


Section 1. Identification of the Substance and of the Company	
1.1 Product Identifier:	Tetrahop Gold®
Synonyms:	Reduced isomerized hop extract, 'Tetra', Tetrahydroiso-humulones, Tetrahydro-iso-alpha extract, Tetrahydro-iso-alpha-acids
1.2 Relevant Uses:	For use as an ingredient in brewing of beer.
1.3 Supplier:	BarthHaas / BarthHaas UK Ltd.
1.4 Emergency Contact Details:	<p>Hop Pocket Lane, Paddock Wood, Kent, TN12 6DQ, UK Emergency phone: +44 1892 833 415 (09:00 - 17:30 Mon-Thurs; 09:00 - 16:30 Fri, UK time) Email: enquiries@barthhaas.co.uk</p> <p>BarthHaas / John I. Haas, Inc. 1600 River Rd., Yakima, WA 98902, USA. Emergency phone: +1 202 777 4800 (office hours) Email: info@johnihaas.com</p>
Section 2. Hazards Identification	
2.1 Classification:	Not classified (Regulation (EC) No. 1272/2008) Not classified (Directive 67/548/EEC)
2.2 Label Elements	<p>According to Regulation (EC) 1272/2008 [CLP]:</p> <p><u>Hazard Pictogram:</u></p> <div style="text-align: center;">  </div> <p><u>Signal Word:</u> Warning</p> <p><u>Hazard Statements:</u></p> <p>H315: Causes skin irritation H317: May cause an allergic skin reaction H319: Causes serious eye irritation</p> <p><u>Precautionary Statements:</u></p> <p>P280: Wear protective gloves and eye protection</p> <p>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.</p>
2.3 Other Hazards:	This product is a bittering ingredient for beer. It is therefore extremely bitter, and it is mildly alkaline. Ingestion of a large dose may cause irritation of mouth, throat and digestive tract. Since the product is mildly alkaline, it may cause eye irritation if in contact with eyes.



Section 3. Components/Information on Ingredients

Component	Concentration (% m/m)	CAS no.	EC no.	REACH Registration No.	Classification according to Regulation (EC) 1272/2008 [CLP]
Potassium salts of hop tetrahydroiso- α -acids	9	92113-15-0	295-619-8	01-2120766317-48-0000	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: Read-across substance iso- α -acid, potassium salt is Skin Corr. 1 as per REACH assessment, but *In Vitro* assessment of the Skin Corrosion Potential of Isohop [30% m/m solution of read-across substance iso- α -acid 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 for final classification details.

Section 4. First Aid Measures

4.1 Description of First Aid Methods:	<p><u>Inhalation:</u> Remove to fresh air</p> <p><u>Skin contact:</u> Wash skin thoroughly with soap and water. If any symptoms persist obtain medical attention.</p> <p><u>Eye contact:</u> Flood the eye with plenty of water. If any symptoms persist obtain medical attention.</p> <p><u>Oral ingestion:</u> The product is extremely bitter and so it is very unlikely that anyone would ingest large amounts. Nevertheless, should this happen, rinse mouth out with water and drink a portion of water (<i>ca.</i> 200ml). Vomiting may occur but should not be induced.</p>
4.2 Most Important Symptoms and Effects	Skin and eye irritation.
4.3 Indication of Immediate Medical Attention or Special Treatment	Action as indicated in Section 4.1 above.

Section 5. Fire-Fighting Measures

5.1 Extinguishing Media:	Dry powder, foam, carbon dioxide or water
5.2 Special Hazards Arising from Substance:	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.

Section 6. Accidental Release Measures

6.1 Personal Protection:	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 for Cleaning 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.
Section 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:	Store at 15 - 25 °C (59 - 77°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.

Section 8. Exposure Controls/Personal Protection	
8.1 Control Parameters:	Not applicable.
8.2 Exposure Controls:	<p><u>Engineering Controls:</u> Not required.</p> <p><u>Eye/Face Protection:</u> Safety goggles.</p> <p><u>Hand Protection:</u> PVC, rubber, latex or nitrile gloves.</p> <p><u>Skin Protection:</u> If danger of splashing, wear a PVC or rubber apron.</p> <p><u>Respiratory Protection:</u> Not required.</p>

Section 9. Physical and Chemical Properties	
Appearance:	Pale yellow/amber liquid
Odour:	Hoppy, resinous
Odour Threshold:	No data available
pH:	8.5 - 11
Freezing Point:	No data available
Boiling Point:	93 - 104 °C (200 - 220 °F)
Flash Point:	Not applicable due to high water content
Evaporation Rate:	Not measured (high water content; substantial evaporation not expected at normal conditions)
Flammability:	Non flammable
Upper/Lower Flammability:	N/A
Vapour Pressure:	No data available
Vapour Density:	No data available
Density:	ca. 1,017 kg.m ⁻³
Solubility in Water:	Miscible
Partition Coefficient:	Miscible in water
Auto-ignition Temperature:	No data available
Decomposition Temperature:	No data available
Viscosity at 20 °C:	Approx. 2 - 10 mPas at 20°C
Explosive Properties:	None known
Oxidising Properties:	None known

Section 10. Stability and Reactivity	
10.1 Reactivity:	No reactivity hazards known
10.2 Stability:	Stable under normal conditions, if stored in accordance with 7.2 and 10.5
10.4 Conditions to Avoid:	None known

10.5 Incompatible Materials	Will precipitate if acidified.
10.6 Hazardous Decomposition Products	None known

Section 11. Toxicological Information

11.1 Information on Toxicological Effects:

Substance contains modified hop extracts, which may be safely used in beer, e.g. in accordance with US FDA regulation 21 CFR 172.560. Toxicological information is derived from REACH registration and from the read-across substance potassium salts of hop iso- α -acids, EC 305-203-0).

- (a) Acute toxicity: At concentration present, the material is not classified as hazardous. Estimated ATE values (oral, dermal) are 11,100 mg/kg bw for 9% m/m solutions.
- (b) Skin corrosion/irritation: Potassium salts of read-across substance hop iso- α -acids, EC 305-203-0 are classified as irritant to the skin according to OECD Guideline 439 (In vitro skin irritation). Therefore, a mixture containing 9% EC 295-619-8 will be classified as Skin Irritation Category 2 as a precaution. In vitro assessment of the skin corrosion potential of the read-across substance 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: Classified as Eye Irritation Category 2 as a precaution based on skin irritation classification and based on pH 8.5 - 11 (see Section 9).
- (a) Respiratory or skin sensitisation: EC 295-619-8 is classified for skin sensitisation by reading across from Hop Extract (EC 232-504-3), which is classified as a skin sensitiser according to in vitro methods. EC 295-619-8 present >1% in Tetrahop, hence Tetrahop is classified as Skin Sensitisation Category 1. The vapour pressure of EC 295-619-8 is very low: 9.5×10^{-9} Pa (estimated by EPISuite™) and therefore respiratory sensitization is not applicable.
- (b) Germ cell mutagenicity: In vitro mammalian cell gene mutation assay (CHO/HGPRT Mutation Assay) on read-across substance Rho-iso-alpha acids: not mutagenic. In vitro mammalian cell gene mutation assay (CHO/HGPRT Mutation Assay) on read-across substance hexahydro-iso-alpha acids: not mutagenic. Bacterial Reverse Mutation Assay on read-across substance 40% iso-alpha acids: not mutagenic.
- (c) Carcinogenicity: History of safe use as a component of beer.
- (d) Reproductive toxicity: Weight of evidence indicates lack of reproductive toxicity. History of safe use as a component of beer. Tetrahydroiso- α -acids are approved food additives for beer in the USA, under 21 CFR § 172.560.
- (e) STOT-single exposure: Weight of evidence indicates safety when used for its intended use - see (g) above.
- (f) STOT-repeated exposure: Weight of evidence indicates safety when used for its intended use - see (g) above.
- (g) Aspiration hazard: Not an aspiration hazard.

Section 12. Ecological Information

12.1 Toxicity: 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:

Read-across substance potassium salts of hop iso- α -acids EC 205-303-0:

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:

Read-across substance potassium salts of hop iso- α -acids EC 205-303-0:

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: Read-across substance potassium salts of hop iso- α -acids EC 205-303-0:

Log K_{oc} 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 Other adverse effects: No data.

Section 13. Disposal Considerations	
Product disposal:	Dispose of in accordance with all applicable local and national regulations.
Container disposal:	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, recycled or disposed of in accordance with applicable local or national regulations.
Section 14. Transport Information	
14.1 UN-Number:	Not listed
14.2 Shipping Name:	N/A
14.3 Transport Hazard Classes:	Not hazardous for transport.
14.4 Packing group:	Not listed
14.5 Environmental Hazards	Not listed
14.6 Special Precautions	None known
Section 15. Regulatory Information	
15.1 Safety, Health and Environmental Regulations:	<p>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.</p> <p>Wassergefährdungsklasse: WGK1 (Selbsteinstufung): schwach wassergefährdend Gemäß Anhang 3 der Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) vom 17.05.1999 Kenn-Nr.: 6390</p>
15.2 Chemical Safety Assessment:	N/A - for food use.

Section 16. Other Information

(a) Indication of changes:

Sections 2 and 3: classification updated following completion of REACH dossier and obtaining test data

Section 4.1: added information on rinsing mouth with water

Sections 4.2 and 4.3: revised according to classification

Section 6.2: updated and added information relating to amount of material handled

Section 7.3: updated following REACH registration

Section 8.2: updated to correspond to new classification and H and P phrases

Sections 9, 11, 12: New data added following REACH registration

Section 15: updated following REACH registration

(b) Key literature references and sources for data:

- REACH registration dossiers for EC 305-203-0 and EC 295-619-8

(c) Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]:

- Skin Irritation Category 2: On basis of expert judgment and read-across from similar substance
- Eye Irritation Category 2: On basis of expert judgment and read-across from similar substance
- Skin Sensitisation Category 1: On basis of expert judgment and read-across from similar substance

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.