

# BarthHaas® Hexahop Gold®

## CHARACTERISTICS

Hexahop Gold® is an aqueous solution, standardised to 10% w/w, comprising a mixture of hexahydro-iso- $\alpha$ -acids and tetrahydro-iso- $\alpha$ -acids produced from CO<sub>2</sub> hop extract using a patented, all-aqueous process. Hexahop Gold® improves foam stand and cling and can be used for light-stable hopping in beers that will be packaged in green or clear glass. Hexahop Gold® imparts clean, smooth bitterness and is especially effective when used to develop low BU beers. Hexahop Gold® will also act as an antimicrobial agent when added to beer. Hexahop Gold® is classified as a modified hop extract which may be safely used in beer in accordance with US FDA regulation 21 CFR 172.560(b) (6) (7).

## PRODUCT SPECIFICATIONS

Description:	A yellow to amber colored, aqueous solution of the potassium salts of tetrahydro-iso- $\alpha$ -acids and hexahydro-iso- $\alpha$ -acids
Concentration:	Standard concentration is 10.0% $\pm$ 0.5 of a 50:50 mixture of tetrahydro-iso- $\alpha$ -acids and hexahydro-iso- $\alpha$ -acids by HPLC.
pH:	8.5 - 11.0
Density:	1.020 g/mL (approximately) 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

Barth-Haas 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.barthhaas.com](http://www.barthhaas.com)) for more information on our systems and programs.

## PRODUCT USE

Hexahop Gold® is normally used after fermentation and before final filtration. Utilisation of Hexahop Gold® 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 flow, e.g. on the suction side of a centrifugal pump. The dosing pump should be adjusted to deliver the Hexahop Gold® over approx. 70% of the total transfer time. It is advisable to make the addition prior to the final filtration step. Local high concentrations of hexa/tetrahydro-iso- $\alpha$ -acids should be avoided and the addition point should be well separated from that of other beer additions. Hexahop Gold® 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 de-mineralised water - caustic soda or sodium hydroxide form poorly soluble salts with most hop acids.

The amount of Hexahop Gold® is calculated based on the hop product concentration and the assumed utilisation. Conducting trials at the brewery will determine the correct dosage of Hexahop Gold® with regard to sensory bitterness and foam enhancement. Depending on the type of beer, Hexahop Gold® may give 1.0 - 1.3 times the perceived bitterness of normal iso- $\alpha$ -acids. Hexahop Gold® should not be left in dosing lines at low temperatures and we recommend cleaning dosing lines with warm, slightly alkaline de-mineralised water or ethanol after use.

## USAGE CALCULATIONS

The following calculations are based on the assumption that the mixture of hexahydro-iso- $\alpha$ -acids and of tetrahydro-iso- $\alpha$ -acids is 1.3 times as bitter as iso- $\alpha$ -acids (IAA). Utilisation of hexahydro-iso- $\alpha$ -acids (HHIAA) can be expected to be about 70% or higher when Hexahop Gold® is used as recommended.

$$\text{Desired Sensory Bitterness Units} = \text{BU}$$

$$\text{hexa/tetrapure required in beer (mg/L)} = \frac{\text{BU}}{1.3} \quad (1.3 \text{ assumes sensory bitterness relative to IAA})$$

$$\text{Dosage hexa/tetrapure in mg/L (70\% utilisation assumed)} = \frac{\text{BU}}{1.3} \times \frac{100}{70}$$

$$\text{Dosage in grams hexa/tetra per hL of beer} = \frac{\text{BU}}{1.3} \times \frac{100}{70} \times \frac{100}{1000}$$

**Amount of Hexahop Gold® (10% soln) ing/hL :**

$$\frac{\text{BU}}{1.3} \times \frac{100}{70} \times \frac{100}{1000} \times \frac{100}{10} \text{ g/hL} = \text{BU} \times 1.10 \text{ g/hL}$$

**Amount of Hexahop Gold® (10% soln) in mL/hL:**

$$\frac{\text{BU}}{1.3} \times \frac{100}{70} \times \frac{100}{1000} \times \frac{100}{10} \times \frac{1}{1.020} \text{ mL/hL} = \text{BU} \times 1.08 \text{ mL/hL}$$

(e. g. for 5 desired sensory bitterness units  $5/1.3 \times 100/70 \times 100/1000 \times 100/10 = 5.5$  g/hL (5.4 mL/hL) are necessary)

## FOAM ENHANCEMENT

Calculate required Hexahop Gold® as shown above for final hexa/tetra pure hop acids concentration to typically be between 2 and 5 mg/L for foam enhancement. We recommend that the final concentration of hexa/tetra hop acids not be more than 5 mg/L to prevent excessive foaming effects.

Reduce alternative bittering contribution (kettle or other products) by equivalent BU to compensate for the bitterness of Hexahop Gold®.

## LIGHT STABILITY

Hexahop Gold® 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

Hexahop Gold® is normally supplied in high-density polythene containers of 20 kg.

## STORAGE AND BEST-BY RECOMMENDATION

Store Hexahop Gold® in full, closed containers at 15 – 25 °C (59 – 77 °F). Prolonged storage at high temperature can cause deterioration. Hexahop Gold® 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.

## ANALYTICAL METHODS

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

## SAFETY

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

## TECHNICAL SUPPORT

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

E-Mail: [Brewingsolutions@barthhaas.de](mailto:Brewingsolutions@barthhaas.de)