

# TECHNICAL INFORMATION SHEET: CALCIUM SULPHATE [GYPSUM]

**PRODUCT NAME:**  
CALCIUM SULPHATE  
[GYPSUM]

**PRODUCT CODE:**

CALSUL

**COMMODITY CODE:**  
25201000

**PACKAGING:**  
25 KG

## Description

Calcium Sulphate (E516) is a salt used to increase the mineral content of brewing liquor to improve its brewing quality and 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
- Improves wort run-off
- 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



### TECHNICAL SUPPORT

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### REGULATORY COMPLIANCE INFORMATION

Refer to the **Product Specification Sheet** or contact us on  
tel: +44 (0) 115 978 5494 | e: [compliance@murphyandson.co.uk](mailto:compliance@murphyandson.co.uk)

### HEALTH & SAFETY INFORMATION

Refer to the **Safety Data Sheet (SDS)**

- Promotes head retention in beer
- Adds sulphate which give beer a drier and more bitter effect and correct mouthfeel

## Principle

	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)

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

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 Sulphate 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.

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 in the wort as insoluble calcium phosphate which 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 and rates of use

Calcium Sulphate 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 Sulphate 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 Calcium Sulphate 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 50 ml of your raw liquor to our laboratory for a full analysis and suggested treatment rates. 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 Sulphate per hl of your brewlength increases calcium levels by 20 mg/litre (ppm) and increases sulphate levels by 48 mg/litre (ppm). Knowing this information you can calculate the amount of Calcium Sulphate needed to increase the relevant ions to the ideal level.

Murphy and Son Ltd are more than happy to calculate these dosage rates for you.

## Guidelines for use

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

## Storage and Shelf life

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



<b>PRODUCT</b>	CALSIUM SULPHATE	<b>PRODUCT CODE</b>	CALSUL
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