

## ECLA EUROPEAN CLASSIFICATION

- D21C PRODUCTION OF CELLULOSE BY REMOVING NON-CELLULOSE SUBSTANCES FROM CELLULOSE-CONTAINING MATERIALS; REGENERATION OF PULPING LIQUORS; APPARATUS THEREFOR**
- D21C1/00 Pretreatment of the finely-divided materials before digesting (of waste paper [D21C5/02](#))**
- D21C1/02 . with water or steam
  - D21C1/04 . with acid reacting compounds
  - D21C1/06 . with alkaline reacting compounds
  - D21C1/08 . with oxygen-generating compounds
  - D21C1/10 . Physical methods for facilitating impregnation
- D21C3/00 Pulping cellulose-containing materials (digesters [D21C7/00](#))**
- D21C3/00B . [N: with organic compounds ([D21C3/20](#) and [D21C3/22B](#) take precedence)]
  - D21C3/00D . [N: with compounds not otherwise provided for]
  - D21C3/02 . with inorganic bases or alkaline reacting compounds, e.g. sulfate processes
  - D21C3/02B . . [N: in presence of S-containing compounds]
  - D21C3/02C . . [N: with NH<sub>3</sub> or H<sub>2</sub>O]
  - D21C3/02D . . [N: in presence of O<sub>2</sub>, e.g. air]
  - D21C3/02E . . [N: in presence of O<sub>3</sub>]
  - D21C3/04 . with acids, acid salts or acid anhydrides [N: ([D21C3/00B](#) and [D21C3/22B](#) take precedence)]
  - D21C3/04B . . [N: in presence of O<sub>2</sub> or O<sub>3</sub>]
  - D21C3/06 . . sulfur dioxide; sulfurous acid; bisulfites [N: sulfites]
  - D21C3/08 . . . calcium bisulfite
  - D21C3/10 . . . magnesium bisulfite
  - D21C3/12 . . . sodium bisulfite
  - D21C3/14 . . . ammonium bisulfite
  - D21C3/16 . . nitrogen oxides; nitric acid [N: nitrates, nitrites]
  - D21C3/18 . with halogens or halogen-generating compounds (bleaching cellulose pulp 9/12)
  - D21C3/20 . with organic solvents [N: or in solvent environment]
  - D21C3/22 . Other features of pulping processes

- D21C3/22B . . [N: Use of compounds accelerating the pulping processes]
- D21C3/22C . . [N: Use of means other than pressure and temperature]
- D21C3/22D . . [N: Use of compounds avoiding scale formation]
- D21C3/22E . . [N: Automation of the pulping processes]
- D21C3/24 . . Continuous processes
- D21C3/26 . . Multistage processes
- D21C3/26B . . . [N: at least one stage being in presence of oxygen]
- D21C3/26C . . . [N: the same pulping agent being used in all stages ([D21C3/26B](#) takes precedence)]
- D21C3/28 . . Prevention of foam

**D21C5/00** **Other processes for obtaining cellulose, e.g. cooking cotton linters (obtaining fibres for spinning D01C);** [N: Processes characterised by the choice of cellulose-containing starting materials]

- D21C5/00B . [N: Treatment of cellulose-containing material with micro-organisms or enzymes]
- D21C5/02 . Working-up waste paper ([mechanical part D21B1/08, D21B1/32](#))
- D21C5/02A . . [N: Chemicals therefor]
- D21C5/02B . . [N: De-inking]
- D21C5/02B2 . . . [N: Chemicals therefor]

**D21C7/00** **Digesters**

- D21C7/02 . Rotary digesters
- D21C7/04 . Linings
- D21C7/06 . Feeding devices
- D21C7/08 . Discharge devices
- D21C7/10 . Heating devices
- D21C7/12 . Devices for regulating or controlling
- D21C7/14 . Means for circulating the lye
- D21C7/16 . Safety devices

**D21C9/00** **After-treatment of cellulose pulp, e.g. of wood pulp, or cotton linters;** [N: Treatment of dilute or dewatered pulp or process improvement taking place after obtaining the raw cellulosic material and not provided for elsewhere (polysaccharides, derivatives thereof C08B; paper-making D12D to D12H)]

- D21C9/00B . [N: Modification of pulp properties ([purification D21C9/08](#))]
- D21C9/00B2 . . [N: by chemical means; preparation of dewatered pulp, e.g. in sheet or bulk form, containing special additives]

- D21C9/00B2B . . . [N: inorganic compounds]
- D21C9/00B2D . . . [N: organic compounds]
- D21C9/00B4 . . [N: by mechanical or physical means]
  
- D21C9/00D . [N: Prevention of corrosion or formation of deposits on pulp-treating equipment  
([D21C9/08](#), [D21H21/02](#) take precedence)]
  
- D21C9/02 . Washing; [N: Displacing cooking or pulp-treating liquors contained in the pulp by  
fluids, e.g. wash water or other pulp-treating agents]
- D21C9/04 . . in diffusers; [N: Washing of pulp of fluid consistency without substantially  
thickening]
- D21C9/06 . . in filters; [N: Washing of concentrated pulp, e.g. pulp mats, on filtering surfaces]
  
- D21C9/08 . Removal of fats, resins, pitch or waxes; [N: Chemical or physical purification, i.e.  
refining, of crude cellulose by removing non-cellulosic contaminants, optionally  
combined with bleaching (fats, waxes [C11B](#); natural resins [C09F1/00](#); hemicellulose  
[C08B37/14](#); purification by mechanical means [D21D5/00](#))]
- D21C9/08B . . [N: with inorganic compounds ([D21C9/08D](#) takes precedence)]
- D21C9/08D . . [N: with organic compounds or compositions comprising organic compounds]
  
- D21C9/10 . Bleaching; [N: Apparatus therefor]
- D21C9/10B . . [N: Pretreatment of the pulp, e.g. degassing the pulp]
- D21C9/10C . . [N: in solvent medium]
- D21C9/10D . . [N: with use of means other than pressure, temperature]
- D21C9/10E . . [N: Electrochemical processes]
- D21C9/10F . . [N: Other features in bleaching processes]
- D21C9/10F2 . . . [N: Pulse, dynamic, displacement processes]
- D21C9/10F4 . . . [N: Use of compounds accelerating or improving the efficiency of the processes]
- D21C9/10F6 . . . [N: Use of chelating agents]
- D21C9/10F8 . . . [N: Conserving the bleached pulp]
- D21C9/10F10 . . . [N: Controlling the process]
- D21C9/10G . . [N: Multistage, with compounds cited in more than one sub-group [D21C9/10](#),  
[D21C9/12](#), [D21C9/16](#)]
- D21C9/10H . . [N: with compounds not otherwise provided for, e.g. activated gases]
- D21C9/10J . . [N: with O2 (closed, see [D21C9/147](#))]
- D21C9/10K . . [N: with O3 (closed, see [D21C9/153](#))]
- D21C9/10L . . [N: with Mn-containing compounds]
- D21C9/10M . . [N: with reducing compounds]
- D21C9/10M2 . . . [N: with dithionites]
- D21C9/10M4 . . . [N: with H2]
- D21C9/12 . . with halogens or halogen-containing compounds ([D21C9/16](#) takes precedence)
- D21C9/12B . . . [N: with Cl2O]
- D21C9/12C . . . [N: with perhalogeno compounds]
- D21C9/14 . . . with ClO2 or chlorites
- D21C9/14B . . . . [N: with ClO2/Cl2 in a multistage process involving ClO2/Cl2 exclusively]
- D21C9/14C . . . . [N: with ClO2/Cl2 and other bleaching agents in a multistage process]

- D21C9/147 . . with oxygen or its allotropic modifications ([D21C9/16](#) takes precedence)
- D21C9/153 . . . with ozone
- D21C9/16 . . with per compounds
- D21C9/16B . . . [N: with peroxides]
- D21C9/16C . . . [N: with peracids]
  
- D21C9/18 . De-watering (de-watering in general F26B); [N: Elimination of cooking or pulp-treating liquors from the pulp ([D21C9/00B2](#), [D21C9/02](#) take precedence; paper-making machines D21F; strainers in digesters [D21C7/00](#); presses in general B30B)
- D21C9/18B . . [N: comprising at least one step where the pulp is suspended in a gaseous medium, e.g. flash drying]
  
- D21C11/00      Regeneration of pulp liquors [N: or effluent waste waters]**
  
- D21C11/00B . [N: Recovery of by-products, i.e. compounds other than those necessary for pulping, for multiple uses or not otherwise provided for (volatile compounds obtained by decomposition of spent liquors in order to regenerate them [D21C11/12D](#); compounds obtained by fractionating the liquors in order to regenerate them [D21C11/00J](#))]
- D21C11/00D . [N: Combination of various pulping processes with one or several recovery systems (cross-recovery)]
- D21C11/00F . [N: Introduction of various effluents, e.g. waste waters, into the pulping, recovery and regeneration cycle (closed-cycle)]
- D21C11/00F2 . . [N: Effluents derived from the washing or bleaching plants]
- D21C11/00H . [N: Introduction of compounds, e.g. sodium sulfate, into the cycle in order to compensate for the losses of pulping agents]
- D21C11/00J . [N: Fractionating or concentration of spent liquors by special methods (concentration by evaporation [D21C11/10](#))]
- D21C11/00J2 . . [N: Treatment of liquors with ion-exchangers]
- D21C11/00K . [N: Oxidation of liquors, e.g. in order to reduce the losses of sulfur compounds, followed by evaporation or combustion if the liquor in question is a black liquor (deodorisation of gases [D21C11/08](#); combustion [D21C11/12](#), [D21C11/14](#))]
- D21C11/00M . [N: Aspects concerning the production and the treatment of green and white liquors, e.g. causticizing green liquor]
- D21C11/00M2 . . [N: Treatment of green or white liquors with gases, e.g. with carbon dioxide for carbonation; Expulsion of gaseous compounds, e.g. hydrogen sulfide, from these liquors by this treatment (stripping); Optional separation of solid compounds formed in the liquors by this treatment (oxidation of liquors (black, green or white) [D21C11/00K](#); treatment of pulp gases [D21C11/06](#))]
- D21C11/00M4 . . [N: Treatment of green or white liquors with other means or other compounds than gases, e.g. in order to separate solid compounds such as sodium chloride and carbonate from these liquors; Further treatment of these compounds (fractionating of spent liquors [D21C11/00J](#))]
- D21C11/00P . [N: Introduction of auxiliary substances into the regenerating system in order to improve the performance of certain steps of the latter, the presence of these substances being confined to the regeneration cycle (introduction of compounds in order to make up for the losses of pulping agents [D21C11/00H](#); conventional

- causticizing of green liquors [D21C11/00M](#); fractionating of spent liquors [D21C11/00J](#)]
- D21C11/00P2 . . [N: Substances modifying the evaporation, combustion, or thermal decomposition processes of black liquor (treatment of solid substances (ash) separated from combustion gases [D21C11/06B2](#); avoiding scale-forming during evaporation [D21C11/10D](#))]
- D21C11/02 . of [N: acid, neutral or alkaline] sulfite lye
- D21C11/04 . of alkali lye
- D21C11/06 . Treatment of pulp gases; Recovery of the heat content of the gases; [N: Treatment of gases arising from various sources in pulp and paper mills; Regeneration of gaseous SO<sub>2</sub>, e.g. arising from liquors containing sulfur compounds]
- D21C11/06B . . [N: Treatment of gas streams comprising solid matter, e.g. the ashes resulting from the combustion of black liquor (evaporation of pulp liquors by direct contact with gases [D21C11/10B](#); post-combustion of gases [D21C11/12D2](#))]
- D21C11/06B2 . . . [N: Separation of solid compounds from these gases; further treatment of recovered products]
- D21C11/08 . . Deodorisation [N: Elimination of malodorous compounds, e.g. sulfur compounds such as hydrogen sulfide and mercaptans, from gas streams (oxidation of liquors [D21C11/00K](#); post-combustion of gases [D21C11/12D2](#))]
- D21C11/10 . Concentrating spent liquor by evaporation (evaporators [B01D](#))
- D21C11/10B . . [N: Evaporation by direct contact with gases, e.g. hot flue gases]
- D21C11/10D . . [N: Prevention of incrustations on heating surfaces during the concentration, e.g. by elimination of the scale-forming substances contained in the liquors]
- D21C11/12 . Combustion of pulp liquors
- D21C11/12B . . [N: Treatment, e.g. dissolution, of the smelt]
- D21C11/12D . . [N: Decomposition of the pulp liquors in reducing atmosphere or in the absence of oxidants, i.e. gasification or pyrolysis]
- D21C11/12D2 . . . [N: with post-combustion of the gases]
- D21C11/14 . . Wet combustion; [N: Treatment of pulp liquors without previous evaporation, by oxidation of the liquors remaining at least partially in the liquid phase, e.g. by application or pressure (oxidation of black, green or white liquors [D21C11/00K](#))]