



PRODUCT NAME: Calcium Chloride Flake  
PRODUCT CODE: CALCHLF  
COMMODITY CODE: 25201000  
COUNTRY OF ORIGIN: UNITED KINGDOM  
PACKAGING: 25 KG BAG

## TECHNICAL INFORMATION SHEET

### CALCIUM CHLORIDE FLAKE - LIQUOR TREATMENT

#### Description

CALCIUM CHLORIDE FLAKE is a salt used to increase mineral content of brewing liquor to produce the desired beer characteristics.

#### Benefits

- Reduces the pH during mashing and wort boiling which improves enzyme activity
- Promotes the precipitation of unwanted proteins in the kettle, hop back or whirlpool
- Improves health and vigour of the yeast
- Improves extract yield and fermentability
- Reduces risk of infection
- Reduces extraction of undesirable silicates, tannins and polyphenols
- Reduces beer stone and can prevent gushing in beer
- Improves beer fining performance
- Promotes head retention on beer
- Adds chloride which ensures correct balance of salts for beer flavour and sweetness

#### Principle

The objective of liquor treatment is to convert your water supply into acceptable brewing liquor.

|            | Bitter  | Strong Bitter | Lager ( 65°C) | Porter  | Mild    | Wheat | Stout   |
|------------|---------|---------------|---------------|---------|---------|-------|---------|
| Calcium    | 180-220 | 200-220       | 120-140       | 130-160 | 120-140 | 180   | 120-140 |
| Alkalinity | 30-50   | 30-50         | 30-50         | 100     | 100     | 35    | 150     |
| Chloride   | 150-300 | 200-300       | Low           | 200-300 | 300     | 250   | 300     |
| Sulphate   | 250-400 | 300-400       | Low           | 200-300 | 150     | 220   | 100     |

TABLE 1. TYPICAL LEVELS OF IONS IN BREWING LIQUOR USED TO PRODUCE DIFFERENT TYPES OF BEER (ALL FIGURES ARE IN MILLIGRAMS PER LITRE COMMONLY KNOWN AS PPM)

**Treating your brewing liquor is vitally important.** When applied correctly all the steps throughout the brewing process will be at the optimum pH. If it is applied incorrectly you will get poor extract and beer that is difficult to clarify.

CALCIUM CHLORIDE FLAKE contains essential calcium ions for pH control and adjusts sulphate and chloride ions to the desired levels in the correct ratios, ideal for most beer styles.

#### pH

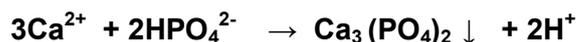
The pH of the liquor will have little effect on the pH of the wort and beer. Alkalinity and calcium are more important in pH control. Once you have established correct levels of these ions it is advisable to follow the guidelines of typical pH measurements in the brewing process shown below. Hand-held pH meters can be purchased from Murphy & Son Ltd.

|                         |            |
|-------------------------|------------|
| Raw Liquor              | pH 6.0-8.0 |
| Treated Liquor          | pH 6.0-8.0 |
| Mash                    | pH 5.2-5.5 |
| 1st Runnings            | pH 4.8-5.2 |
| Last Runnings           | pH 5.4-5.6 |
| Wort in Copper          | pH 5.1-5.4 |
| Wort after boil         | pH 4.9-5.3 |
| Beer after fermentation | pH 3.7-4.2 |

TABLE 2. TYPICAL pH MEASUREMENTS THROUGHOUT THE BREWING PROCESS

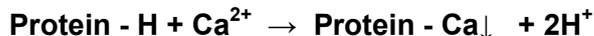
## Calcium

**Reduces the pH during mashing and wort boiling which improves enzyme activity.** This is achieved by the calcium ions precipitating phosphates present in the wort as insoluble calcium phosphate which in turn releases the hydrogen ions in the wort which reduces the pH.



The optimum pH of the enzyme  $\alpha$ -amylase is about 5.7 and that of  $\beta$ -amylase is about 4.7. Therefore an optimum range in the mash of pH 5.2-5.5 promotes the production of sugars from starch thus making worts more fermentable.

**Promotes the precipitation of unwanted proteins in the kettle, hop back or whirlpool.** Calcium also has an effect on the precipitation of undesirable wort proteins both during mashing and during the boil.



The hydrogen ions released further reduce the pH which encourages further precipitation of proteins. The reduction of pH then causes protein breakdown by the enzymes present in malt, this reduces protein levels and increases wort Free Amino Nitrogen levels (FAN).

**Improves health and vigour of the yeast.** This is a result of FAN compounds being utilised by the yeast during fermentation.

**Improves clarity and stability of the finished product.** Reduced protein levels in beers make beer easier to fine and less prone to haze formation, in particular chill haze. The shelf life of the final product is also improved.

**Calcium ions protect  $\alpha$ -amylase enzyme from inhibition by heat.** Calcium ions also improve enzyme activity.

**Reduces the risk of infection.** The drop in pH encouraged by Calcium ions in the mash and copper provides a greater resistance to microbiological infection.

**Reduces extraction of silicates, tannins and polyphenols.** These materials contribute to harsh flavours, hazes in the final beer and decreased stability.

**Reduces beerstone and in some cases prevents gushing in beer.** Oxalates derived from the malt contribute to the formation of beerstone and are also thought to promote gushing in beer. Calcium reacts with oxalates to form insoluble calcium oxalate which is precipitated out in the mash.

**Reduces colour formation during wort boiling.** The extraction of colour forming compounds are reduced during sparging.

**Improves beer fining performance.** Calcium ions promote yeast flocculation at the end of fermentation.

## Sulphate and Chloride

These two ions have a huge impact on beer flavour characteristics, sulphate gives beer a drier, more bitter flavour, whilst chloride imparts palate fullness and to an extent sweetness.

These desirable ions need to be in the correct ratios for brewing different beer styles (please refer to table 1).

## Application

CALCIUM CHLORIDE FLAKE is normally added to the grist prior to mashing but can be split across the mash and sparge liquor. To achieve best results we recommend any salts dosage in excess of 75g/hl be added 2/3 with the grist and 1/3 with the sparge. This will maintain an even distribution of calcium and help maintain pH levels throughout the mash and sparge.

CALCIUM CHLORIDE FLAKE should NOT be added to the hot liquor tank (HLT), as some constituents are insoluble. They will remain in the hot liquor tank as opposed to being released into the grist, thus requiring the HLT to be cleaned on a regular basis.

## Rates of Use

Rates of CALCIUM CHLORIDE FLAKE should be determined based on the final brew-length and are dependant on the levels of calcium, sulphate and chloride present in your untreated liquor.

Levels of the relevant ions present in your liquor can be obtained from your Local Water Authority or you can send in 50ml of your raw liquor to Murphy's laboratory for a full analysis and suggested treatment rates. This service is free of charge once a year. Please note Local Authority reports can provide results that are not up to date and this may affect your calculations for ideal dosage rates. It is advisable to check the analysis of your water at least once a year, or on a more regular basis if the supply changes.

Once you have obtained your analysis of your raw liquor you can then calculate your dosage rates by selecting which beer type you wish to brew and refer to table 1, this will help you determine how many ions to add.

9g of CALCIUM CHLORIDE FLAKE per hl of your brew-length increases calcium levels by 23.5 mg/litre (ppm) and increases chloride levels by 42 mg/litre (ppm).

Knowing this information you can calculate the amount of CALCIUM CHLORIDE FLAKE needed to increase the relevant ions to the ideal level.

Murphy's are more than willing to calculate these dosage rates for you just simply contact our laboratory: +44 (0)115 978 2728

## Guidelines for use

- Check that the product is within its shelf life before use
- Test your water regularly to obtain ideal dosage rates for the best results
- Read the Material Safety Data sheet prior to use

## Specification

|             |                        |
|-------------|------------------------|
| COMPOSITION | Calcium Chloride Flake |
| APPEARANCE  | An off-white flake     |
| ODOUR       | Free from odour        |

### Analysis

Assay (% w/w as CaCl<sub>2</sub>) > 99

### Maximum Limits of Impurities

|                          |    |
|--------------------------|----|
| As (ppm)                 | 3  |
| Pb (ppm)                 | 5  |
| Cu (ppm)                 | 2  |
| Heavy metals as Pb (ppm) | 5  |
| Fe (ppm)                 | 20 |
| F (ppm)                  | 40 |
| Mg and alkali salts (%)  | 1  |

## Regulations

This material conforms to the requirement of:-

The materials and articles in contact with food regulations, 1994

The miscellaneous additives in food regulations, 1995

The feedingstuffs regulations, 1988

The food chemical codex, 5th Edition, 12004

## Storage & Shelf life

- Store in original container
- Keep containers sealed when not in use
- The shelf life at the recommended storage conditions is 2 years.

## Technical Support

For Health & Safety information on this product, please see the Safety Data Sheet (SDS)

For support and advice on the use of this product, please call or e-mail our Technical Support:-

Telephone:- + 44 (0)115 978 5494

[techsupport@murphyandson.co.uk](mailto:techsupport@murphyandson.co.uk)

For up to date information regarding, Kosher, Halal, Vegetarian, GMO status, or anything not mentioned on this tech sheet please email:-

[compliance@murphyandson.co.uk](mailto:compliance@murphyandson.co.uk) or call +44 (0)115 978 5494

## Reference

|            |                        |               |                      |
|------------|------------------------|---------------|----------------------|
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| WRITTEN BY | F.M.Maud               | AUTHORISED BY | Dr Christine Fleming |