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Solution de mouillage et procédé d'impression l'utilisant

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(73) Proprietor: **SUN CHEMICAL CORPORATION**
New York New York (US)

(72) Inventors:
• **Bassemir, Robert**
Jamaica, N.Y. (US)
• **Krishnan, Ramasamy**
Sewaren, N.J. (US)
• **Lowell, Arthur**
Edison, N.J. (US)

(74) Representative: **Lawrence, Peter Robin**
Broughton et al
GILL JENNINGS & EVERY,
Broadgate House,
7 Eldon Street
London EC2M 7LH (GB)

(56) References cited:
EP-A- 0 024 298 **FR-A- 2 093 585**
US-A- 4 329 422 **US-A- 4 560 410**
US-A- 4 576 743

• **Chemische Werke Hüls AG: Richtrezepturen,**
Seiten 24-26 (August 1980)
• **Seifen-Öle-Fette-Wachse, 103. Jhrg., Nr. 7/1977,**
Seite 193-197
• **Römpps Chemie-Lexikon, 7. Auflage, Seite 2074-**
2075

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Description

This invention relates to fountain solutions, more specifically to fountain solutions which contain or are used with alcohol substitutes.

The offset lithographic printing process employs planographic plates which transfer ink to a blanket roll which, in turn, then transfers the ink to a substrate thereby forming the printed images. The plates are referred to as planographic since the image and non-image areas are in the same plane. The plates are constructed so that with proper treatment the images are hydrophobic and oleophilic and thereby receptive to inks. The non-image areas are hydrophilic and are water receptive. In order to maintain the hydrophilic characteristics on the non-image areas, and to prevent ink from accumulating on the non-image areas, it is necessary to continuously treat the plate with a water based fountain solution.

The aqueous fountain solution is used to maintain the non-image areas of a lithographic printing plate insensitive to ink. While an offset printing press is running, fountain solution is continuously applied to the printing plate just before the application of the printing ink, or as a water in ink emulsion. The fountain solution has an affinity for the non-image, hydrophilic areas of the plate and immediately wets these areas. A complete and uniform film of fountain solution prevents the subsequent application of ink from covering the plate in the non-image areas. The fountain solution and ink on the plate are then both transferred to the blanket and then to the printing substrate and the process begins again.

Lithographic printing plates are developed to expose metal surface in the non-image areas while image areas are left coated with a hydrophobic polymer. A developing system is disclosed in FR 2093585 for developing an exposed lithographic plate to remove non-image areas from plates of which the light-sensitive agent in the coating is a diazomium compound. The solutions comprise water soluble salts of organic aromatic sulphonic acids, water-miscible solvents for the light sensitive coating, surfactant and phosphoric or oxalic acid.

US 4329422 relates to a solution for stabilising and protecting diazo-sensitised lithographic plates before use and thereby to prevent scumming, blinding and grease smudging during printing. The solutions comprise water soluble aromatic acids, water soluble mono-ester alkali metal salts of sorbitol phosphate or α/β glycerophosphate and water.

There are many fountain solutions which contain highly polar liquids which will wet and coat the exposed metal surface of the non-image area of the plate. Plain water may temporarily perform fairly well, although various aqueous electrolytes, surfactants and water soluble polymers are generally required for good continuous performance. These additives promote plate wetting and fountain solution uniformity, as well as controlling the interaction of the fountain solution with the ink and the substrate.

Acid fountain solutions are the most widely used in commercial printing. Alkaline fountain solutions are primarily used for newspaper printing. While there is a trend toward more neutral pH fountain solutions, acidic solutions continue to be widely used because of the proven effectiveness of gum arabic, a water soluble polymer. Gum arabic is a protective colloid that desensitizes the non-image areas of the plate. Since gum arabic is best solubilized and most effective under acidic conditions, acidic fountain solutions continue to be preferred.

Many lithographic presses have a fountain solution distribution system that is separate from the ink distribution system. Generally, the conventional fountain solution distribution system includes a ductor roller which has intermittent or interrupted flow of the fountain solution from the reservoir to the dampening form rollers that contact the printing plate. Often these conventional dampening systems use paper or molleton (cloth) covered rollers or specially treated rollers in the dampening system roller train to act as intermediate fountain solution reservoirs. Alternately brushes can flick droplets of water onto form rollers or directly onto the plate or nozzles can similarly spray a fine-mist.

A growing number of lithographic presses are equipped with a continuous feed dampening system sold by Dahlgren Mfg. Co., Dallas, TX, under the tradename Dahlgren. Other dampening systems of the direct continuous type include the system sold by Miehle-Gross-Dexter, Chicago, IL, under the trademark Miehlematic, and by Harris Corp., Cleveland, OH, under the trademarks Duo-Trol and Microflow and by Miller Western Mfg. Co., Pittsburgh, PA, under the trademark Miller-matic.

In the Dahlgren system, the printing plate is contacted only by inked rollers, that is, the fountain solution must be carried from the dampening unit rollers by means of one or more inked rollers, usually one of the form rollers, to the printing plate. This type of system requires the assistance of a water transport additive such as a water soluble glycol as disclosed in U.S. Patent No. 3,625,715 or an alcohol such as disclosed in U.S. Patent No. 3,168,037, with isopropyl alcohol being almost universally used. The excellent and more independent control of ink and water delivery to the printing plate accounts for the ever increasing use of this type of dampening system in lithographic printing. This, in turn, accounts for the extensive use of isopropyl alcohol in Dahlgren continuous dampening systems. Typically, the fountain solution will contain between about 10 to 30 percent isopropyl alcohol depending upon the specific press, speed, type of form and substrate being printed. The use of isopropyl alcohol is the best compromise between good press and printing performance and cost of the fountain solution.

Another variety of a continuous contact dampening system is the Miller-matic type wherein the fountain solution is applied to the printing plate by means of a dampener form roller that is not part of the inking system. With such an arrangement it would be expected that isopropyl alcohol would not be required because the inked form

roller is not used to distribute the aqueous fountain solution. Because, however, of the excellent ink and water balance control, it is also common to use isopropyl alcohol as a constituent in the dampening solution used with the Millermatic type of dampener.

The typical fountain solution is made up from a fountain solution concentrate, water and an alcohol or alcohol substitute. The fountain solution concentrate generally includes buffering salts, protective colloids, i.e. water-soluble resins or gums such as gum arabic or cellulose gum and frequently a surfactant (wetting agent). The preferred fountain solutions are generally acidic and include acidic components such as phosphoric or citric acid to maintain a pH value between about 3.5 and 5.5, although neutral and basic fountain solutions are also useful.

Typically, the fountain solution contains 1 to 10% by volume of a fountain solution concentrate (or etch). The fountain solution concentrate is diluted with water, with additional dilution with an alcohol or alcohol replacement if desired to obtain the fountain solution which is ready for lithographic printing.

Alcohol (isopropanol) and alcohol substitutes are commonly added to fountain solutions. These additions are required with certain types of continuous dampening systems (Dahlgren, Duo-Trol, Miehlomatic, etc.). Even with conventional systems, smaller amounts of alcohol have proven to be beneficial. Generally speaking, alcohol will make a borderline dampening solution work better by solubilizing the surfactant and lowering the surface tension of the water, thereby increasing the wetting action of the dampening solution. Also, it minimizes the fountain solution use while maintaining moisture on the plate surface. Reduced water pickup makes it easier for the pressman to maintain the correct ink/water balance. Also, the rapid evaporation of the alcohol from the film of fountain solution on the blanket and printed sheet helps to minimize the paper's tendency to curl. Generally about 10 to 30% of a fountain solution can be isopropanol.

Environmental concerns about press room emissions as well as the cost of alcohol have led to the use of alcohol substitutes. These can perform some, but generally not all, of the functions of isopropanol. Because of these concerns for isopropyl alcohol, a number of materials have been suggested as replacements in fountain solutions. Additives such as 2-butoxy ethanol and ethylene glycol have been used as substitutes for isopropyl alcohol. U.S. Patent 3,877,372 discloses a fountain solution which includes 2-butoxy ethanol and at least one of hexylene glycol and ethylene glycol, a silicone glycol copolymer and a defoamer type surfactant. U.S. Patent 4,278,467 discloses an isopropyl alcohol-free fountain solution which includes an additive having a surface tension less than about 50 dynes/cm such as n-hexoxydiethylene glycol (n-hexyl cellosolve), n-hexoxydiethylene glycol (n-hexyl carbitol), 2-ethyl-1,3-hexanediol, n-butoxyethylene glycolacetate, n-butoxydiethylene-glycolacetate, 3-butoxy-2-propanol and mixtures thereof. U.S. Patent 4,560,410 discloses a fountain solution containing a mixture of a polyol and/or glycol ether partially sol-

uble in water with a polyol and/or glycol ether completely soluble in water.

The use of higher boiling solvents such as glycols, glycol ethers and glycol ether acetates as alcohol substitutes in fountain solutions has resulted in a higher dynamic surface tension because of the limited solubility of the surfactants in these systems. The higher dynamic surface tension reduces the performance and effectiveness of the fountain solution due to decreased wetting action at press speeds. In addition certain fountain solution concentrate systems containing alcohol substitute systems cannot be supplied in a one step form because of precipitation of one or more components when mixed with the alcohol substitutes. This type of one-step fountain solution concentrate is desirable because of the simplicity of metering it on existing dilution equipment.

Further, fountain solutions contain alcohol and alcohol substitutes to dissolve surfactants in an aqueous system. It would be desirable to be able to dissolve surfactants in an aqueous system while eliminating or reducing alcohol or alcohol substitutes to avoid the environmental problems they cause as well as the lithographic problems caused by their evaporation.

Compositions comprising water, a surfactant and hydrotrope are known for cleaning purposes and are described for example in *Chemische-Werke* published by Huls AG dated August 1980. The surfactants used in these compositions are anionic and/or cationic.

In "Seifen-Ole-Fette-Wachse" 103 (1977) p193-197 by W.Lang, liquid detergents and washing compositions are disclosed which include as surfactants sodium alkyl benzene sulphonate, sodium fatty alcohol ether sulphonate or nonyl phenol reacted with ethylene oxide.

Briefly, this invention involves the use of hydrotrope to increase the solubility of a surfactant in an aqueous fountain solution. The hydrotrope is added to an aqueous fountain solution or fountain solution concentrate containing a surfactant. By this invention the use of alcohol or alcohol substitutes can be eliminated or reduced and if used in combination with an alcohol substitute system, performance and effectiveness of the fountain solution can be enhanced.

It has now been found that when a hydrotrope is added with a surfactant to a fountain solution or fountain solution concentrate, the solubility of the surfactant is increased thus lowering the dynamic surface tension and enhancing the wetting action and performance of the fountain solution during the lithographic printing process.

In accordance with the present invention a fountain solution composition is provided comprising water, a surfactant and a hydrotrope characterised in that the surfactant is a non-ionic surfactant chosen from block copolymers, ethoxylated acetylenic carbinols, 3,5-dimethyl-1-hexyn-3-ol and 2,4,7,9-tetramethyl-5-decyne-4,7 diol and the hydrotrope is a salt of a hard acid-soft base or of a soft acid-hard base and which is chosen from sodium toluene sulfonate, sodium xylene sulfonate, sodium cumene sulfonate, ammonium xylene sulfonate, tetrabutyl ammonium hydrogen sulfonate, tetraphenyl

phosphonium bromide, tetrabutyl ammonium bromide, cetyl trimethyl ammonium bromide, sodium thiocyanate and mixtures thereof and which is present in an amount effective to increase the solubility of the surfactant in the fountain solution.

The hydrotrope is a salt of a hard acid-soft base or soft acid-hard base and is an electrolyte generally with an inorganic and organic ion. Descriptions of hard and soft acids and bases are contained in Survey of Progress in Chemistry (edited by A. Scott, Academic Press, Vol 5, 1969, pp 1-52). The action of the hydrotrope is to assist in the solubilisation of an insoluble phase (i.e. a surfactant) in a second phase (i.e. water). Preferably the hydrotropes selected in addition do not increase the hydrophilic-lipophilic balance (HLB Value) of the fountain solution which would interfere with the lithographic printing process. The suitable hydrotropes are sodium toluene sulfonate, sodium xylene sulfonate, sodium cumene sulfonate, ammonium xylene sulfonate, tetrabutyl ammonium hydrogen sulfonate, tetraphenyl phosphonium bromide, tetrabutyl ammonium bromide, cetyl trimethyl ammonium bromide and sodium thiocyanate. Mixtures of hydrotropes may also be used.

The hydrotrope is used in an amount effective to increase the solubility of the surfactant, preferably to maintain the surfactant dissolved in the fountain solution and fountain solution concentrate. Generally the amount of hydrotrope to surfactant is within the range of 1:1 to 10:1 by weight, preferably 4:1 to 6:1 by weight.

The use of the hydrotrope to increase the solubility of a surfactant reduces the dynamic surface tension of the fountain solution, thus enhancing its performance during lithographic printing. In general the addition of an effective amount of hydrotrope will reduce the dynamic surface tension of the fountain solution by at least 5 mN/m (5 dynes/cm), preferably at least 10 mN/m (10 dynes/cm), as measured at a surface age of 200 milliseconds with a Sensadyne (TM) Surface Tensiometer 5000 manufactured by Chem-Dyne Research Corporation, Milwaukee, Wisconsin. The resultant fountain solution will generally have a dynamic surface tension of less than 40mN/m (40 dynes/cm), preferably 28 to 35 mN/m (28 to 35 dynes/cm), as measured above. Common commercial dampening solutions containing alcohol replacements generally have dynamic surface tensions in the range of from greater than 35 to 65 mN/m (35 to 65 dynes/cm) as measured above.

The fountain solution or fountain solution concentrate contains surfactants or wetting agents which are added in amounts effective to lower the surface tension and to control emulsification ability and capacity thus making the fountain solution more efficient in dampening the lithographic plate. Suitable surfactants are non-ionic surfactants chosen from block copolymers, ethoxylated acetylenic carbinols, 2,4,7,9-tetramethyl-5-decyne-4,7-diol and 3,5-dimethyl-1-hexyn-3-ol as well as mixtures thereof. In general, the amount of surfactant will range from 0.05 to 20% by weight of the fountain solution con-

centrate and from 0.001 to 1% by weight of the fountain solution.

The fountain solution or fountain solution concentrate generally contains several other ingredients. These can include protective colloids, i.e. water-soluble polymers, in particular water-soluble gums which contain carboxyl and hydroxyl groups. Gum arabic is the oldest and most widely used polymer and is typically added as a 14° Baume' solution (about 27% solution). Carboxymethyl cellulose, hydroxyethyl cellulose as well as styrene maleic anhydride copolymers, polyvinyl, pyrrolidone, and the like, may also be used. These polymers are generally used to protect the non-image areas of a plate from contamination from ink and to maintain the area hydrophilic. In general, the amount of protective colloid will range from 5 to 25% by weight of the fountain solution concentrate and 0.1 to 2% by weight of the fountain solution. The protective colloids are generally added to acidic fountain solutions.

The fountain solution or fountain solution concentrate can also contain buffering salts effective to maintain a desired pH. The fountain solutions are preferably used as aqueous acidic solutions having a pH of about 3.5 to 5.5. Phosphoric acid is a preferred acid for use in acidifying the formulation. Other acids which can be used include inorganic as well as organic acids, such as acetic acid, nitric acid, hydrochloric acid, citric acid and the like. The buffering salts can include ammonium acetate, magnesium nitrate, zinc nitrate, sodium sulfate and disodium hydrogen phosphate. The fountain solution can also be neutral or alkaline as desired and contain suitable buffering salts to maintain a desired pH such as sodium hydrogen phthalate, potassium hydrogen phosphate and sodium or potassium silicates.

Other additives which may be used in the fountain solution or fountain solution concentrate include preservatives such as dimethoxane, phenol, sodium salicylate, and the like; corrosion inhibitors such as ammonium bichromite, magnesium nitrate and the like; anti-foaming agents; and dyes, as well as other additives which are common in the art.

The fountain solution or fountain solution concentrate can also contain an alcohol or alcohol substitute. While an alcohol such as isopropanol or alcohol substitutes can be used, the hydrotrope in combination with the surfactant reduces the dynamic surface tension sufficiently to be able to reduce or eliminate their use. Preferably alcohol comprises less than 5% by volume of the fountain solution. Advantageously the addition of hydrotrope increases the efficiency of fountain solutions containing alcohol substitutes and also eliminates precipitation problems allowing the use of one step formulations which contain alcohol substitutes. Generally alcohol replacements can comprise up to 75% by volume of a fountain solution concentrate and up to 10% by volume of a fountain solution. Typical alcohol replacements include 2-butoxy ethanol, n-hexoxyethanol, ethylene glycol, 2-ethyl-1,3-hexanediol and mixtures thereof.

The addition of hydrotrope to the fountain solution resulting in increased solubility of the surfactant and a reduction in the dynamic surface tension at press speeds has resulted in a number of major advantages including a wider latitude with regards to the amount of water use (i.e. wider water balance) and the ability to greatly reduce the water usage. In addition, other advantages which have been observed include faster clean-up of the lithographic plates, reduced and more easily removed pillings on the non-image area of the blanket and cleaner fountain solution sumps due to reduced ink feedback.

Example 1

The addition of a hydrotrope allows one to prepare a composite one step fountain solution concentrate without precipitation of solids occurring.

The following formulation was prepared. A fountain solution concentrate was prepared containing 77% by weight water, 11% by weight gum arabic, 7% by weight magnesium nitrate, 1.4% by weight citric acid, 1.3% by weight phosphoric acid (85% solution), 1.2% by weight disodium hydrogen phosphate and 0.25% by weight block copolymer of ethylene oxide/propylene oxide plus 0.2% by weight preservatives and anti-foaming agents. Upon addition of 74 ml (2 1/2 oz.) of the concentrate to 118 ml (4 oz.) of alcohol replacement (containing 34% by weight ethylene glycol, 58% by weight 2-butoxyethanol, 4.6% by weight 3,5-dimethyl-1-hexyn-3-ol and 2.9% by weight 2,4,7,9-tetramethyl-5-decyne-4,7-diol) added per 3.8 litres (US) gallon of water a precipitate was formed. The further addition of 89 ml (3 oz.) of ammonium xylene sulfonate (42% by weight solution in water) led to solution of the precipitate and a uniform product.

The dynamic surface tension of the diluted fountain solution containing hydrotrope was 29.5 mN/m (29.5 dynes/cm) at a surface renewal rate of 200 milliseconds as measured with a Sensadyne Surface Tensiometer 5000. Without the addition of hydrotrope, the fountain solution had a dynamic surface tension of 35 mN/m (35 dynes/cm), as measured above, despite the fact that the hydrotrope is not surface active.

In a sheet fed press trial, using a Dahlgren dampening system the above fountain solution with hydrotrope ran with a water balance of 15 notches (70-85) with catchup at 65 notches. A 15 notches water balance is a wide water balance which allows efficient lithographic performance.

Example 2

Utilizing a 2-step process (i.e. dilute concentrate with water then add alcohol replacement) on a Miehle Press a fountain solution containing 18.7 g/l (2 1/2 oz./gallon) of the fountain solution concentrate of Example 1 with 18.7 g/l (2 1/2 oz./gallon) of the alcohol replacement of Example 1 did not run with any water control on a Dahlgren dampening unit indicating the ink would not lithograph with this fountain solution. This fountain solu-

tion had a dynamic surface tension of 39 mN/m (39 dynes/cm) as measured above.

The addition to the fountain solution of 18.7 g/l (2 1/2 oz./gallon) of hydrotrope (an aqueous solution containing 42% by weight of equal amounts of sodium cumene sulfonate, sodium toluene sulfonate and ammonium xylene sulfonate) provided a fountain solution which ran with a water balance of 5 notches (90-95) and catchup at 90 notches indicating the press could run. The fountain solution, containing hydrotrope had a dynamic surface tension of 32 mN/m (32 dynes/cm.), as measured above.

Example 3

In a fountain solution containing 14.9 g/l (2 oz./gallon) of the fountain solution concentrate of Example 1 and 5% by volume of the fountain solution of isopropanol, the addition of 29.8 g/l (4 oz./gallon) of an aqueous solution containing by weight 8.3% 3,5-dimethyl-1-hexyn-3-ol, 8.3% 2,4,7,9-tetramethyl-5-decyne-4,7-diol, 17.5% sodium cumene sulfonate, 17.5% ammonium xylene sulfonate and 48.4% water gave a wide water balance of 65 notches to 85 notches with a dynamic surface tension of 28 mN/m (28 dynes/cm.), as measured above. Without the addition of hydrotropes the water balance was 80 to 90 notches with a dynamic surface tension of 31 mN/m (31 dynes/cm), as measured above.

Example 4

A solvent-free fountain solution was prepared containing 18.7 g/l (2 1/2 oz./gallon) of the fountain solution concentrate of Example 1 and 29.8 g/l (4 oz./gallon) of an aqueous solution containing 38.6% by weight ammonium xylene sulfonate, 4.5% by weight 3,5-dimethyl-1-hexyn-3-ol and 3.5% by weight of 2,4,7,9-tetramethyl-5-decyne-4,7-diol and 53.4% by weight water.

The water balance was 75-85 notches with catchup at 70 on a Dahlgren dampening system. The dynamic surface tension was 30.5 mN/m (30.5 dynes/cm), as measured above.

Example 5

A fountain solution concentrate was prepared containing 90% by weight of sodium toluene sulfonate (42% by weight aqueous solution) and 10% by weight 2,4,7,9-tetramethyl-5-decyne-4,7-diol. A fountain solution containing 22.4 g/l (3 oz./gallon) of the concentrate was run on a Chambon Press using a Dahlgren type dampening system. Inks of the various colors (cyan, magenta, yellow and black) all ran well on the lithographic press. The dynamic surface tension of the fountain solution was 31 mN/m (31 dynes/cm) as measured above.

Claims

1. A fountain solution composition comprising water, a surfactant and a hydrotrope characterised in that the

surfactant is a non-ionic surfactant chosen from block copolymers, ethoxylated acetylenic carbinols, 3,5-dimethyl-1-hexyn-3-ol and 2,4,7,9-tetramethyl-5-decyne-4,7 diol and the hydrotrope is a salt of a hard acid-soft base or of a soft acid-hard base and which is chosen from sodium toluene sulfonate, sodium xylene sulfonate, sodium cumene sulfonate, ammonium xylene sulfonate, tetrabutyl ammonium hydrogen sulfonate, tetraphenyl phosphonium bromide, tetrabutyl ammonium bromide, cetyl trimethyl ammonium bromide, sodium thiocyanate and mixtures thereof and which is present in an amount effective to increase the solubility of the surfactant in the fountain solution.

2. A composition according to claim 1 wherein the ratio of hydrotrope:surfactant is within the range of 1:1 to 10:1 by weight, preferably 4:1 to 6:1 by weight.
3. A composition according to claim 1 or claim 2 wherein the addition of hydrotrope reduces the dynamic surface tension as measured at a surface age of 200 milliseconds of the resultant fountain solution by at least 5mN/m (5 dynes/cm) to a dynamic surface tension of less than 40mN/m (40 dynes/cm) and preferably by at least 10mN/m (10 dynes/cm) to a dynamic surface tension of 28 to 35 mN/m (28 to 35 dynes/cm).
4. A composition according to any preceding claim wherein the hydrotrope does not increase the HLB value of the resultant fountain solution.
5. A composition according to any preceding claim in which the hydrotrope is an electrolyte comprising an inorganic ion and an organic ion.
6. A composition according to any preceding claim further comprising an alcohol replacement, preferably chosen from 2-butoxy ethanol, n-hexoxyethanol, ethylene glycol, 2-ethyl-1,3-hexane diol and mixtures thereof.
7. A composition according to any preceding claim further comprising less than 5% of alcohol.
8. A composition according to any preceding claim further comprising one or more additives selected from a protective colloid (preferably gum arabic or cellulose gum), an acid or a biocide.
9. The use of a hydrotrope to reduce the dynamic surface tension of an aqueous fountain solution containing a non-ionic surfactant chosen from block copolymers, ethoxylated acetylenic carbinols, 3,5-dimethyl-1-hexyn-3-ol and 2,4,7,9-tetramethyl-5-decyne-4,7-diol by adding to a fountain solution an amount of hydrotrope effective to increase the solubility of the non-ionic surfactant and the hydrotrope

is a salt of a hard acid-soft base or of a soft acid-hard base and is chosen from sodium toluene sulfonate, sodium xylene sulfonate, sodium cumene sulfonate, ammonium xylene sulfonate, tetrabutyl ammonium hydrogen sulfonate, tetraphenyl phosphonium bromide, tetrabutyl ammonium bromide, cetyl trimethyl ammonium bromide, sodium thiocyanate and mixtures thereof.

10. The use of a hydrotrope according to claim 9 in which the resultant fountain solution is a composition according to any of claims 1 to 8.
11. An offset lithographic printing process using a planographic plate that is treated during the process with a fountain solution, characterised in that the fountain solution is a fountain solution according to any of claims 1 to 8.

Patentansprüche

1. Feuchtwasserlösungszusammensetzung, enthaltend Wasser, ein oberflächenaktives Mittel und ein Hydrotrop, dadurch **gekennzeichnet**, daß das oberflächenaktive Mittel ein nicht-ionisches oberflächenaktives Mittel, ausgewählt aus Block-Copolymeren, ethoxylierten acetylenischen Carbinolen, 3,5-Dimethyl-1-hexin-3-ol und 2,4,7,9-Tetramethyl-5-decin-4,7-diol ist, das Hydrotrop ein Salz einer harten Säure - weichen Base oder einer weichen Säure - harten Base ist, welches aus Natriumtoluolsulfonat, Natriumxyloisulfonat, Natriumcumolsulfonat, Ammoniumxyloisulfonat, Tetrabutylammoniumhydrogensulfonat, Tetraphenylphosphoniumbromid, Tetrabutylammoniumbromid, Cetyltrimethylammoniumbromid, Natriumthiocyanat und Gemischen davon ausgewählt ist, und das in einer Menge vorliegt, die wirksam ist, die Löslichkeit des oberflächenaktiven Mittels in der Feuchtwasserlösung zu erhöhen.
2. Zusammensetzung nach Anspruch 1, dadurch **gekennzeichnet**, daß das Verhältnis Hydrotrop:oberflächenaktives Mittel im Bereich von 1:1 bis 10:1, bezogen auf das Gewicht, bevorzugt 4:1 bis 6:1, bezogen auf das Gewicht, liegt.
3. Zusammensetzung nach Anspruch 1 oder 2, dadurch **gekennzeichnet**, daß die Zugabe des Hydrotrops die dynamische Oberflächenspannung, gemessen bei einem Oberflächenalter von 200 Millisekunden der entstandenen Feuchtwasserlösung, um mindestens 5 mN/m (5 dyn/cm) auf eine dynamische Oberflächenspannung von weniger als 40 mN/m (40 dyn/cm) und bevorzugt um mindestens 10 mN/m (10 dyn/cm) auf eine dynamische Oberflächenspannung von 28 bis 35 mN/m (28 bis 35 dyn/cm) vermindert.

4. Zusammensetzung nach einem der vorausgehenden Ansprüche, dadurch **gekennzeichnet**, daß das Hydrotrop den HLB-Wert der entstandenen Feuchtwasserlösung nicht erhöht.
5. Zusammensetzung nach einem der vorausgehenden Ansprüche, dadurch **gekennzeichnet**, daß das Hydrotrop ein Elektrolyt mit einem anorganischen und einem organischen Ion ist.
6. Zusammensetzung nach einem der vorausgehenden Ansprüche, dadurch **gekennzeichnet**, daß sie weiterhin einen Alkoholversatz, bevorzugt ausgewählt aus 2-Butoxyethanol, n-Hexoxyethanol, Ethylenglykol, 2-Ethyl-1,3-hexandiol und Gemischen davon enthält.
7. Zusammensetzung nach einem der vorausgehenden Ansprüche, dadurch **gekennzeichnet**, daß sie weiterhin weniger als 5 % Alkohol enthält.
8. Zusammensetzung nach einem der vorausgehenden Ansprüche, dadurch **gekennzeichnet**, daß sie weiterhin eines oder mehrere Additive, ausgewählt aus einem Schutzkolloid (bevorzugt Gummi-Arabicum oder Zellulose-Gummi), einer Säure oder einem Biozid enthält.
9. Verwendung eines Hydrotroops, um die dynamische Oberflächenspannung einer wäßrigen Feuchtwasserlösung, die ein nicht-ionisches oberflächenaktives Mittel, ausgewählt aus Block-Copolymeren, ethoxylierten acetylenischen Carbinolen, 3,5-Dimethyl-1-hexin-3-ol und 2,4,7,9-Tetramethyl-5-decin-4,7-diol, enthält, zu reduzieren, indem man einer Feuchtwasserlösung eine Menge eines Hydrotroops zusetzt, die wirksam ist, die Löslichkeit des oberflächenaktiven Mittels zu erhöhen, und wobei das Hydrotrop ein Salz einer harten Säure - weichen Base oder einer weichen Säure harten Base ist, und aus Natriumtoluolsulfonat, Natriumxylolsulfonat, Natriumcumolsulfonat, Ammoniumxylolsulfonat, Tetrabutylammoniumhydrogensulfonat, Tetraphenylphosphoniumbromid, Tetrabutylammoniumbromid, Cetyltrimethylammoniumbromid, Natriumthiocyanat und Gemischen davon ausgewählt wird.
10. Verwendung eines Hydrotroops nach Anspruch 9, dadurch **gekennzeichnet**, daß die entstandene Feuchtwasserlösung ein Mittel nach einem der Ansprüche 1 bis 8 ist.
11. Offset-lithographisches Druckverfahren unter Verwendung einer planographischen platte, die während des Verfahrens mit einer Feuchtwasserlösung behandelt wird, dadurch **gekennzeichnet**, daß die Feuchtwasserlösung eine Feuchtwasserlösung nach einem der Ansprüche 1 bis 8 ist.

Revendications

1. Composition de solution de mouillage comprenant de l'eau, un agent tensio-actif et un agent hydro-tropique, caractérisée en ce que l'agent tensio-actif est un agent tensio-actif non-ionique choisi parmi les copolymères séquencés, les carbinols acétyléniques éthoxylés, le 3,5-diméthyl-1-hexyne-3-ol et le 2,4,7,9-tétraméthyl-5-décyne-4,7-diol et l'agent hydro-tropique est un sel d'un acide fort avec une base faible ou d'un acide faible avec une base forte, qui est choisi parmi les toluènesulfonate de sodium, xylènesulfonate de sodium, cumènesulfonate de sodium, xylènesulfonate d'ammonium, hydrogènesulfonate de tétrabutylammonium, bromure de tétraphénylphosphonium, bromure de tétrabutylammonium, bromure de cetyltriméthylammonium, thiocyanate de sodium et leurs mélanges, et qui est présent selon une quantité efficace pour augmenter la solubilité de l'agent tensioactif dans la solution de mouillage.
2. Composition suivant la revendication 1, dans laquelle le rapport pondéral agent hydro-tropique/agent tensio-actif se situe dans la gamme de 1/1 à 10/1, de préférence de 4/1 à 6/1.
3. Composition suivant la revendication 1 ou la revendication 2, dans laquelle l'addition de l'agent hydro-tropique diminue la tension superficielle dynamique mesurée à un âge surfacique de 200 millisecondes de la solution de mouillage résultante, d'au moins 5 mN/m (5 dynes/cm) jusqu'à une tension superficielle dynamique inférieure à 40 mN/m (40 dynes/cm), et de préférence d'au moins 10 mN/m (10 dynes/cm) jusqu'à une tension superficielle dynamique de 28 à 35 mN/m (28 à 35 dynes/cm).
4. Composition suivant l'une quelconque des revendications précédentes, dans laquelle l'agent hydro-tropique n'augmente pas la valeur de l'équilibre hydrophile/lipophile de la solution de mouillage résultante.
5. Composition suivant l'une quelconque des revendications précédentes, dans laquelle l'agent hydro-tropique est un électrolyte comprenant un ion minéral et un ion organique.
6. Composition suivant l'une quelconque des revendications précédentes, comprenant en outre un remplacement alcool qui, de préférence, est choisi parmi les 2-butoxyéthanol, n-hexyloxyéthanol, éthylèneglycol, 2-éthyl-1,3-hexanediol et leurs mélanges.
7. Composition suivant l'une quelconque des revendications précédentes, comprenant en outre moins de 5 % d'alcool.

8. Composition suivant l'une quelconque des revendications précédentes, comprenant en outre un ou plusieurs additifs choisis parmi un colloïde protecteur (de préférence la gomme arabique ou la gomme cellulosique), un acide ou un biocide. 5
9. Utilisation d'un agent hydrotropique pour diminuer la tension superficielle dynamique d'une solution de mouillage aqueuse contenant un agent tensio-actif non ionique choisi parmi les copolymères séquencés, les carbinols acétyléniques éthoxylés, le 3,5-diméthyl-1-hexyne-3-ol et le 2,4,7,9-tétraméthyl-5-décyne-4,7-diol et par addition à une solution de mouillage d'une quantité efficace d'agent hydrotropique pour augmenter la solubilité de l'agent tensio-actif non ionique, ledit agent hydrotropique étant un sel d'un acide fort avec une base faible ou d'un acide faible avec une base forte, qui est choisi parmi les toluènesulfonate de sodium, xylènesulfonate de sodium, cumènesulfonate de sodium, xyléanasulfonate d'ammonium, hydrogénosulfonate de tétrabutylammonium, bromure de tétraphénylphosphonium, bromure de tétrabutylammonium, bromure de cétyltriméthylammonium, thiocyanate de sodium et leurs mélanges. 10
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10. Utilisation suivant la revendication 9, dans laquelle la solution de mouillage résultante est une composition selon l'une quelconque des revendications 1 à 8. 30
11. Procédé d'impression lithographique offset utilisant une plaque planographique qui est traitée lors de la mise en oeuvre du procédé avec une solution de mouillage, ledit procédé étant caractérisé en ce que la solution de mouillage est une solution de mouillage selon l'une quelconque des revendications 1 à 8. 35
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