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(54) **Ink-jet paper coating**

(57) A paper coating for ink-jet printing according the invention, comprising of sodium aluminosilicate, sodium chloride, ammonium chloride, polyvinyl alcohol, aliphatic polyamine and polyaluminum chloride, of hydrophilic

properties characterises in that weight ratio of sodium chloride, ammonium chloride and polyaluminum chloride to aliphatic polyamine is 8.55:1. The coating is applied by a machine on a paper ground on one- or two-sides.

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Description

[0001] The present invention relates to a paper coating for ink-jet printing.

[0002] Ink-jet printing, a technique pioneered during the second half of twentieth century, has created a need for paper of appropriate quality. During the last years of last century, special coatings designed for ink acceptance during printing were applied to improve print quality. The aim was achieved by hydrophilic coatings applied onto paper ground, using silica gel, polyvinyl alcohol and/or carboxymethylcellulose plus low molecular weight cationic polymer (e.g. modified polyethylenimine, polyvinylamine, condensation product of organic amides with formaldehyde, polyacrylamide) [Handbook of Paper and Board. Ed. H. Holik, WILEY-VCH Verlag GmbH & Co. KGaA, 2006, Weinheim, pp. 98-99]. Patent and specialist literature provide numerous versions of ink-jet paper coatings.

[0003] A paper ground for ink-jet printing with a cationic two-component surface coating is known from patent description US4,554,181. Cationic polymers applied in that invention characterises in that the cationic groups are available for anionic component of ink dye(s). The other source of cations are salts of a metal from group II, III or the Transition Metals of the Periodic Table of Elements of solubility greater than 5 g in 100 ml of water at 23°C. Due to tend to colour the paper, salts of Fe^{2+} , Fe^{3+} and Cu^{2+} are scarcely useful. It was revealed that salts of strong acids (including hydrochloric acid) are capable of insolubilising anionic ink components, but the anionic parts of the strong acids accelerate paper degradation.

[0004] A coating for ink-jet paper is known for Japanese patent application description JP 2001315433, which consists of 2-10 parts by weight of inorganic electrolyte (preferably sodium chloride), 0-100 parts by weight of porous absorbing material (e.g. silica particles), and up to 100 parts by weight hydrophilic or vinyl acetal resin. The mixture is to be prepared onto a polyethylene foil and then transferred onto a paper.

[0005] The Polish patent application P405943 discloses a paper coating for ink-jet printing according the invention, comprising of sodium aluminosilicate, sodium chloride, polyvinyl alcohol, aliphatic polyamine and polyaluminum chloride, of hydrophilic properties, which characterises in that weight ratio of sodium chloride and polyaluminum chloride to aliphatic polyamine is 9.6 : 1.

[0006] A paper coating for ink-jet printing according the invention, comprising of sodium aluminosilicate, sodium chloride, ammonium chloride, polyvinyl alcohol, aliphatic polyamine and polyaluminum chloride, of hydrophilic properties characterises in that weight ratio of sodium chloride, ammonium chloride and polyaluminum chloride to aliphatic polyamine is 8.55 : 1. The coating is applied by a machine on a paper ground on one- or two-sides.

[0007] Unexpectedly, decrease of sodium chloride content, simultaneously preserving very high concentration of chlorides in the mixture (supplied with ammonium chloride) provides very good printing quality, better than one according to the solution disclosed in P405943. In addition, it is suitable for direct, mechanical applying on a paper with a standard machines. In laboratory tests on papers for ink-jet printing the following parameters were recorded: mottling, show-through, bleeding and optical density. Paper with the coating according to the invention was produced on a size press of a papermaking machine. Assessment of coatings was done by OCE Printing Systems in 2014 showed high quality. In the following charts AmberHighway 80 gsm 2014-02 Trial and AmberHighway 90gsm 2014-02 Trial are the tested paper with coating according to this invention.

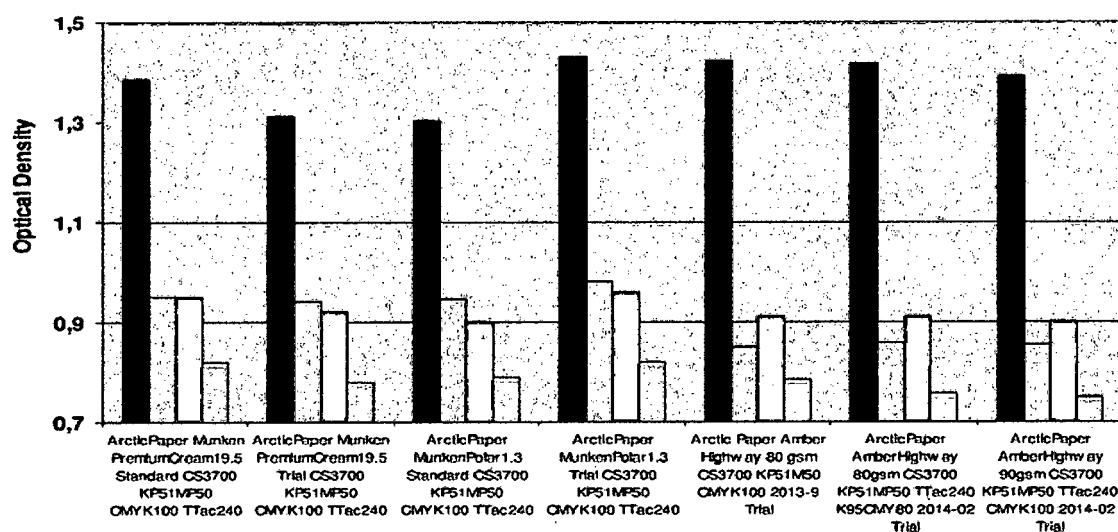


Chart 1: Optical density for CMYK

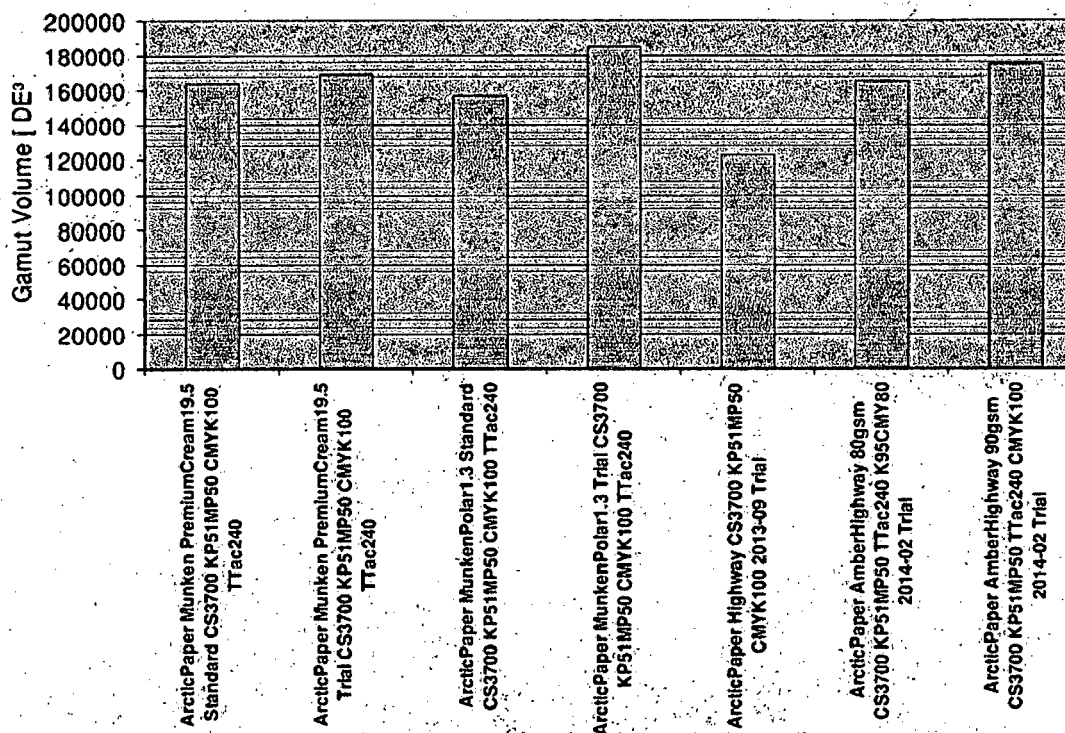


Chart 2: results for colour gamut $\Delta E^*_{ab} = ((\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2)^{1/2}$

The gamut for the best papers is about 210 000.

Strike Through Black 100% with White Backing

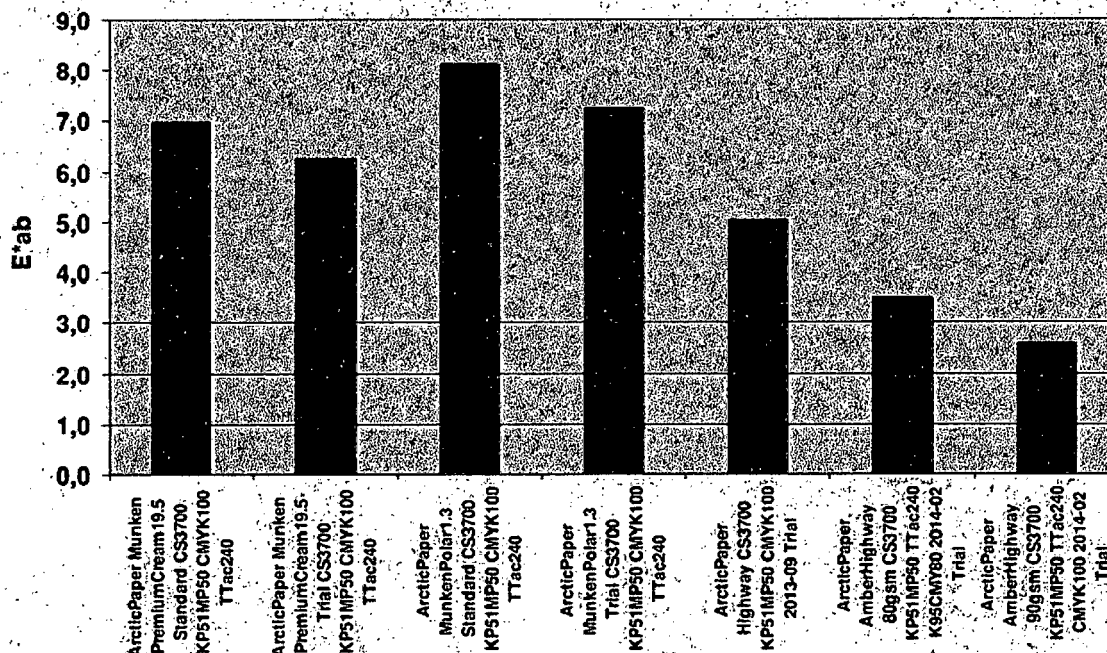


Chart 3: show-through

[0008] The referred laboratory described papers with coating according to this invention as:

- drying is assessed as correct,
- both versions of the paper are qualified as adequate for on-line printing as sufficiently quick drying.
- colour gamut is better in comparison with paper coating known from application P405943.

[0009] The results confirm a printing quality comparable with those of the reference paper for ink-jet printing. No accelerated degradation was found.

[0010] The invention is illustrated by the following exemplary embodiment.

[0011] Example. Water is to be poured into a mixer with a high-speed stirrer at amounts depending on demanded concentration of the coating mixture, and than the ingredients are added gradually at the indicated amounts::

Ingredient	Commercial name	Amount of a dry substance in g/100 g of the mixture	Weight percentage of all ingredients
Sodium aluminosilicate	Zeocros PF	2.00	17.45%
Sodium chloride	evaporated salt	2.50	21.93%
Ammonium chloride		3.00	26.32%
Polyvinyl alcohol	PVOH BP-05	3.00	26.32%
Aliphatic polyamine	CATIOFAST 160	0.67	5.88%
Polyaluminum chloride	PAX 18	0.23	2.02%

[0012] Every ingredient shall be added as soon as a previous is completely dissolved in the mixture. A paper sheet is to be covered with the mixture with a papermaking machine or with a covering machine on one or two sides. Paper density of the produced paper is 70 - 160 g/m², and coating density is 2-4 g/m².

Claims

1. A paper coating for ink-jet printing according the invention, comprising of sodium aluminosilicate, sodium chloride, ammonium chloride, polyvinyl alcohol, aliphatic polyamine and polyaluminum chloride, of hydrophilic properties **characterises in that** weight ratio of sodium chloride, ammonium chloride and polyaluminum chloride to aliphatic polyamine is 8.55:1.
2. The paper coating according to the claim 1 **characterises in that** the mixture is applied by a machine on a paper ground on one- or two-sides.



EUROPEAN SEARCH REPORT

Application Number
EP 14 46 0083

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 4 250 299 A (CRAMM GUNTHER [DE] ET AL) 10 February 1981 (1981-02-10) * column 9, line 40 - line 60; example 1 * -----	1,2	INV. D21H17/11 D21H17/36 D21H17/56 D21H17/66
A	US 2004/122151 A1 (SMITH HUGH MCINTYRE [US] ET AL) 24 June 2004 (2004-06-24) * claim 1 *	1,2	
A	WO 2006/005402 A1 (EASTMAN KODAK CO [US]; PONCELET OLIVIER JEAN CHRISTIA [FR]) 19 January 2006 (2006-01-19) * claims 1-15 * -----	1,2	
			TECHNICAL FIELDS SEARCHED (IPC)
			D21H
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		5 October 2015	Ponsaud, Philippe
CATEGORY OF CITED DOCUMENTS			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			
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 P : intermediate document			

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

EP 14 46 0083

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
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05-10-2015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4250299 A	10-02-1981	BR 7808244 A CA 1121547 A1 DE 2756431 A1 EP 0002474 A1 ES 476042 A1 FI 783858 A JP S5490399 A JP S6135211 B2 NO 784040 A US 4250299 A US 4319019 A	14-08-1979 06-04-1982 21-06-1979 27-06-1979 16-04-1979 18-06-1979 18-07-1979 12-08-1986 17-07-1979 10-02-1981 09-03-1982
US 2004122151 A1	24-06-2004	NONE	
WO 2006005402 A1	19-01-2006	EP 1765599 A1 FR 2872736 A1 JP 2008504993 A US 2008305284 A1 WO 2006005402 A1	28-03-2007 13-01-2006 21-02-2008 11-12-2008 19-01-2006

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 4554181 A [0003]
- JP 2001315433 B [0004]
- PL P405943 [0005]

Non-patent literature cited in the description

- Handbook of Paper and Board. WILEY-VCH Verlag GmbH & Co. KGaA, 2006, 98-99 [0002]