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## (54) Reduction of organically bound chlorine formed in chlorine dioxide bleaching

(57) The invention relates to an improvement in bleaching of kraft pulp. In ECF bleaching chlorine dioxide is most often a prefered bleaching chemical in certain process positions. The disadvantage is that residual amounts of organically bound chlorine in form of AOX, i.e organically bound chlorine in effluents, and/or OCI, i. e. chlorine organically bound in the produced pulp, is obtained. A normal approach has been to reduce charges of chlorine dioxide.

According to the invention could substantial reductions in AOX levels be obtained if the process conditions in the chlorine dioxide stage elevated to above 91°C and extended to more than 90 minutes. A major reduction of AOX up to 50% have been shown without a corresponding increase in OCI. The chlorinated substances is degraded by the process conditions to harmless chloride ions, instead of being liberated into the effluent as AOX or bound to pulp as OCI.

# Chlorinated organic structure bound to the pulp

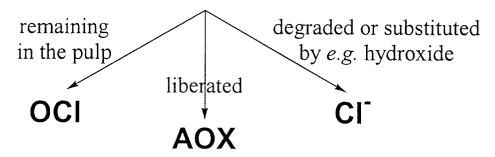


FIGURE 2

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# **EUROPEAN SEARCH REPORT**

**Application Number** EP 02 07 6282

|  | DOCUMENTS CONSIDERE   |  | T   |  |  |
|--|---|--|---|--|--|
| Category   | Citation of document with indication of relevant passages   | on, where appropriate,   | Relevant<br>to claim  | CLASSIFICATION OF THE APPLICATION (Int.CI.7) |  |
| X  | US 3 622 444 A (ANDREWS 23 November 1971 (1971 * column 1, line 3 - co examples 1,2 *                   | 1,4  | D21C9/14  |  |  |
| Х  | WO 98 00602 A (SUNDS DE<br>;GERMGAARD ULF (SE); ME<br>B) 8 January 1998 (1998<br>* the whole document * | 1,2,4  | 1,2,4   |  |  |
| Α  | US 6 235 154 B1 (MCK BI<br>22 May 2001 (2001-05-22<br>* column 1, line 28 -                             | 2)   | 6-9,11  |  |  |
| A  | US 3 652 388 A (CROON :<br>ET AL) 28 March 1972 (:<br>* the whole document *                            | 1  |   |  |  |
| D,A  | EP 0 500 813 B (EKA NOBEL AB)   |  |   |  |  |
|  | 7 December 1994 (1994-1   | LZ-U/)<br>   |   | TECHNICAL FIELDS<br>SEARCHED (Int.CI.7)      |  |
|  |   |  |   | D21C   |  |
|  |   |  |   |  |  |
|  | The present search report has been d  | rawn up for all claims  Date of completion of the search   |   | Examiner                                     |  |
| MUNICH   |   | 23 December 2002   |   |  |  |
| CATEGORY OF CITED DOCUMENTS  X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure |   | T : theory or principle E : earlier patent doc after the filing date D : document cited in L : document cited fo | December 2002   Nestby, K  T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filling date D: document cited in the application L: document oited for other reasons  8: member of the same patent family, corresponding |  |  |

### ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 02 07 6282

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23-12-2002

| Patent document<br>cited in search report |    | Publication date |   | Patent family<br>member(s)  | Publication date   |
|---|----|------------------|---|---|--|
| US 3622444                                | Α  | 23-11-1971       | CA<br>ZA  | 864409 A<br>7002034 A   | 23-02-1971<br>24-11-1971   |
| w0 9800602                                | A  | 08-01-1998       | SE<br>AU<br>EP<br>SE<br>WO                                | 506938 C2<br>3468797 A<br>0909354 A1<br>9602602 A<br>9800602 A1   | 02-03-1998<br>21-01-1998<br>21-04-1999<br>29-12-1997<br>08-01-1998   |
| US 6235154                                | B1 | 22-05-2001       | AU<br>BR<br>CA<br>WO<br>EP<br>JP                          | 2822099 A<br>9908832 A<br>2321683 A1<br>9947744 A1<br>1070167 A1<br>2002506935 T  | 11-10-1999<br>21-11-2000<br>23-09-1999<br>23-09-1999<br>24-01-2001<br>05-03-2002   |
| US 3652388                                | А  | 28-03-1972       | SE<br>AT<br>DE<br>FI<br>FR<br>NO                          | 334286 B<br>292443 B<br>1959118 A1<br>45573 B<br>2025415 A5<br>130776 B   | 19-04-1971<br>25-08-1971<br>11-06-1970<br>04-04-1972<br>11-09-1970<br>28-10-1974   |
| EP 0500813                                | В  | 02-09-1992       | AT<br>AU<br>BR<br>CA<br>EP<br>ES<br>JP<br>NO<br>PT<br>SEO | 115208 T 7235691 A 9105959 A 2074715 A1 0500813 A1 2065007 T3 923420 A 6072385 B 4507118 T 922995 A 96630 A ,B 9000340 A 9111554 A1 | 15-12-1994<br>21-08-1991<br>13-10-1992<br>01-08-1991<br>02-09-1992<br>01-02-1995<br>29-07-1992<br>14-09-1994<br>10-12-1992<br>15-09-1992<br>15-10-1991<br>01-08-1991<br>08-08-1991 |
|   |    |                  |   |   |  |

FORM P0459

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