Section 1. Identification of the Mixture and of the Company	
1.1 Product Identifier:	**Isohop®**
Synonyms:	Isomerized hop extract, 'Iso', Postfermentation Bittering, 'PFB'
1.2 Relevant Uses:	For use as an ingredient in brewing of beer.
1.3 Supplier: 1.4 Emergency Contact Details:	**Barth-Haas Group / Barth Haas UK Ltd.** 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: intray@BarthHaas.co.uk **BARTH-HAAS Group / John I. Haas, Inc.** 5185 MacArthur Boulevard, N.W., Suite 300, Washington DC, 20016 USA. Emergency phone: +1 202 777 4800 (office hours) Email: info@johnihaas.com
Section 2. Hazards Identification	
2.1 Classification:	According to Regulation (EC) 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 Statements: H315: Causes skin irritation H317: May cause an allergic skin reaction H319: Causes serious eye irritation Precautionary Statements: 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

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 isohumulones	ca. 20% or 30% depending on customer requirements	94349-84-5	305-203-0	01-2120766877-32-0000	Acute Tox. 4 H302, H312 Skin Irritation Category 2 Eye Irritation Category 2 Skin Sensitisation Category 1
Water	Balance	**7732-18-5**	231-791-2	N/A	Not classified

Section 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. If any symptoms persist obtain medical attention. 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.
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 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 processing aid. 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:	Engineering Controls: Not required. Eye/Face Protection: Safety goggles. Hand Protection: PVC, rubber, latex or nitrile gloves are all suitable and should be used. Skin Protection: Not normally required. Long-sleeved workwear recommended to avoid accidental skin contact. Respiratory Protection: Not required. Environmental Exposure Controls: Not required.
Section 9. Physical and Chemical Properties	
Appearance:	Pale yellow/amber liquid
Odour:	Hoppy, resinous
Odour Threshold:	No data available
pH:	7.5 – 10.5
Freezing Point:	< 0 °C
Boiling Point:	93 – 104 °C
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:	Vapour pressure of hop iso-α-acids is *ca*. 9 x 10^{-9} Pa
Vapour Density:	Not applicable – low vapour pressure
Density:	1,000 – 1,200 $kg.m^{-3}$
Solubility in Water:	Miscible. Will precipitate if acidified.
Partition Coefficient:	$LogP_{ow}$ for purified active component (hop iso-α-acids) is 2.7 – 4 at pH 7
Auto-ignition Temperature:	N/A
Decomposition Temperature:	No hazardous decomposition when used for its intended use.
Viscosity at 20 °C:	10 – 20 mPas at 20 °C
Explosive Properties:	Not explosive
Oxidising Properties:	Not an oxidizing agent

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:	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

Section 11. Toxicological Information

11.1 Information on Toxicological Effects:

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 values (oral, dermal) are 5000 or 3333 mg/kg bw for 20% or 30% m/m solutions, respectively.

(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 20% or 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 [20% or 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).

(a) Respiratory or skin sensitisation:

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 sensitiser 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.

(b) 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.

(c) Carcinogenicity:

Long history of safe use as a component of beer. Hop iso-α-acids are a natural component of beer from the traditional brewing process. Bacterial reverse mutation assay: not mutagenic.

(d) 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.

(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:
Active component of Isohop 10A, viz. potassium salts of hop β-acids:
EC50 - Daphnia magna (Water flea) – 1.87 mg/l - 48 h.
NOEC – Daphnia magna (Water flea) – 1.54 mg/L – 48 h.

Toxicity to freshwater algae:
Active component of Isohop 10A, viz. potassium salts of hop β-acids:
ErC50 - *Pseudokirchneriella subcapitata* strain: CCAP 278/4 – 18.57 mg/l - 72 h.
NOEC - *Pseudokirchneriella subcapitata* strain: CCAP 278/4 – 0.992 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 K_{oc} 2.7 – 2.9 (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	Not required
Section 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 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 dossier for EC 305-203-0

(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 test data and read-across from similar substance, together with bridging principle “dilution”
- Eye Irritation Category 2: On basis of expert judgment and read-across from similar substance, together with bridging principle “dilution”
- Skin Sensitisation Category 1: On basis of expert judgment and read-across from similar substance, together with bridging principle “dilution”

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.

Date of issue: 03 October 2012
Revision: 05 October 2018 (information from REACH registration of the same substance)