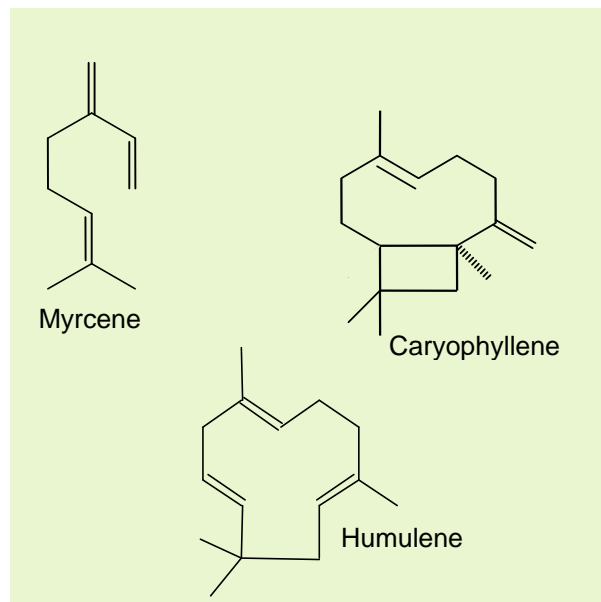


## Hop Oil - Type DRY

### ❖ Overview

- **Hop Oil - Type DRY** is produced from leaf hops and contains the complete range of essential oils.
- **Hop Oil - Type DRY** can be dosed at several stages during the brewing process, resulting in improved oil recoveries compared to normal hopping techniques.
- **Hop Oil - Type DRY** produces pleasant hop aroma that can be subtly altered according to the manner of its use.



### ❖ Specification

- **Description:** An almost colorless, clear liquid, containing the complete range of hop essential oils.
- **Iso-alpha-acids:** < 0.1 %
- **Alpha-acids:** < 0.1 %
- **Beta-acids:** < 0.1 %
- **Main essential oils:**

Myrcene:	55 – 75 %	(depending on variety)
Humulene:	8 – 15 %	(depending on variety)
Caryophyllene:	5 – 10 %	(depending on variety)
- **Solvent residue:** Ethanol content < 2 %
- **Density:** Typically 0.8 g/ml

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## ❖ Properties

### ❑ Flavor

**Hop Oil - Type DRY** can be used to provide a strong or, alternatively, a more subtle hop aroma depending on the quantity added, method and point of addition.

As well as aroma, **Hop Oil - Type DRY** also has an influence on total hop flavor. It is therefore very suitable for addition to lightstable beers in order to enhance hop character.

### ❑ Recovery

Depending on the time and method of addition, hop oil recoveries can range up to 80 %. These figures are only valid when the hop oil is used according to the section entitled "Product Use".

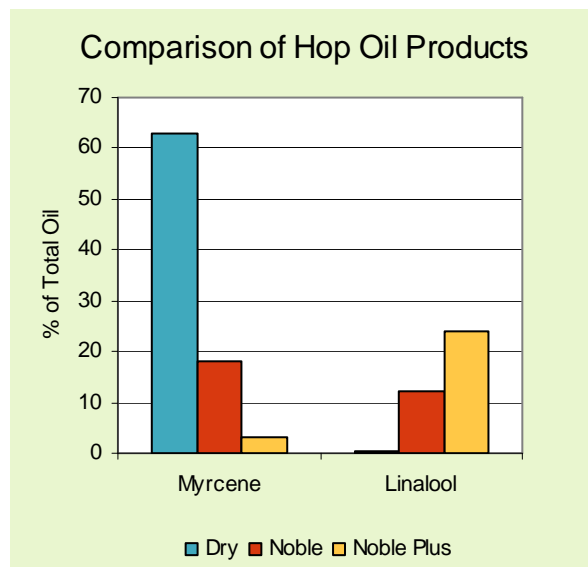
### ❑ Quality

All Hopsteiner® products are produced in plants accredited to internationally accepted quality standards.

## ❖ Packaging

**Hop Oil - Type DRY** is usually packaged in aluminum bottles containing either 0.5 kg or 1 kg.

**Hop Oil - Type DRY** can be delivered as pure hop oil or diluted with ethanol, ethanol / water or propylene glycol.



## ❖ Product Use

### ❑ Addition

**Hop Oil - Type DRY** can be added at different stages during beer production:

- **To the kettle:** results in low recoveries. Blending **Hop Oil - Type DRY** with a "carrier material", like beta acids, improves recoveries.
- **Pre-fermentation:** the chemical reaction of volatile compounds during fermentation, combined with the modification of aroma compounds by yeast, can produce a more 'typical' or 'comparable' aroma.
- **Post-fermentation:** direct addition prior to filtration, results in the hop oils dissolving unchanged into the beer.

For the latter two addition options **Hop Oil - Type DRY** should be diluted to 1 % with ethanol.

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## ❑ Dosage

The quantity of hop oil to be dosed depends on the method of addition:

- Kettle addition: 1 – 5 g per hl
- Pre-fermentation: 0.5 – 2 g per hl
- Post-fermentation: 0.05 – 0.2 g per hl

The above figures are indications only; actual additions will depend on the quality and strength of aroma required. Dosing experiments, using a microlitre syringe to inject oil into bright beer, will give useful indications of the target quantity required.

(Note: Where additions are made pre-fermentation, the influence of the fermentation conditions must be taken into consideration.)

## ❑ Storage

**Hop Oil - Type DRY** should be stored below 10°C in screw top bottles. If aluminum bottles are not used, exposure to light must be avoided.

## ❑ Best Before Date

**Hop Oil - Type DRY** is stable 1 year from date of production under the recommended storage conditions.

## ❑ Safety

If material comes into contact with the skin, wash off with soap and water. If material gets into the eyes, irrigate with excess water and seek medical attention. **Hop Oil - Type DRY** is a combustible material.

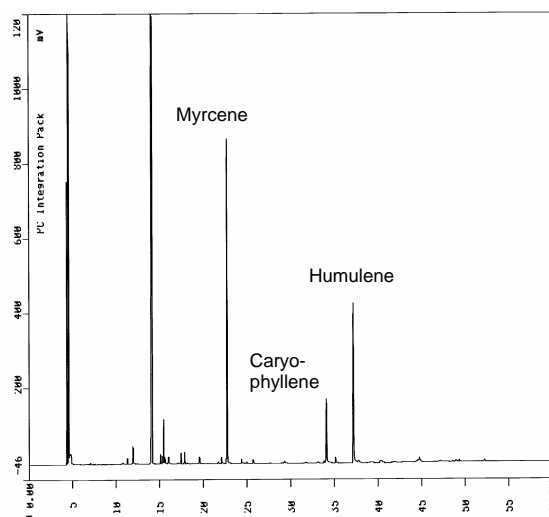
For full safety information please see the relevant Steiner material safety data sheet.

## ❖ Analytical Methods

### ❑ Composition of hop oils

For the analysis of individual hop oil components, gas chromatography techniques are used. Details of methods are available on request from Steiner.

### Typical Gas Chromatogram of Hop Oil – Type DRY



## ❖ Technical Support

We will be pleased to offer help and advice on the full range of Hopsteiner® products:

- ❑ Copies of all relevant analytical procedures
- ❑ Material Safety Data Sheets (MSDS)
- ❑ Assistance with pilot or full brewery trials
- ❑ Specialist analytical services

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