

# SOLUTIONS: PULP AND PAPER

## MATERIAL RECOMMENDATIONS FOR TYPICAL PULP AND PAPER CHEMICALS

Chemical Name	Chemical Formula	Purpose	Pipe Recommendation
Agalite or Talc (Silicate of Magnesia)	MgO - 32% SiO <sub>2</sub> - 42%	Helps to provide a greasy/soapy feel to the paper and improves the finishing.	- Chem Proline <sup>®</sup>
AKD (Alkyl Ketene Dimer)	C <sub>4</sub> H <sub>4</sub> O <sub>2</sub>	Sizing agent	- Chem Proline <sup>®</sup>
Alabaster or Annaline (Anhydrate Calcium Sulfate)	CaSO <sub>4</sub>	Paper loading material	- Chem Proline <sup>®</sup>
Alginic Acid (Alginic Acid or Na-Alginate)	Na(C <sub>6</sub> H <sub>8</sub> O <sub>6</sub> ) <sub>n</sub>	Coating and surface treatment	- Chem Proline <sup>®</sup>
Alum (Sulfate of Alumina)	Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> · 18H <sub>2</sub> O	Alkaline sizing (in conjunction with Rosin)	- Chem Proline <sup>®</sup>
Albarine (Natural Sulfate of Lime)	CaSO <sub>4</sub> · 2H <sub>2</sub> O - 100%	A variety of purposes, including building materials	- Chem Proline <sup>®</sup> - PRO150 <sup>®</sup> >120° F
Animal Glue	-	Pigment coating binder	- Chem Proline <sup>®</sup> - PRO150 <sup>®</sup> >120° F
Barium Carbonate	BaCO <sub>3</sub>	Pigment for coating	- Chem Proline <sup>®</sup> - PRO150 <sup>®</sup> >120° F
Barium Sulfate (blanc fix, fast white, pearl white, or permanent white)	BaSO <sub>4</sub>	A filler as well as a pigment for coating	- Chem Proline <sup>®</sup> - PRO150 <sup>®</sup> >120° F
Casein	-	Pigment coating binder	- Chem Proline <sup>®</sup> - PRO150 <sup>®</sup> >120° F

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Chlorine Dioxide	$\text{ClO}_2$	Used in pulp bleaching	- For $\leq 60\%$ concentration at $80^\circ\text{C}$ : Ultra Proline <sup>®</sup>
Chlorine Gas (Chlorine)	$\text{Cl}_2$	Used in pulp bleaching and water treatment	N/A
Clay or Kaolin (Kaolinite)	$\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$	Filler	- Chem Proline <sup>®</sup>
Dolomite (Calcium Magnesium Carbonate)	$\text{CaMg}(\text{CO}_3)_2$	Filler and coating	- Chem Proline <sup>®</sup> - Proline <sup>®</sup> PRO150 $>120^\circ\text{F}$
DTPA (Diethylene Triamine Penta Acetate or Pentetic Acid)	$\text{C}_{14}\text{H}_{33}\text{N}_3\text{O}_{10}$	Chelation (removal of transition metals from pulp)	- Chem Proline <sup>®</sup> - PRO150 <sup>®</sup> $>120^\circ\text{F}$
EDTA (Ethylene Diamine Tetra Acetic Acid)	$\text{C}_{10}\text{H}_{16}\text{N}_2\text{O}_8$	Chelation (removal of transition metals from pulp)	<i>Concentration/temperature dependent</i> - Chem Proline <sup>®</sup> - Proline <sup>®</sup> PRO150 - Super Proline <sup>®</sup>
Enzyme	-	Used in deinking	- Chem Proline <sup>®</sup> - Proline <sup>®</sup> PRO150
FSA (Formamidine Sulphuric Acid or Thiourea Dioxide)	$\text{CH}_4\text{N}_2\text{SO}_2$	Post-deinking bleaching	- Chem Proline <sup>®</sup> - Proline <sup>®</sup> PRO150
Guar Gum (Natural Polymer)	-	Dry strength additive	N/A
Gypsum or Mineral White or Plaster (Natural Sulfate of Lime)	$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$	Gypsum board	Application dependent
Hydrogen Peroxide	$\text{H}_2\text{O}_2$	Used in bleaching	- Low Conc.: Chem Proline <sup>®</sup> or Proline <sup>®</sup> PRO150 <sup>®</sup> - High Conc.: Super Proline <sup>®</sup> or Ultra Proline <sup>®</sup>
Hypochlorous Acid	$\text{HOCl}$	Used in pulp bleaching	- Chem Proline <sup>®</sup> - Proline <sup>®</sup> PRO150

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Lime (Calcium Oxide)	CaO	Alkaline pulping process chemical recovery, as well as bleaching	- Chem Proline <sup>®</sup>
Lime Stone (Calcium Carbonate)	CaCO <sub>3</sub>	Used to make precipitated CaCO <sub>3</sub> , used as filler, and used in coating	- Chem Proline <sup>®</sup>
Magnesium Bisulfite	Mg(HSO <sub>3</sub> ) <sub>2</sub>	Used in sulfite pulping	- Ultra Proline <sup>®</sup>
Magnesite (Magnesium Carbonate)	MgCO <sub>3</sub> - 100%	Filler for cigarette paper	- Chem Proline <sup>®</sup> - Proline <sup>®</sup> PRO150 - Super Proline <sup>®</sup>
Milk of Lime (Calcium Hydroxide)	Ca(OH) <sub>2</sub>	Used in causticizing of green liquor	- Chem Proline <sup>®</sup> - Proline <sup>®</sup> PRO150
Milk of Magnesia (Magnesium Hydroxide)	Mg(OH) <sub>2</sub>	Increased efficiency in lignin oxidation phase, alkaline extraction phase, and for bleaching with peroxide	- Chem Proline <sup>®</sup> - Proline <sup>®</sup> PRO150
Oxygen	O <sub>2</sub>	Used in bleaching	- Air-Pro <sup>®</sup>
Ozone	O <sub>3</sub>	Used in pulp bleaching	- Chem Proline <sup>®</sup> - Super Proline <sup>®</sup>
PVA (Polyvinyl Alcohol)	[CH <sub>2</sub> CH(OH)] <sub>n</sub>	Pigment coating binder	- Chem Proline <sup>®</sup> - Proline <sup>®</sup> PRO150
Rosin (Abietic Acid)	C <sub>19</sub> H <sub>29</sub> COOH	Sizing agent	- Chem Proline <sup>®</sup> - Proline <sup>®</sup> PRO150
Rosin Soap (Sodium Abietate)	C <sub>19</sub> H <sub>29</sub> COONa	Sizing agent	- Chem Proline <sup>®</sup> - Proline <sup>®</sup> PRO150
Salt Cake (Sodium Sulfate)	Na <sub>2</sub> SO <sub>4</sub> · 10H <sub>2</sub> O	A makeup chemical used in sulfate pulping chemical recovery	- Chem Proline <sup>®</sup> - Proline <sup>®</sup> PRO150 - Super Proline <sup>®</sup>

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Satin	$3\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 3\text{CaSO}_4 \cdot 31\text{H}_2\text{O}$	Used for pigmentation	- Chem Proline® - Proline® PRO150
Soap / Fatty Acid	-	Used in deinking	- Chem Proline® - Proline® PRO150
Soda Ash (Sodium Carbonate)	$\text{NaHSO}_3$	A makeup chemical used in alkaline pulping chemical recovery	- Chem Proline® - Proline® PRO150 - Super Proline®
Sodium Aluminate	$\text{Na}_2\text{Al}_2\text{O}_4$	Used to control pH in conjunction with Alum	- Super Proline® - Ultra Proline®
Sodium Bisulfate	$\text{NaHSO}_4$	Used in sulfite pulping	- Chem Proline® - Ultra Proline®
Sodium Bisulfite	$\text{NaHSO}_3$	Used to neutralize residual chlorine in the pulp during the bleaching process	- Chem Proline® - Proline® PRO150
Sodium Chlorate	$\text{NaClO}_3$	Used to generate chlorine dioxide	- Ultra Proline®
Sodium Dithionite (Sodium Hydrosulfite)	$\text{Na}_2\text{S}_2\text{O}_4$	Bleaching	- Chem Proline® - Proline® PRO150 - Super Proline®
Sodium Hypochlorite	$\text{NaOCl}$	Bleaching	- Chem Proline®
Sodium Peroxide	$\text{Na}_2\text{O}_2$	Bleaching	- Chem Proline®
Sodium Silicate	$\text{Na}_2\text{SiO}_3$	Used in wastepaper deinking for wetting, peptization, ink dispersion, and peroxide stabilization	- Chem Proline® - Proline® PRO150
Sodium Sulfide	$\text{Na}_2\text{S}$	Active chemical in kraft/sulfate cooking liquor	- Chem Proline® - Proline® PRO150

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Sodium Thiosulfate	$\text{Na}_2\text{S}_2\text{O}_3$	Bleaching	- Chem Proline® - Proline® PRO150 - Super Proline®
Sodium Tripolyphosphate	$\text{Na}_5\text{P}_3\text{O}_{10}$	Dispersant	- Chem Proline® - Proline® PRO150 - Super Proline®
Starch	-	Comprised of glycosides, used as a wet- and dry-end additive	- Chem Proline® - Proline® PRO150
Sulfur	S	To make HSO3 for bisulfite pulping	<i>Application dependent</i>
Surfactant	-	Used in deinking and as de-bonders in fluff pulp manufacture	- Chem Proline® - Proline® PRO150
Titania (Titanium Dioxide)	$\text{TiO}_2$	Used as a filler to increase the opacity and brightness of paper, and also used in coating	<i>Application dependent</i>
Anatase (Titanium Dioxide)	$\text{TiO}_2$	Grade of titanium oxide paper coating pigment that is water dispersible	<i>Application dependent</i>
Zinc Hydrosulfite	$\text{ZnS}_2\text{O}_4$	Bleaching	- Chem Proline® - Proline® PRO150 - Super Proline®
Zinc Sulfide	ZnS	Pigmenting	- Chem Proline® - Proline® PRO150 - Super Proline®
Zinc White	ZnO	Pigmenting	- Chem Proline® - Proline® PRO150 - Super Proline®

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