



# Isohop®

Iso- $\alpha$ -acids are the native bittering acids found in traditionally hopped beer. Isohop® is a standardized solution of iso- $\alpha$ -acids (30% w/w) produced from CO<sub>2</sub> hop extract using an all-aqueous process. Isohop® is classified by the U.S. FDA as a modified hop extract that may be safely used in beer in accordance with US FDA regulation 21 CFR 172.560 (b) (2-5).

## CHARACTERISTICS

Isohop® is used to replace kettle bittering hops to improve hop utilisation or to adjust bitterness in beers that may have been under-hopped in the kettle. For precise control of beer bitterness, Isohop® should be added post-fermentation to adjust the bitterness of the beer to the target bitterness units (BU). It may also provide an economic alternative to kettle hopping when performing high-gravity brewing. When hopping does not go according to plan, Isohop® will help to get back on target. Isohop® will contribute to foam stand and cling similar to that of traditional bitter hopping (whole hops, pellets, or CO<sub>2</sub> extract). Isohop® will also act as a natural antimicrobial agent when added to beer. Isohop® provides a very good utilization along with comparatively low costs.

## PRODUCT SPECIFICATIONS

<b>Description</b>	A pale yellow to amber aqueous solution of the potassium salts of iso- $\alpha$ -acids
<b>Concentration</b>	Standard concentration is 30.0% $\pm$ 0.5 of iso- $\alpha$ -acids by HPLC
<b>pH</b>	8.0 - 10.0
<b>Density</b>	1.075 g/mL (approximately) at 20 °C (68 °F)
<b>Viscosity</b>	10 - 20 mPas at 20°C (68°F)
<b>Solubility</b>	Soluble in pH-adjusted de-mineralized water, and in alcohol
<b><math>\alpha</math>-acids</b>	< 0.7 %
<b><math>\beta</math>-acids</b>	< 0.3 %

## 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

Isohop® is normally used after fermentation and before final filtration. Utilization of Isohop® in final beer is typically between 60 - 90% depending on the time and efficiency of dosing. If Isohop® is used in the brewhouse, utilization may be expected at 50 - 60%. The preferred point of post-fermentation addition is 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 Isohop® 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 iso- $\alpha$ -acids should be avoided in the beer stream and the addition point should be well separated from that of any other additions. Isohop® may be added at ambient temperature without prior dilution directly to beer. Dilution is not advised, but if necessary, the use of de-mineralized water and a pH adjustment to 9 - 10 with KOH is recommended. Do not use sodium bases to adjust the pH of dilution water; caustic soda or sodium hydroxide form poorly soluble salts with most hop acids.

The amount of Isohop® needed for dosing is calculated based on the product concentration and the assumed utilization. Conducting trials at the brewery will determine the correct dosage of Isohop® in regard to sensory bitterness. Isohop® will give similar bitterness as that of traditional iso- $\alpha$ -acids. Following dosing, we recommend cleaning lines and dosing pumps with warm slightly alkaline de-mineralised water or ethanol immediately after each use.

## USAGE CALCULATIONS FOR BITTERNESS ADJUSTMENT

The following calculations are based on an assumed utilization of 80%. (IAA = iso- $\alpha$ -acids).

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

$$\text{Dosage IAA in mg/L (80\% utilisation)} = \text{BU} \times \frac{100}{80}$$

$$\text{Dosage in grams IAA per hL of beer} = \text{BU} \times \frac{100}{80} \times \frac{100}{1000}$$

$$\text{Dosage amount of Isohop® (30\%IAA) in g/hL :}$$

$$\text{BU} \times \frac{100}{80} \times \frac{100}{1000} \times \frac{100}{30} \text{ g/hL} = \text{BU} \times 0.42 \text{ g/hL}$$

$$\text{Amount of Isohop® (30\%IAA) in mL/hL:}$$

$$\text{BU} \times \frac{100}{80} \times \frac{100}{1000} \times \frac{100}{30} \times \frac{1}{1.075} \text{ mL/hL} = \text{BU} \times 0.39 \text{ mL/hL}$$

(e. g. for 5 desired sensory bitterness units  $5 \times 100/80 \times 100/1000 \times 100/30 = 2.1$  g/hL 30% Isohop® is necessary if utilization is 80%)

## PACKAGING

Isohop® is normally supplied in high-density polyethylene containers of 20 kg. Larger package units are available on request.

## STORAGE AND BEST-BY RECOMMENDATION

Store Isohop® in full, closed containers at 2 - 8 °C (36 - 46 °F). Prolonged storage at high temperature can cause deterioration. Isohop® 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 determination of iso- $\alpha$ -acids comprises three types of methods, the specific measurement of iso- $\alpha$ -acids by means of HPLC, spectrophotometric or conductometric methods. In regard to the spectrophotometric method, please note that the optical density multiplication factor in the formula needs to be adjusted from 50 to 70.

- EBC 7.8 for Iso- $\alpha$ -acids,  $\alpha$ -acids,  $\beta$ -acids by HPLC
- EBC 7.9 for Iso- $\alpha$ -acids
- ASBC Hops-16 (Iso- $\alpha$ -,  $\alpha$ -, and  $\beta$ -acids in Hop Extracts and Isomerized Hop Extracts by HPLC)

## SAFETY

Any material that contacts with skin should be washed off with soap and water. For more information, download the relevant Safety Data Sheet (SDS) on our website

## TECHNICAL SUPPORT

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

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