
(Opponent) Legal Services Department  
Klybeckstrasse 200  
4057 Basel (CH)

**Respondent:** Everlight USA, Inc.  
(Patent Proprietor) 10570 Southern Loop Boulevard  
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**Representative:** Lang, Johannes  
Bardehle Pagenberg Partnerschaft mbB  
Patentanwälte, Rechtsanwälte  
Prinzregentenplatz 7  
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**Decision under appeal:** **Interlocutory decision of the Opposition**  
**Division of the European Patent Office posted on**  
**5 February 2013 concerning maintenance of the**  
**European Patent No. 1669415 in amended form.**

**Composition of the Board:**

**Chairman** A. Lindner  
**Members:** M. Pregetter  
M. Blasi

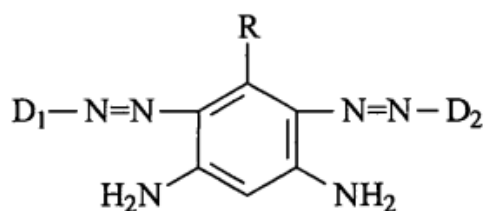
## Summary of Facts and Submissions

- I. European patent No. 1 669 415 was filed as patent application number 05025981.1. Claim 1 is the only independent claim. Claim 1 and dependent claim 17 read as follows:

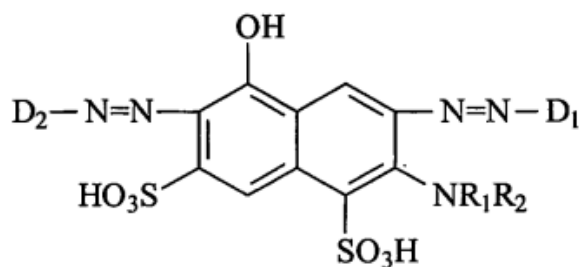
claim 1:

"1. A dye composition comprising:

(A) At least one disazo dye selected from the formula (I) or (II) present in an amount ranging from 1% to 99% by weight,



(I)



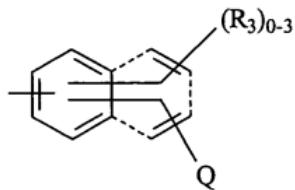
(II)

wherein

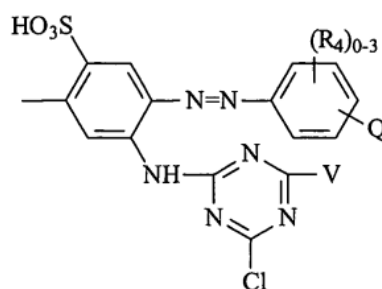
R is hydrogen or carboxyl;

$R_1$  and  $R_2$  are each independently of one another denote hydrogen or  $C_{1-4}$  alkyl;

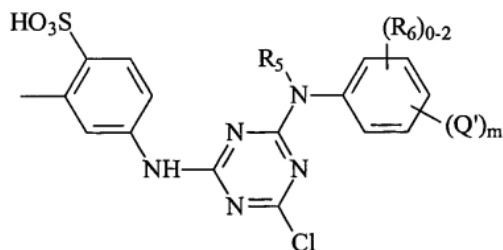
D<sub>1</sub> and D<sub>2</sub> are each independently can be any group selected from the formulas (1a), (1b), (1c), (1d) or (1e) below



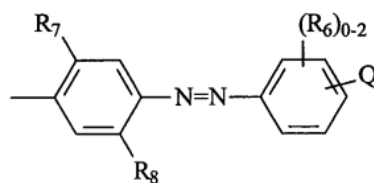
(1a)



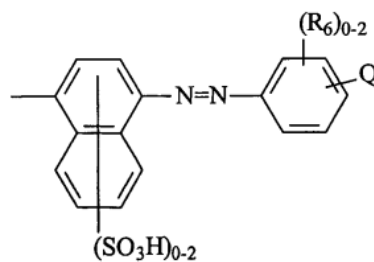
(1b)



(1c)



(1d)



(1e)

wherein

$(R_3)_{0-3}$  and  $(R_4)_{0-3}$  are each independently of one another 0 to 3 identical or different radicals selected from the group consisting of halogen, carboxyl, sulfo,  $C_{1-4}$  alkyl and  $C_{1-4}$  alkoxy;

$R_5$  is hydrogen or  $C_{1-4}$  alkyl which is unsubstituted or substituted by hydroxyl, sulfo, carboxyl or cyano;

$(R_6)_{0-2}$  is 0 to 2 identical or different radicals selected from the group consisting of sulfo,  $C_{1-4}$  alkyl and  $C_{1-4}$  alkoxy;

$R_7$  is hydrogen, sulfo,  $C_{1-4}$  alkyl or  $C_{1-4}$  alkoxy;

$R_8$  is hydrogen, ureido, sulfo,  $C_{1-4}$  alkyl,  $C_{1-4}$  alkoxy or  $C_{2-4}$  alkanoylamino;

V is a amino which is unsubstituted or substituted by non-fiber-reactive radicals;

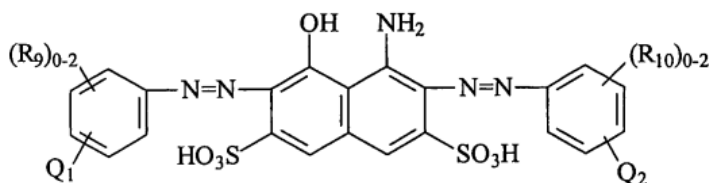
Q and Q' are each independently of one another denotes  $-NH-CO-CH(Hal)-CH_2(Hal)$ ,  $-NH-CO-C(Hal)=CH_2$  or  $-SO_2-Y$ ;

Y is  $-CH=CH_2$ ,  $-CH_2CH_2OSO_3H$  or  $-CH_2CH_2-U$ ; U is a group which can be eliminated under alkaline conditions;

Hal is halogen;

m is an integer of 0 or 1; and

(B) A disazo dye of formula (III) present in an amount ranging from 99% to 1% by weight,



(III)

wherein

$(R_9)_{0-2}$  and  $(R_{10})_{0-2}$  are each independently of one

another 0 to 2 identical or different radicals selected from the group consisting of sulfo, C<sub>1-4</sub> alkyl and C<sub>1-4</sub> alkoxy;

Q<sub>1</sub> and Q<sub>2</sub> are independently of one another denotes -NH-CO-CH(Hal)-CH<sub>2</sub>(Hal), -NH-CO-C(Hal)=CH<sub>2</sub> or -SO<sub>2</sub>-Y;

Y is -CH=CH<sub>2</sub>, -CH<sub>2</sub>CH<sub>2</sub>OSO<sub>3</sub>H or -CH<sub>2</sub>CH<sub>2</sub>-U; U is a group which can be eliminated under alkaline conditions;

Hal is Halogen".

claim 17:

"The dye composition of claim 1, wherein said component (A) is present in an amount ranging from 5% to 95% by weight relative to total weight of said composition, and said component (B) is present in an amount ranging from 95% to 5% by weight relative to total weight of said composition."

II. The following documents were cited during the opposition and appeal proceedings:

(1) WO 2004/069937

(2) EP 1 035 171

(3) US 6 160 101

(4) Comparative experimental report, dated May, 2011, submitted on 21 September 2011

(5) Supplemental comparative experimental report, dated September, 2012, submitted on 19 October 2012

III. The appeal lies from the interlocutory decision of the opposition division on the amended form, i.e. based on

the auxiliary request filed during oral proceedings before the opposition division on 14 January 2013, in which the patent in suit can be maintained. The claims of this request differ from those as granted in that the subject-matter of claim 17 as granted has been introduced into claim 1 as granted.

The opposition division stated that the opponent had acknowledged novelty of the auxiliary request.

With respect to the issue of inventive step, the opposition division identified document (1) as the closest prior art. It was not considered to be obvious to arrive at the subject-matter of claim 1 of the auxiliary request when starting from document (1).

- IV. The appellant (opponent) lodged an appeal against this decision. In its statement of grounds of appeal, the appellant objected to the subject-matter of claims 1, 2, 3, 5, 6, 8, 9, 10 and 15 of the auxiliary request on the ground of lack of novelty and disputed the analysis and conclusions of the opposition division with respect to inventive step.
- V. Oral proceedings were held before the board on 6 July 2016.
- VI. The appellant's arguments, insofar as they are relevant to the present decision, may be summarised as follows:

The subject-matter of claim 1 of the auxiliary request lacked novelty with respect to document (1): document (1) disclosed a dye mixture comprising dyes (1) and (2), wherein dye (2) was almost identical to the dye defined under point (B) of claim 1 of the auxiliary request. Dye (1) of document (1), a trisazo



dye, was obtained according to a process as described in document (3). The reference to document (3) in document (1) on page 3, paragraph 2, had to be understood as the incorporation of the whole content of document (3). Neither an indication to carry out purification nor motivation to do so could be found in document (3). The person skilled in the art would not envisage a purification step. The experimental report (5) showed that for one example of document (3), example 114, the amount of the intermediate disazo compound in the precipitated reaction mixture containing the trisazo dye (1) was 22.3% by weight. This disazo compound corresponded to the dye of point (A) of claim 1 of the auxiliary request. Document (1), example 78, disclosed a ratio of 1:1 of dye (1) : dye (2), resulting in the presence of about 11% by weight of disazo compound. Taking into consideration the total dye content of example 78, a disazo concentration of 4.46% by weight was disclosed, which was only slightly outside the claimed concentration. When considering document (1) as a whole, the disclosure on page 17, paragraph 3 pointed to the use of the dye (1) in concentrations higher than 5% by weight.

With respect to the issue of inventive step, the appellant started from document (1) as the closest state of the art, and defined the problem to be solved as providing a further dye mixture. The solution proposed in the patent in suit was obvious, since a person skilled in the art following the recommendation on page 17, paragraph 3 of document (1) would increase the amount of dye (1), together with its disazo by-product. Furthermore, there was no proof on file that the concentration of 5-95% by weight of dye according to point (A) of claim 1 of the auxiliary request was

critical.

VII. The respondent's arguments, insofar as they are relevant to the present decision, may be summarised as follows:

Document (1) provided teachings concerning trisazo dyes as components of a dye mixture comprising a first dye having diazo groups and a second dye (dye (2) in document (1) or dye according to point (B) in claim 1 of the auxiliary request). Document (3) provided information on how the trisazo dyes of document (1) may possibly be synthesised. Document (1) itself taught solely the use of trisazo dyes, which implied a purification of the reaction mixtures obtained by the processes of document (3). When trisazo compounds were formed, some disazo compounds would also be formed as by-products. However, the appellant reproduced only one single example, example 114, out of the 192 examples of document (3). It was mere speculation that the concentration of 22.3% by weight disazo compound found for example 114 was representative. Different amounts of disazo compound were to be expected, depending on the starting compounds. It was also mere speculation that the reaction mixtures were not purified to some extent.

On the question of inventive step, the respondent identified the problem of the patent in suit as lying in the provision of an alternative dye mixture. This problem was solved by providing two different dyes. The closest prior art was document (1). Regarding the structures as defined in point (A) of present claim 1, document (1) directed its teaching explicitly to trisazo dyes and was completely silent on the presence of a disazo dye. The proposal to use higher amounts of

a compound present as an impurity was inadmissible hindsight.

VIII. The appellant requested that the decision under appeal be set aside and that European patent No. 1 669 415 be revoked to the extent of claims 1, 2, 3, 5, 6, 8, 9, 10 and 15 as considered allowable in the decision under appeal.

The respondent requested that the appeal be dismissed.

IX. At the end of the oral proceedings, the decision of the board was announced.

### **Reasons for the Decision**

1. The appeal is admissible.
2. Documents (2) and (3) are family members. Document (3) is referred to on page 3, paragraph 2, of document (1). The contents of the relevant passages of documents (2) and (3) are identical. Reference is hereafter made only to document (3), published in English.
3. *Novelty (Articles 52(1) and 54 EPC)*
  - 3.1 The subject-matter of claim 1 of the auxiliary request, which is the only request on file, relates to a dye composition comprising certain concentrations of two dyes, a disazo dye of formulae (I) or (II), defined under point (A), and a dye of formula (III), defined under point (B). The black or navy blue reactive dye

composition is intended for use in dyeing or printing cellulosic based fibres.

- 3.2 Document (1) describes reactive dyes, especially black or navy-blue dyeing mixtures, that are suitable for dyeing or printing nitrogen-containing or hydroxy-group-containing fibre materials and yield dyeings or prints having good all-round fastness properties (page 1, paragraph 1). The dye mixtures comprise a reactive dye having at least one structural unit of formula (1) and a reactive dye of formula (2) (page 1, last paragraph - page 2, first paragraph). The dye of formula (2) of document (1) overlaps to a great extent with the dye of formula (III), defined under point (B), of claim 1 of the auxiliary request.

Document (1) depicts its preferred reactive dyes of formula (1) as having a structure according to formula (1a) (page 3, paragraph 3). Formulae (1) and (1a) of document (1) are trisazo dyes. It is stated that "dyes comprising at least one structural unit of formula (1) are known from US-A-6 160 101" (page 3, paragraph 2). US-A-6 160 101 forms part of these proceedings as document (3).

The structure of the trisazo dyes of document (1) is thus described as being known from document (3). Formula (1a) of document (1) and formula (2) of document (3) have the same general Markush formula.

- 3.3 Disazo dyes as defined in formula (I) of present claim 1 are neither mentioned in document (1) nor in document (3). The appellant argued that these disazo dyes were implicitly disclosed in document (1), as disazo compounds were unavoidably formed in the process of preparing the trisazo dyes according to document (3),

to which document (1) referred.

- 3.4 Document (1) makes explicit reference to the dyes of formula (2), (3) or (4) of document (3), i.e. to dyes having specific Markush formulae and thus specific structures. Document (1), however, does not make explicit reference to a particular reaction process for obtaining its dyes. Also, there is no direct link between the structure of the compounds, e.g. compounds of formula (2), and one specific reaction process of document (3). Consequently, the board comes to the conclusion that document (1) refers specifically to the structures of the dyes of document (3), but does not refer to any of the processes described in document (3). It is thus mere speculation that the trisazo dyes used in document (1) are actually obtained by a process selected from the processes disclosed in document (3). In the absence of any reference directed to one of the processes of synthesis described in document (3), there is no disclosure of the amounts of possible disazo impurities in the trisazo dyes used in document (1).

As a result of the foregoing, the board concludes that the processes of synthesis described in document (3) and the compounds/reaction mixtures directly obtainable by these processes are not relevant to the present decision. Possible economic considerations concerning the omission of purifying the reaction mixtures obtainable by the processes of document (3) need not be taken into account.

- 3.5 Consequently, a direct and unambiguous disclosure of the amounts of disazo dyes present in the dye mixture cannot be derived from document (1), either from the examples, or from the general description.

The subject-matter of the auxiliary request is therefore considered to be novel (Articles 52(1) and 54 EPC).

4. *Inventive step (Articles 52(1) and 56 EPC)*

4.1 The subject-matter of the contested patent is dye compositions with high build-up, and excellent fixation with cellulose as well as easy wash-off of the unfixed dyes. Claim 1 of the auxiliary request relates to a dye composition comprising a **disazo** dye of formulae (I) or (II) and a second dye.

4.2 The board considers, in agreement with the parties and the opposition division, that document (1) represents the closest prior art.

Document (1) defines dye mixtures comprising **trisazo** dyes, and a second dye (claims 1 and 7). The trisazo dyes of document (1) correspond to the disazo dyes of the patent in suit with a further diazo substitution at position 4.

4.3 The problem to be solved, in the light of document (1), may be defined as lying in the provision of an alternative dye mixture.

The proposed solution as defined in claim 1 is characterised by the use of the disazo compound, which can be seen as an intermediate or by-product of a process leading to the trisazo dye of document (1).

4.4 The board is satisfied that the problem has been solved in view of the examples figuring in the patent in suit.

4.5 It remains to be investigated whether the proposed solution would be obvious to the skilled person in the light of the prior art.

4.6 Regarding the structure defined by formula (I) of present claim 1, document (1) teaches the use of trisazo dyes. The diazotization in three positions is a mandatory technical feature of document (1). The document is completely silent on the use of the disazo dyes under consideration.

As already discussed under point 3.4 above, there is no reference in document (1) to processes of synthesis according to document (3). There is thus no link between the trisazo dyes of document (1) and impurities or by-products of specific processes of synthesis.

4.7 Starting from document (1) the skilled person would have had no incentive to use dye compounds of a structure different from the structures described in document (1). The board considers that it is hindsight to construe the disclosure of document (1) as providing a teaching based on a non-mentioned impurity (or by-product) stemming from the process of synthesising the trisazo dyes.

4.8 The board notes that there is no disclosure of a disazo dye falling within formula (I) of claim 1 of the auxiliary request in any of the documents cited as prior art. Not even document (3) acknowledges the formation of disazo by-products in its processes of preparing the trisazo dyes.

4.9 In view of the above, the board concludes that the subject-matter of claim 1 of the auxiliary request involves an inventive step. The same applies to the

dependent claims. Accordingly the subject-matter of the claims of the auxiliary request meets the requirements of Articles 52(1) and 56 EPC.

**Order**

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

**The appeal is dismissed.**

The Registrar:

The Chairman:



M. Schalow

A. Lindner

Decision electronically authenticated