AQUAMAG®

Magnesium Hydroxide Slurry

Used for ONP/OMG Deinking

Introduction

A suitable use for AQUAMAG® can be found in deinking of old newsprint and magazines. It has been shown that excellent results can be achieved with low alkaline deinking with magnesium hydroxide as the sole source of alkalinity. In addition to significant chemical cost savings, the benefits of low alkaline deinking include lower stickies production, improved machine runnability, and lower COD generation in the mill effluent.

AQUAMAG®

On a pound for pound basis AQUAMAG® provides 27% more alkalinity than caustic soda.

The stoichiometry of AQUAMAG® is as follows:

$Mg(OH)_2 \rightarrow Mg^{2+} + 2\ OH^-$
Molecular weight $Mg(OH)_2 = 58.3$
$2\ NaOH \rightarrow 2\ Na^+ + 2\ OH^-$
Molecular weight NaOH = 80
1lb NaOH is equiv. to 0.73 lb's of $Mg(OH)_2$
1lb $Mg(OH)_2$ is equiv. to 1.37 lb's of NaOH

Comparison of Baseline Chemical dosages

Typical Alkaline Pulper Chemistry
NaOH - 0.9%
H_2O_2 - 1.0%
Na_2SiO_3 - 1.5%
NI Surfactant / FA – 0.2% / 0.6%

Low Alkaline Pulper Chemistry
$Mg(OH)_2$ - 0.1%
H_2O_2 – 0.5%
Na_2SiO_3 - 1.0%
NI Surfactant / FA – 0.2% / 0.6%

Lower chemical costs are achieved with the elimination of caustic soda and the reduction of hydrogen peroxide. Reduction of sodium silicate would be possible with a chemistry including AQUAMAG®. AQUAMAG® is a buffered source of alkalinity as well as being effective in preventing metal catalyzed peroxide decomposition. These are two of the functions that sodium silicate is well known for.

Caustic soda is very reactive and will disassociate into the hydroxide ion (OH-) almost instantaneously. This rapid dissociation, leads to alkaline darkening of the fibre thus requiring high dosages of hydrogen peroxide to counteract the alkaline darkening. AQUAMAG® is initially less reactive, due to its lower solubility, and only initially disassociates some hydroxide ions. Under the presence of hydrogen peroxide, AQUAMAG® progressively disassociates its hydroxide ions leading to less alkaline darkening and a reduced demand for peroxide.

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From mill data, we learn that it is possible to still get good ink detachment from the fibre using AQUAMAG® as an alkali source. Hyperwash ERIC values of < 100 were regularly achieved demonstrating very good ink detachment from the fibre. Mill data also shows a reduction in b* value (alkaline darkening) when using low alkaline pulping.

Stickies and COD

It has been well documented that reducing the alkalinity of the pulper generates less stickies and COD in the mill effluent. The high pH pulper environment encountered with traditional alkaline deinking can extract organics from the fibre and cause a high COD loading on mill effluent. Similarly, the high pH environment can also extract organics from glues and bindings found in the wastepaper causing sticky deposits on equipment and papermachines. The reduction in extracted organics leads to improved cleanliness on the papermachine reducing downtime and improving runnability.

Conclusions

AQUAMAG® low alkaline deinking provides a cost effective chemistry for deinking old newsprint and magazines. In addition to the benefits of lower chemical costs the low alkaline deinking generates less stickies and COD, greatly impriving the performance and runnability of the papermachine.