

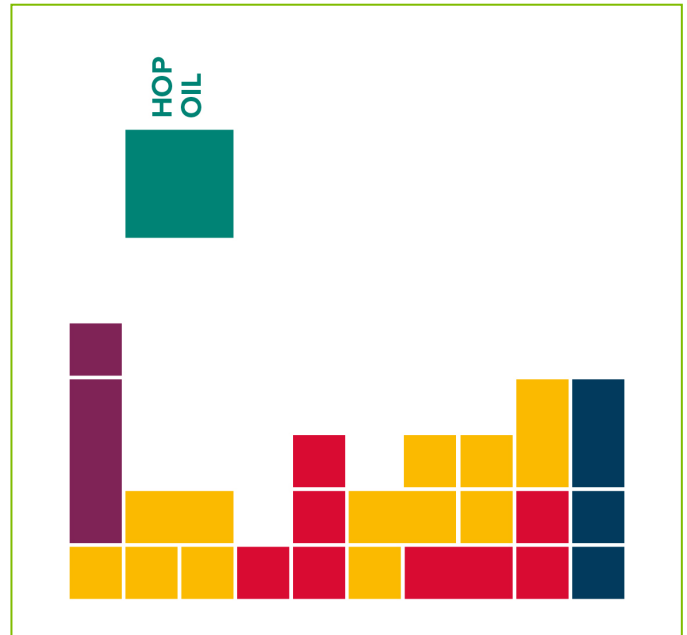
## HOP OIL (THIN FILM)

### OVERVIEW

**Hop Oil (thin film)** is produced from thin film evaporation of variety specified CO<sub>2</sub> hop extract and contains the complete range of essential oils found in them.

**Hop Oil (thin film)** can be added at various points in the brewing process (typically on the cold side of production) and results in improved aroma yields compared to traditional hopping techniques. By using **Hop Oil (thin film)** the so-called “hop creep effect” will not occur.

**Hop Oil (thin film)** imparts a pleasant hop aroma to beer which varies depending on the time of the addition.



### SPECIFICATIONS

<b>Short description</b>	pure hop oil made from thin film evaporation of CO <sub>2</sub> hop extract, containing the complete range of hop essential oils
<b>Key compounds:</b>	Myrcene Humulene Caryophyllene Farnesene
<b>Bittering substances</b>	not detectable
<b>Density</b>	ca. 0,85 g/ml (20 °C / 68 °F) / ca. 1,0 g/ml (20 °C / 68 °F) if diluted 1:100 in PG
<b>Viscosity</b>	ca. 10 mPas (25 °C / 77 °F)

For batch-dependent information, please refer to the enclosed certificate of analysis.

### PROPERTIES

#### APPEARANCE

Hop Oil (thin film) is a nearly colorless, clear liquid.

#### FLAVOR

Hop Oil (thin film) can be used to provide a strong hop aroma, or alternatively, a more subtle hop aroma depending on the quantity added as well as the time and point of the addition. The intensity of the bitterness might increase depending on the quantity added. During beer aging the aroma components of Hop Oil (thin film) remain mostly stable and contribute to overall flavor stability.

## UTILIZATION

Depending on the time and point of the addition, the recovery rate for certain aroma compounds of the hop oil can be as high as 95 %. Actual utilization will vary from brewery to brewery due to differences in equipment and process conditions.

## QUALITY

All Hopsteiner® products are processed in facilities which fulfill internationally recognized quality standards. A monitoring system for residues is in place.

## PACKAGING

Our products are delivered in their respective recommended standard packaging. Alternatives may be possible upon customer request.

Standard packages of our processing plants in the USA (US) and Germany (DE) are:

- Aluminum bottles 0.5 and 1.0 kg (DE)

The product is supplied pure. A 1:100 dilution in propylene glycol is also available. Other dilutions may be available on request.

## USAGE

### DOSAGE

The required quantity of Hop Oil (thin film) depends on the point of the addition:

- To fermentation: up to 5 g per hl
- To maturation: 0.5 to 3 g per hl
- Prior to filtration:
  - up to 0.2 g per hl (top fermented beers)
  - up to 0.05 g per hl (bottom fermented beers)

The dosage rates above are intended for orientation only; actual additions will depend on the intensity of the aroma desired. Trials performed by injecting oil into the beer with a microliter syringe are helpful for determining the quantity of Hop Oil (thin film) required. If Hop Oil (thin film) is used to replace pellets in existing recipes, 65-75% of the total oil content of the pellets will be sufficient to match the required aroma intensity.

### APPLICATION

Shake the packaging well before use.

Hop Oil (thin film) can be added at different stages of beer production. Dosing equipment which pumps the product into the beer stream is preferred for the addition of Hop Oil (thin film). Alternatively, the hop oil can be added to the tank prior to filling.

### STORAGE

The recommended storage temperature in the original unopened packaging is 1 - 10 °C.

### BEST BEFORE DATE

Under the recommended storage conditions, the shelf life from the date of production/ packaging is at least 1 year.

Opened containers should be consumed as soon as possible.

### SAFETY

Ensure good ventilation of the workplace and wear personal protective equipment. Avoid contact with eyes and skin. Do not inhale vapors or dusts. For full safety information, please refer to the relevant Hopsteiner® safety data sheet.

## ANALYTICAL METHODS

International approved methods listed in committees such as ASBC or Analytica-EBC using current standards are applied.

## PRODUCT ANALYTICS

Hop oil components

- Analytica-EBC 7.12 (GC)
- ASBC Hops-17 (GC)

## TECHNICAL SUPPORT

We are pleased to offer assistance and advice on:

- safety data sheets
- support for brewing trials on a pilot or commercial scale
- analytical services and information about analytical procedures

Disclaimer: The information provided in this document is believed to be correct and valid. However, Hopsteiner® does not guarantee that the information provided here is complete or accurate and thus assumes no liability for any consequences resulting from its application.

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