

# ECOMAG<sup>®</sup>

## Magnesium Hydroxide Suspension

### Product Description

A *safe* aqueous suspension of magnesium hydroxide for *cost effective* neutralisation and heavy metal removal from wastewater streams.

### Principal Benefits of Mg(OH)<sub>2</sub> Compared to Other Alkalis

- ◆ SAFE HANDLING
- ◆ COST EFFECTIVE
- ◆ BUFFERED pH CONTROL
- ◆ MICROBIOLOGICAL TREATMENT
- ◆ LOWER SLUDGE VOLUME
- ◆ NEUTRALISATION OF SULPHATE WASTES

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## SAFE HANDLING

ECOMAG<sup>®</sup> suspension is a non-hazardous, non-corrosive alkali. Magnesium hydroxide is a weak base and can be handled with the minimum of safety precautions and protective equipment. ECOMAG<sup>®</sup> suspension has a freezing point of 0°C compared to 12°C for 48% NaOH. Hence, there is no need for heated storage facilities and lagged pipelines.

## COST EFFECTIVE

ECOMAG<sup>®</sup> is a more cost-effective solution for many pH neutralisations than either Caustic Soda or Lime. Less ECOMAG<sup>®</sup> is required to neutralise acidic streams.

**Table 1: Neutralisation of Sulphuric Acid**

Mg(OH) <sub>2</sub> 58.3kg	+	H <sub>2</sub> SO <sub>4</sub> 98kg	→	MgSO <sub>4</sub> 120.3kg	+	2H <sub>2</sub> O
2NaOH 80kg	+	H <sub>2</sub> SO <sub>4</sub> 98kg	→	Na <sub>2</sub> SO <sub>4</sub> 142kg	+	2H <sub>2</sub> O
Ca(OH) <sub>2</sub> 74kg	+	H <sub>2</sub> SO <sub>4</sub> 98kg	→	CaSO <sub>4</sub> . 2H <sub>2</sub> O↓ 172kg		
Na <sub>2</sub> CO <sub>3</sub> 106kg	+	H <sub>2</sub> SO <sub>4</sub> 98kg	→	Na <sub>2</sub> SO <sub>4</sub> 142kg	+	2H <sub>2</sub> O + CO <sub>2</sub>

1Kg of ECOMAG<sup>®</sup> has the same neutralising capacity as 1.27kg of Lime (Ca(OH)<sub>2</sub>), 1.37kg of Caustic Soda (NaOH) and 1.82kg of Soda Ash (Na<sub>2</sub>CO<sub>3</sub>).

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## BUFFERED pH CONTROL

ECOMAG<sup>®</sup> suspension has a natural buffering effect at pH 9 – 10 in most effluent streams. This means that an accidental overdose will not increase the pH above this value, unlike Lime and Caustic Soda where the pH will rise to 12 and 14 respectively.

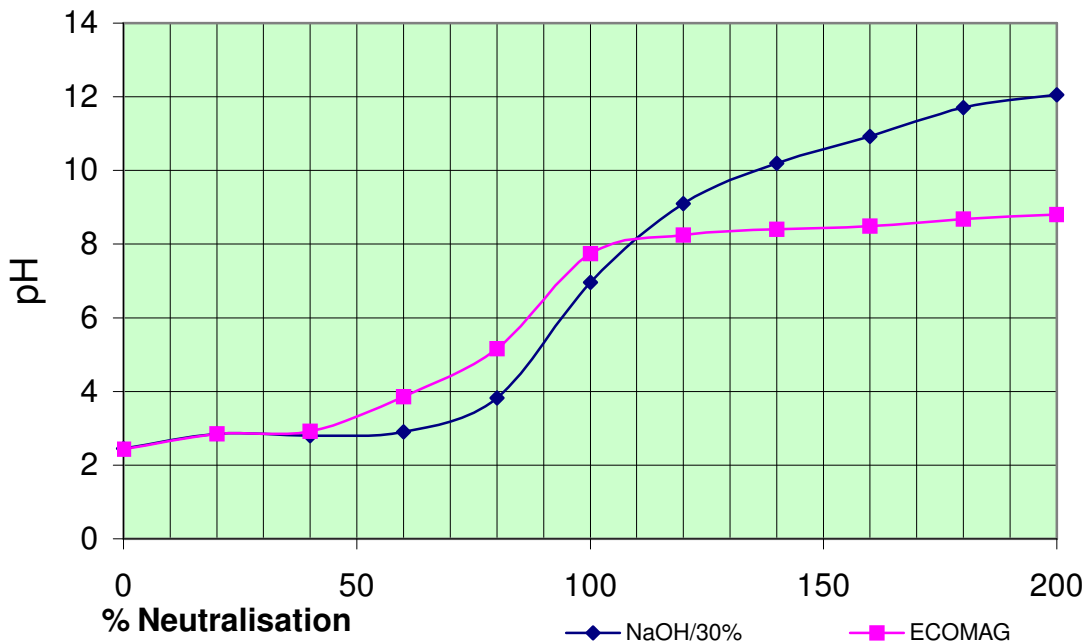


Figure 1: pH against % Neutralisation

## MICROBIOLOGICAL TREATMENT

The inherent buffering capacity of  $Mg(OH)_2$  is useful for controlling the pH of effluent streams containing organic waste. Aerobic and anaerobic digesters need pH control at approximately 9.0, which is particularly suited to ECOMAG<sup>®</sup>.

The higher pH values resulting from an overdose of either Lime or Caustic Soda would severely disrupt the operation of these digesters.

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## LOWER SLUDGE VOLUME

ECOMAG<sup>®</sup> suspension neutralises acidic effluents more slowly than other alkalis leading to the precipitation of larger crystals which settle to a denser, more compact sludge. This sludge, when filtered, produces a drier residue for disposal resulting in lower disposal costs.

By contrast, Lime and Caustic Soda produce lighter, gel-like precipitates composed of smaller particles, which are difficult to settle and filter.

## HEAVY METAL REMOVAL

Magnesium hydroxide is as effective at removing dissolved metals from water streams as either Lime or Caustic Soda. The lower sludge volumes generated are another advantage of Mg(OH)<sub>2</sub> over the more traditional alkalis. Table 2 illustrates the effectiveness of ECOMAG<sup>®</sup> for metal removal in a sample of mine “run-off” water.

**Table 2: Metal Removal using ECOMAG<sup>®</sup>**

Element	Initial Concentration (mg/l)	Final Concentration (mg/l)
Sulphur	549	530
Zinc	84	<0.1
Cadmium	0.24	<0.1
Lead	1.5	<0.1
Cobalt	0.21	<0.1
Iron	104	<0.1
Manganese	6	1
Copper	10	<0.1
Aluminium	161	<0.5

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## NEUTRALISATION OF SULPHATE WASTES

Using Lime to treat a sulphate containing waste results in the production of insoluble Calcium Sulphate ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ). Magnesium sulphate is, on the other hand, 100 times more soluble than Calcium Sulphate, which coats the Lime particles reducing their availability for reaction.  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$  also causes scaling problems in pipelines.

## TREATMENT OF PHOSPHATE WASTES

Some studies have suggested that magnesium hydroxide is effective at removing dissolved phosphates from aqueous streams.

## PRODUCT DELIVERY AND STORAGE

ECOMAG<sup>®</sup> is available in bulk tankers at a concentration of approximately 40 - 50%  $\text{Mg}(\text{OH})_2$  solids.