



Isohop®

Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

1.1 Product identifier

Isohop®

Synonyms: Isomerized hop extract, 'Iso', Postfermentation Bittering, 'PFB'

1.2 Relevant identified uses of the substance or mixture and uses advised against

For use as an ingredient in brewing of beer

1.3 Details of the supplier of the safety data sheet

BarthHaas UK Ltd.

Hop Pocket Lane, Paddock Wood, Kent, TN12 6DQ, UK

Email: sds@barthhaas.co.uk

BarthHaas / John I. Haas, Inc.

1600 River Rd., Yakima, WA 98902, USA.

Email: info@johnihaas.com

1.4 Emergency telephone number

+44 1892 833 415 (09:00 – 17:30 Mon- Thurs; 09:00 – 16:30 Fri, UK time)

+1 509 469 4000 (office hours)

2. HAZARD IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP]:

- Skin Irritation Category 2
- Eye Irritation Category 2
- Skin Sensitisation Category 1

2.2 Label elements

According to Regulation (EC) 1272/2008 [CLP]:

- **Hazard pictogram**



- **Signal word:**

- Warning

- **Hazard statement**

- H315: Causes skin irritation
- H317: May cause an allergic skin reaction
- H319: Causes serious eye irritation

- **Precautionary statement**

- P280: Wear protective gloves and eye protection
- P302+P352: IF ON SKIN: Wash with plenty of soap and water
- P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P333+P313: If skin irritation or rash occurs: Get medical advice/attention.

2.3 Other hazards

None. No components are known to be PBT/vPvB or to have endocrine disrupting properties.

3. COMPONENTS/INFORMATION ON INGREDIENTS

3.1 Substances N/A

3.2 Mixtures

Component	Concentration (% m/m)	CAS no.	EC no.	REACH Registration No.	Classification according to Regulation (EC) 1272/2008 [CLP]
Potassium salts of Isohumulones	30	94349-84-5	305-203-0	01-2120766316-50-0000	Acute Tox. 4 H302, H312 Skin Corr. 1 H314 Eye Damage 1 H318 Skin Sens. 1 H317
Water	Balance	7732-18-5	231-791-2	N/A	Not classified

Note: *In Vitro* Assessment of the Skin Corrosion Potential of Isohop [30% m/m solution of EC 305-203-0 in water] according to OECD Test Guideline 431 (reconstructed human epidermis (RHE) Test Method) confirms that the mixture is **not** corrosive to skin. See Section 2.1 for final classification of Isohop [20% or 30% m/m solution of EC 305-203-0 in water].

4. FIRST AID MEASURES

4.1 Description of first aid methods:

- **Inhalation** - Remove to fresh air
- **Skin contact** - Wash skin thoroughly with soap and water
- **Eye contact** - Flood the eye with plenty of water. If any symptoms persist obtain medical attention.
- **Oral ingestion** - Rinse mouth out with water and drink a portion of water (ca. 200ml). Vomiting may occur but should not be induced. Obtain medical attention if symptoms persist.

4.2 Most important symptoms and effects, both acute and delayed

Skin and eye irritation

4.3 Indications of immediate medical attention and special treatments needed

Action as indicated in Section 4.1 above



5 FIRE AID MEASURES

- 5.1 Extinguishing media** Carbon dioxide, dry powder, foam.
- 5.2 Special hazards arising from substance or mixture** The product is an aqueous solution and is therefore not expected to burn. No known unusual fire or explosion hazards.
- 5.3 Advice for firefighters** Wear self-contained breathing apparatus

6. ACCIDENTAL RELEASE MEASURES

- 6.1 Personal precautions, protective equipment and emergency procedures** Wear appropriate protective clothing – see Section 8.
- 6.2 Environmental precautions** Small amounts (<10 litres) can be safely diluted with water and flushed into the drain. Do not discharge large amounts onto the ground or into watercourses – hold for disposal, or in the case of spillages, deal with this as indicated in Section 6.3
- 6.3 Methods and materials for containment and clearing up** Contain spillage using earth, sand or other inert material. Transfer to suitable sealed container prior to disposal. Flush area with hot soapy water to remove final traces. Use adequate ventilation or a respirator if in a confined area.
- 6.4 References to other sections** See Section 8 for appropriate protective clothing. See Section 13 for disposal.

7. HANDLING AND STORAGE

- 7.1 Precautions for safe handling** Avoid excessive contact with product. Use appropriate protective clothing as indicated in Section 8. Wash hands after use.
- 7.2 Conditions for safe storage, including any incompat** Store at 2 – 8 °C (36 – 46 °F). Keep container closed. Store in original container or suitable high-grade stainless steel, low silicate glass or high-density polyethylene. Protect from light.
- 7.3 Specific End Uses** For use as a food ingredient. It should be used in accordance with applicable food legislation.



8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control Parameters Not applicable.

8.2 Exposure Controls:

- | | |
|--|---|
| - Engineering Controls | - Not required |
| - Eye/Face Protection | - Safety goggles |
| - Hand Protection | - PVC, rubber, or nitrile gloves are all suitable and should be worn. Breakthrough time estimated as 150 minutes, 136 minutes and 210 minutes respectively. |
| - Skin Protection | - Not normally required. Long-sleeved workwear is recommended to avoid accidental skin contact. |
| - Respiratory Protection | - Not required |
| - Environmental exposure controls | - Not required |



9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Physical state	Liquid
b) Color	Pale yellow to amber
c) Odor	Hoppy, resinous
d) Melting point/Freezing point	Not practical to measure/ < 0°C
e) Boiling point	93 – 104 °C
f) Flammability	Non-flammable
g) Lower and upper explosion limit	N/A
h) Flash point	Not applicable due to high water content
i) Auto-ignition temperature	N/A
j) Decomposition temperature	No hazardous decomposition when used for its intended use.
k) pH	7.5 – 10.5
l) Kinematic viscosity	10 – 20 mPas at 20 °C
m) Solubility	Miscible. Will precipitate if acidified.
n) Partition coefficient n-octanol/water (log value)	LogPow for purified active component (hop iso- α -acids) is 2.7 – 4 at pH 7
o) Vapor pressure	Vapour pressure of hop iso- α -acids is ca. 9×10^{-9} Pa



p) Density [kg/m³] 1000 – 1200

q) Relative vapor density Not practical to measure

r) Particle characteristics N/A

9.2 Other information N/A

10. STABILITY AND REACTIVITY

10.1 Reactivity No reactivity hazards known.

10.2 Chemical Stability Stable if stored according to Section 7.2 and 10.5

10.3 Possibility of Hazardous Reaction None known

10.4 Conditions to Avoid Avoid strong oxidizing agents. Precipitation may occur on mixing with any material

10.5 Incompatible Materials Precipitation may occur on mixing with any material.

10.6 Hazardous Decomposition Products None known



11. TOXICOLOGICAL INFORMATION

11.1 Information on hazard classes as defined in Regulation (EC) No. 1272/2008

Isohop contains modified hop extracts (potassium salts of hop iso- α -acids, EC 305-203-0), which may be safely used in beer, e.g., in accordance with US FDA regulation 21 CFR 172.560.

a) Acute Toxicity	At concentration present, the material is not classified as hazardous. Estimated ATE value (oral, dermal) is 3333 mg/kg bw for 30% m/m solutions.
b) Skin Corrosion/Irritation	Potassium salts of hop iso- α -acids, EC 305-203-0 classified as irritant to the skin according to OECD Guideline 439 (In vitro skin irritation). Therefore, a mixture containing 30% EC 305-203-0 will be classified as Skin Irritation Category 2. In vitro assessment of the skin corrosion potential of Isohop [30% m/m solution of EC 305-203-0 in water] according to OECD Test Guideline 431 (reconstructed human epidermis (RHE) test method) confirms that the mixture is not corrosive to skin.
c) Serious Eye Damage/Irritation	Isohop [30% m/m solution of EC 305-203-0 in water] is classified as Eye Irritation Category 2 as a precaution based on skin irritation results and based on pH 7.5 – 10.5 (see Section 9).
d) Respiratory or Skin Sensitization	EC 305-203-0 is classified for skin sensitisation by reading across from Hop Extract (EC 232 504-3), which is classified as a skin sensitizer according to in vitro methods. EC 305-203-0 present >1% in Isohop, hence Isohop is classified as Skin Sensitisation Category 1. The vapour pressure of EC 305-203-0 is very low: 9×10^{-9} Pa (estimated by EPISuite™) and therefore respiratory sensitization is not applicable.
e) Germ Cell Mutagenicity	OECD Guideline 471 (Bacterial Reverse Mutation Assay) on read-across substance Hop Extract EC 232-504-3: not mutagenic. Bacterial Reverse Mutation Assay on 40% iso-alpha acids: not mutagenic. In vitro mammalian cell gene mutation assay (CHO/HGPRT Mutation Assay) on read-across substance Rho-iso-alpha acids: not mutagenic.
f) Carcinogenicity	Long history of safe use as a component of beer. Hop iso- α -acids are a natural of beer from the traditional brewing process. Bacterial reverse mutation assay: not mutagenic.
g) Reproductive Toxicity	Weight of evidence indicates lack of reproductive toxicity. Long history of safe use as a component of beer. Iso- α -acids are approved food additives for beer in the USA, under 21 CFR § 172.560. Isohop (30% aqueous solution of iso- α -acids present as their potassium salts) was assessed to be GRAS ("generally regarded as safe") by John I. Haas, Inc., USA, in 2008.
h) STOT- Single Exposure	Weight of evidence indicates safety when used for its intended use. See (g) above.
i) STOT-Repeated Exposure	Weight of evidence indicates safety when used for its intended use. See (g) above.
j) Aspiration Hazard	Not an aspiration hazard.
11.2 Information on other hazards	N/A

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity

Read across from hop extract EC 232-504-3, toxicity to fish: *Carassius auratus* (goldfish) - Etude pharmacologique de l'action du lupulin et de la fleur d'organer sur le poisson. *Pharmaceutica acta Helvetiae* (1953) **28**(7-8), pp.183-206: lowest dose causing adverse effects estimated by calculation as ca. 80 mg/l.

Toxicity to *Daphnia* and other aquatic invertebrates:

Active component of Isohop, viz. potassium salts of hop iso- α -acids EC 205-303-0:

EC50 - *Daphnia magna* (Water flea) - >57 mg/l - 48 h.

NOEC - *Daphnia magna* (Water flea) - 57 mg/L - 48 h.

Toxicity to freshwater algae:

Active component of Isohop, viz. potassium salts of hop iso- α -acids EC 205-303-0:

ErC50 - *Pseudokirchneriella subcapitata* strain: CCAP 278/4 - >100 mg/l - 72 h.

NOEC - *Pseudokirchneriella subcapitata* strain: CCAP 278/4 - >100 mg/l - 72 h

12.2 Persistence and Degradability

Ultimate biodegradation (natural product).

12.3 Bioaccumulative Potential

Natural product, not expected to bioaccumulate.

12.4 Mobility in Soil

Log Koc 1.7 - 1.9 (modelling by EPISuite™)

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Endocrine disrupting properties

Not been assessed as an endocrine disruptor. We are not aware of any information indicating that hop iso-a-acids have endocrine disrupting properties.

12.7 Other adverse effects

N/A



13. DISPOSAL CONSIDERATIONS

- 13.1 Waste treatment methods** Dispose in accordance with all applicable local and national regulations. Labels should not be removed from containers until they have been cleaned. Contaminated containers should not be treated as household waste. Containers should be cleaned using appropriate methods and then re-used or disposed of by landfill or incineration as appropriate.

14. TRANSPORT INFORMATION

- 14.1 UN-number** Non-hazardous for transport
- 14.2 Proper shipping name** Non-hazardous for transport
- 14.3 Transport Hazard Class** Non-hazardous for transport
- 14.4 Packing Group** Non-hazardous for transport
- 14.5 Environmental Hazards:** Non-hazardous for transport
- 14.6 Special Precautions for user** Non-hazardous for transport
- 14.7 Maritime transport in bulk according to IMO instruments** Non-hazardous for transport

15. REGULATORY INFORMATION

- 15.1 Safety, Health, and Environmental Regulations** For food use
Germany: Water contaminant class 1 (self assessment) according to VwVwS from May 17th 1999 appendix 3. Do not discharge onto the ground or into watercourses.
Wassergefährdungsklasse:
WGK1 (Selbsteinstufung): schwach wassergefährdend Gemäß Anhang 3 der Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) vom 17.05.1999 Kenn-Nr.: 6390
- 15.2 Chemical Safety Assessments** N/A – for food use.



16. OTHER INFORMATION

- a) Revision information** Updated according to EU 2020/878
- b) Abbreviations**
- CAS Chemical Abstracts Service
- CLP Classification, Labelling and Packaging Regulation (EC) no. 1272/2008
- EC European Community/Commission
- PBT Persistent, Bioaccumulative and Toxic
- REACH Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) no. 1907/2006
- vPvB very Persistent, very Bioaccumulative
- c) Key literature references and sources for data**
- REACH registration dossiers for EC 305-203-0 for EC 295-619-8
- Glove breakthrough time: estimated by using cresol breakthrough time: Massey, L.K.. (2003). Permeability Properties of Plastics and Elastomers - A Guide to Packaging and Barrier Materials (2nd Edition) - Permeation Rates . William Andrew Publishing/Plastics Design Library. Retrieved from <https://app.knovel.com/hotlink/pdf/id:kt002WPFW2/permeability-properties/permeation-rates>
- d) Method used for classification of mixtures**
- Skin Irritation Category 2: On basis of test data, expert judgement and read-across from similar substance, together with bridging principle "dilution"
 - Eye Irritation Category 2: On basis of test data, expert judgement and read-across from similar substance, together with bridging principle "dilution"
 - Skin Sensitisation Category 1 On basis of test data, expert judgement and read-across from similar substance, together with bridging principle "dilution"
- e) H statements used in Section 3**
- H302 Harmful if swallowed
- H312 Harmful in contact with skin
- H314 Causes severe skin burns and eye damage
- H317 May cause an allergic skin reaction
- H318 Causes serious eye damage
- f) Training requirements for workers** N/A

The information in this safety data sheet is believed to be correct but does not purport to be all-inclusive and shall be used only as a guide. The information in this document is based on our present knowledge and should be used only as a supplement to information already in your possession concerning this product. It does not represent any guarantee of the properties of the product. The determination of

whether and under what condition the product should be used is yours to make. We do not accept any liability for loss, injury or damage that may result from its use.