

## Hexahop® 95

Hexahop® 95 is an aqueous solution, standardised to 20% w/w, of hexahydro-iso- $\alpha$ -acids produced from CO<sub>2</sub> hop extract using a patented, all-aqueous process. Hexahop® 95 is a hop extract that improves beer foam stand and cling and can be used for light-stable hopping in beers that will be packaged in green or clear glass. Hexahop® 95 imparts a clean and smooth bitterness and is especially effective when used to develop low bitterness units (BU) beers. Hexahop® 95 will also act as an antimicrobial agent when added to beer. Hexahop® 95 is classified by the U.S. FDA as a modified hop extract which may be safely used in beer in accordance with regulation 21CFR 172.560(b) (6) (7).

### Product Specifications:

Description:	An amber colored, aqueous solution of the potassium salts of hexahydro-iso- $\alpha$ -acids.
Concentration:	Standard concentration is 20.0% $\pm$ 0.5 of a 95:5 mixture of hexahydro-iso- $\alpha$ -acids (95%) and tetrahydro-iso- $\alpha$ -acids (5%) by HPLC.
pH:	8.5 – 11.0
Density:	1.040 g/mL (approximately) at 20 °C (68 °F)
Viscosity:	2 -15 mPas at 20 °C (68 °F)
Solubility:	Soluble in pH-adjusted de-mineralised water, and in alcohol
Iso- $\alpha$ -acids:	< 0.1%

### Quality and Food Safety:

The Barth-Haas Group maintains quality management systems registered to the ISO 9001 standard, as well as food safety management programs based on internationally recognised (HACCP) principles. Please refer to our web site ([www.barthhaasgroup.com](http://www.barthhaasgroup.com)) for more information on our systems and programs.

### Product Use:

Hexahop® 95 is normally used after fermentation and before final filtration. Utilisation of Hexahop® 95 in final beer can be expected between 55-80% depending on the time and efficiency of dosing (Kettle dosing is not advisable, as utilisation can decrease considerably). The point of addition should be close to a region of turbulent beer flow, e.g. on the suction side of a centrifugal pump. The dosing pump should be adjusted to deliver the Hexahop® 95 over approximately 70% of the total transfer time. It is advisable to make the addition prior to the final filtration step. Local high concentrations of hexahydro-iso- $\alpha$ -acids should be avoided in the beer and the addition point should be well separated from that of other additions. Hexahop® 95 may be added at ambient temperature without prior dilution directly to beer. If dilution is necessary, the use of de-mineralised water with a pH adjustment to 10 – 11 (with KOH) is necessary. Do not use sodium bases to adjust the pH of deionised water – caustic soda or sodium hydroxide form poorly soluble salts with most hop acids.

The amount of Hexahop® 95 for dosing is calculated based on the product concentration and the assumed utilisation. Conducting trials at the brewery will determine the correct dosage of Hexahop® 95 in regard to sensory bitterness and foam enhancement. Depending on the type of beer, Hexahop® 95 may give 1.0 to 1.1 times the perceived bitterness of normal iso- $\alpha$ -acids. Hexahop® 95 should not be left in dosing lines at low temperatures and we recommend cleaning the dosing lines and pumps with warm, slightly alkaline de-mineralised water or ethanol after use.

### Usage Calculations:

The following calculations are based on the assumption that hexahydro-iso- $\alpha$ -acids are 1.1 times as bitter as iso- $\alpha$ -acids (IAA). Utilisation of hexahydro-iso- $\alpha$ -acids is likely to be about 70% or more when Hexahop® 95 is used as recommended.

Desired Sensory Bitterness Units = BU (*95% Hexa / 5% Tetra combination described as "Hexa"*)

Hexa pure required in beer =  $\frac{\text{BU}}{1.1}$  (*1.1 assumes sensory bitterness relative to IAA*)

Dosage hexa pure in mg/L (*70% utilisation assumed*) =  $\frac{\text{BU}}{1.1} \times \frac{100}{70}$

Dosage in grams hexa pure per hL of beer =  $\frac{\text{BU}}{1.1} \times \frac{100}{70} \times \frac{100}{1000}$

Dosage Amount of Hexahop®95 (20% soln) in g/hl :

$$\frac{\text{BU}}{1.1} \times \frac{100}{70} \times \frac{100}{1000} \times \frac{100}{20} = \text{BU} \times 0.65 \text{g/hl}$$

Amount of Hexahop®95 (20% soln) in ml/hl :

$$\frac{\text{BU}}{1.1} \times \frac{100}{70} \times \frac{100}{1000} \times \frac{100}{20} \times \frac{1}{1.04} \text{ml/hl} = \text{BU} \times 0.62 \text{ml/hl}$$

(e. g. for 5 desired sensory bitterness units  $5/1.1 \times 100/70 \times 100/1000 \times 100/20 = 3.3 \text{ g/hL}$  (**3.1 mL/hL**) are necessary)

### Foam Enhancement:

Calculate required Hexahop® 95 as shown above (generally we recommend Hexahop® products not be added for the final beer to contain more than 5 ppm pure tetra and/or hexa). Reduce kettle or other hop product bittering by equivalent "hexa BU" to compensate for the bitterness contribution of Hexahop® 95.

### Light Stability:

Hexahop® 95 will only provide protection from light-struck flavour if a complete absence of normal iso- $\alpha$ -acids is achieved, therefore no other sources of non-reduced iso- $\alpha$ -acids should exist in the wort or beer streams. Thus for light-stable beers packaged in clear or green glass bottles, all the hop bitterness must be derived from reduced hop acids such as Tetrahop Gold®, Redihop® or Hexahop® products. Iso- $\alpha$ -acids (from equipment or yeast) must not be present in the beer. If beta extracts are used as kettle additives, ensure that the concentration of  $\alpha$ -acids and iso- $\alpha$ -acids are below 0.2%

### Packaging:

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Normally available in high density polythene containers of 20 kg.

**Storage and Best-by Recommendation:**

Store Hexahop® 95 in full, closed containers at 15 – 25 °C (59 – 77 °F). Prolonged storage at high temperature can cause deterioration. Hexahop® 95 performs best if used within 24 months from the time of production if stored as recommended. Opened containers should be used within a few days.

**Safety:**

Safety Data Sheet (SDS) is available on our website ([www.barthhaasgroup.com](http://www.barthhaasgroup.com)).

**Analytical Methods:**

The concentration of hexahydro- and tetrahydro-iso- $\alpha$ -acids is measured by UV Spectrophotometry (with modified factors) or by the EBC Method 7.9 (HPLC). Details of recommended methods are available on request.

**Technical Support:**

We will be pleased to offer help and advice on the use of Hexahop® 95 in brewing.