

# Acid Neutralization: Alkali Cost Savings & Reduced Health and Safety Concerns

## Case Study



**Company:** Sofix LLC  
**Location:** Chattanooga, TN  
**Owner:** NAGASE & CO., LTD  
**Engineer:** Paul Cahill

### ABOUT THE COMPANY

Sofix LLC is an organic specialty chemical manufacturer, producing a range of color formers for the thermal paper industry. Their production plant utilizes magnesium hydroxide for pH and alkalinity control during the neutralization of excess sulfuric acid.

### PROCESS

Excess sulfuric acid is dispatched into a neutralization tank where magnesium hydroxide is introduced. While the dosing technique is temperature-dependent, the AlkapHix<sup>®</sup> is pumped into the system until the pH reaches between 3 and 5. Once the pH increases to between 5 and 5.5, the batch is rinsed, which is enough to bring the pH between 6 and 8. The treated solution is then pumped out into a flume.

### PROJECT SUMMARY

#### APPLICATION

Thermal paper color formers

#### PROCESS

Acid neutralization by means of AlkapHix<sup>®</sup> addition

#### CHALLENGE

The price of caustic soda reached an economically unfeasible point, which would lower profitability

#### GOAL

Find a replacement alkali source that produces the same desired results at a lower cost

#### SOLUTION

AlkapHix<sup>®</sup> provides desirable results at a fair price, with the perk of easing operations and reducing employee health & safety concerns



## PROCESS CONDITIONS

### CHALLENGE

In 2011, Sofix concluded that the cost per pound of caustic soda was no longer economically feasible to utilize as an alkalinity source for pH control within their plant operations. If they were going to continue neutralizing excess sulfuric acid, an alternative material would be the optimal solution.

### SOLUTION

The replacement of caustic soda, NaOH, with magnesium hydroxide, Mg(OH)<sub>2</sub>, resulted in an average cost savings of 55%, per dry pound, while achieving the desired 6-8 pH range and alkaline stability.

### BENEFITS

- ◆ A cost savings average of 55%, per dry pound
- ◆ Provides a very similar process to that of caustic soda –making for an easy transition and ongoing operational process
- ◆ Yields a large window to hit your neutralization point, resulting in little-to-no adjustments
- ◆ Requires less raw water cooling due to the significant decrease in the heat of reaction

### AlkapHix®: Acid RATIO

~400 gal Mg(OH)<sub>2</sub> : 1500 gal H<sub>2</sub>SO<sub>4</sub>

### PERCENT SOLUTION OF ACID

30%, by volume, H<sub>2</sub>SO<sub>4</sub>

pH, INITIAL: ≤1

pH, LINE BLOW OUT: 5–5.5

pH, FINAL: 6–8

### AlkapHix® SLURRY STORAGE

A 7,000-gal storage tank installed with a centrifugal pump to pull directly from the bottom of the tank. Agitation is continuous in order to keep slurry in suspension.





# Alkali Safety & Hazard Comparison

	MAGNESIUM HYDROXIDE	SODIUM HYDROXIDE
CHEMICAL FORMULA	Mg(OH) <sub>2</sub>	NaOH
ALIAS	Milk of Magnesia Mineral Brucite	Caustic Soda Lye
CAUSTIC/CORROSIVE	<b>NO</b>	<b>YES</b>
EYE DAMAGE	<b>NO</b>	<b>YES</b>
SKIN IRRITANT	<b>NO</b>	<b>YES</b>
INHALATION HAZARD	<b>NO</b>	<b>YES</b>
ORAL HAZARD	<b>NO</b>	<b>YES</b>
HAZARD SYMBOL	<b>NONE</b>	
NFPA HAZARD RATING		

## BENEFITS

- ◆ The handling of magnesium hydroxide is much safer than that of sodium hydroxide
- ◆ Alleviation from freezing and plugged-line problems due to magnesium hydroxide having a lower freezing point
- ◆ Elimination of offset corrections in the event of an overdose. Mg(OH)<sub>2</sub> is a low-soluble alkaline that peaks at a pH of 8, if overdosing occurs

*AlkapHix® is a high purity magnesium hydroxide that is designed to support your application with the necessary pH control and additional alkalinity while providing consistent reactivity.*

*It is a nontoxic alternative for acid neutralization treatment and many other industrial processes.*



- Technical Data Sheets
- Safety Data Sheets
- Applications



- ✓ Acid Neutralization
- ✓ Municipal Wastewater Treatment
- ✓ Industrial Wastewater Treatment



- 50 lb Bags
- Full Pallet
- Bulk Bags
- Bulk Pneumatic
- Rail



- Totes
- Bulk Tanker





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Contact us any time  
for a Free Sample!

## Manufacturing Locations

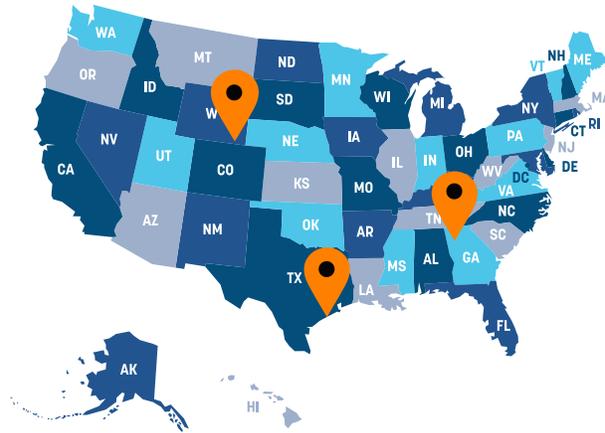
Cheyenne, WY



Crandall, GA



Houston, TX



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