

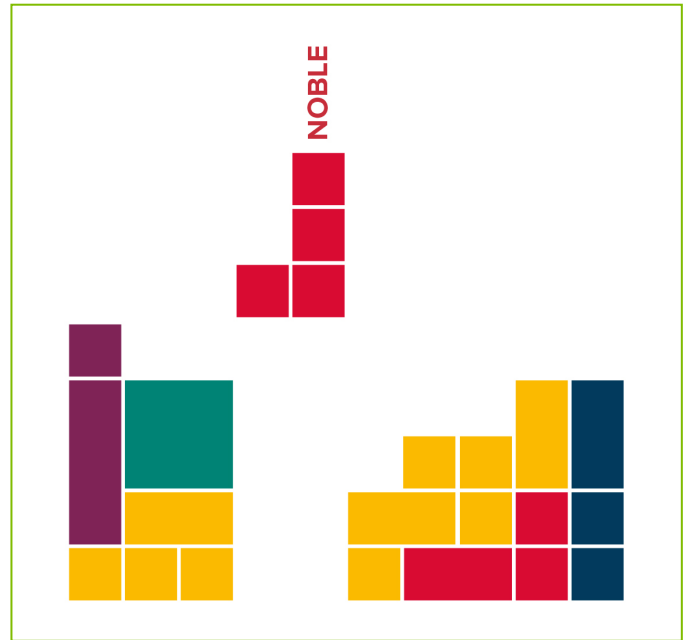
## HOP OIL TYPE NOBLE PLUS

### OVERVIEW

**Hop Oil Type NOBLE PLUS** is produced by conventional hop extraction with subsequent fractionation by means of distillation.

**Type NOBLE PLUS** has been specifically developed for additions prior to beer filtration. This product can completely or partially replace late hop additions in the brewhouse while still imparting a typical “late hop” aroma to the beer. **Type NOBLE PLUS** has an excellent hop oil recovery.

**Type NOBLE PLUS** has been shown to improve the taste of non-alcoholic beers.



### SPECIFICATIONS

<b>Short description</b>	pure hop oil diluted in propylene glycol, resulting in a product diluted to 1:100
<b>Key compounds:</b>	Linalool 2000 ppm ( $\pm 50$ ) Ratio Linalool / Myrcene > 5 Ratio Linalool / Caryophyllene > 30 Ratio Linalool / Humulene > 15 Ratio Linalool / Farnesene > 25
<b>Bittering substances</b>	not detectable
<b>Density</b>	ca. 1.0 g/ml (20 °C / 68 °F)
<b>Viscosity</b>	ca. 46 mPas (25 °C / 77 °F)

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

### PROPERTIES

#### APPEARANCE

Type NOBLE PLUS is a nearly colorless to light green, transparent or slightly turbid liquid.

#### FLAVOR

Type NOBLE PLUS contains a lower amount of volatile hydrocarbon fraction, resulting in a more subtle and pleasant hop aroma. Depending on the quantity added and the type of beer, Type NOBLE PLUS imparts mainly floral and citrusy notes to beer. Type NOBLE PLUS has little influence on the sensory bitterness of beer. It is suitable for use in beers brewed with conventional hop products as well as light stable beers to impart a more typical “late hop” character. During beer aging the aroma components of Type NOBLE PLUS remain stable and contribute to overall flavor stability.

## UTILIZATION

Type NOBLE PLUS has an excellent recovery rate. Depending on the time of the addition, the recovery rate for hop oil can be close to 100%.

## 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)
- Aluminium bottles 0.1 - 5.0 kg (US)

The product is supplied as a 1:100 dilution in propylene glycol. Other dilutions or pure hop oils may be available on request.

## USAGE

### DOSAGE

The quantity of the hop oil addition is determined by the brewer and depends on the time and point of the addition. The hop oil dosage should be based on the desired concentration of linalool in the beer. The threshold in beer is usually around 20 µg/l. This lowest concentration is intended for orientation only. Actual addition will depend on the quality and intensity of the aroma desired. Typical range of application is 1 - 5 ml/hl. Trials performed by injecting the product into bottled beer with a microliter syringe are helpful for determining the quantity of Type NOBLE PLUS required.

### APPLICATION

Shake the packaging well before use. Type NOBLE PLUS can be added at different stages on the cold side of beer production, typically prior to filtration. For the highest possible yield, a direct addition into the beer stream prior to filtration is recommended. This enables the hop oil to dissolve in the beer without changing its flavor.

### 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 2 years.

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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