



YAKIMA CHIEF HOPS™



ISO

PRODUCT DATA SHEET

PACKAGED BY

Yakima Chief Hops
306 Division Street, Yakima, WA 98902 USA
Phone (509) 456-4792, Fax (509) 453-1551

DESCRIPTION

Iso is a clear pale yellow aqueous solution of the potassium salts of hop derived iso-alpha-acids. Iso is derived from a pure resin CO₂ extract of hops through an aqueous process and is standardized at 30% w/w by HPLC analysis. Custom blends and formulations may be available upon request.

PACKAGING & STORAGE

Standard packaging is available in 20 kg deltangular tight-head PET containers and 1000kg totes. Iso should be stored at room temperature or in a refrigerated environment, preferably between 59°F and 77°F (15°C and 25°C). Under these conditions, Iso will remain stable in a closed container for two (2) years. Opened containers should be used as quickly as possible.

APPLICATION & USAGE

Iso provides precise control of the pure bitter flavor of hops in beer. It is designed to economically add bitterness into beer through post-fermentation injections. It allows for greater flexibility in brewing through post-fermentation bitterness adjustments (bitterness corrections, product differentiation, etc.). Yakima Chief Hops recommends direct, undiluted injection of Iso into the beer stream via a positive displacement pumping system. If an appropriate pump is not available, Iso can be diluted with de-ionized water. The dilution factor will be determined by the available dosing installation. Buffering agents are not required and CO₂ back pressure should not be used. Iso should be added to beer after fermentation and primary filtration, at a point where there is sufficient mixing but no foaming, and ideally before a final filtration step (e.g. before trap filter). A good proportioning over 75% of the transfer time is recommended. A 2-3 mm in diameter dip tube positioned in the middle of the beer stream and oriented against it provides excellent dispersion.

USE RATE CALCULATIONS

In optimal conditions, the addition of 100g of Iso 30% per 100 barrels of finished beer will provide 1.8 bitterness units. To calculate use:

$$\text{kg product} = \text{IBU} / 90 \times \text{hl} / 30$$

Where: IBU = international bitterness unit desired, hl = hectoliters of finished beer (1 barrel = 1.173 hectoliters).

Use rates may vary depending on the brewing process and the desired hopping level.

CHARACTERISTICS

Flavor of a solution in de-ionized water containing 30 mg/L of Iso-alpha-acids: Fine bitterness with no detectable flavors

Aroma of a solution in de-ionized water containing 30 mg/L of Iso-alpha-acids: None Detectable

Gushing potential in beer: No increased potential



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SPECIFICATION SHEET

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HOP ACIDS ASSAY	METHOD	TYPICAL ANALYSIS
Iso-alpha-acids (IAA)	HPLC by EBC 7.8 or ASBC HOPS-16 (Iso Std.)	30% +/- 1.0% (w/w)
Residual alpha-acids	HPLC by EBC 7.8 or ASBC HOPS-16 (Alpha Std.)	< 0.5% (w/w)
Residual beta-acids	HPLC by EBC 7.8 or ASBC HOPS-16 (Alpha Std.)	< 0.5% (w/w)

	METHOD	TYPICAL ANALYSIS
Area Purity	IAA Peak Area as % of Total Area HPLC by EBC 7.8 or ASBC HOPS-16 (Iso Std.)	> 90 %
pH		8.5 - 11.0
Haze of 1.0% Solution	Haze Units, EBC 9.16	< 0.5
Specific Gravity		1.02 +/- 0.01
Lead		< 1.0 ppm
Arsenic		< 0.5 ppm
Cadmium		< 0.03 ppm
Total Heavy Metals (as Pb eq.)		< 10 ppm

* NOTE: Concentration dependent upon variety of hops and crop year



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SAFETY DATA SHEET

1. PRODUCT IDENTIFICATION

1.1 Product Name	Iso (Iso 10%, Iso 30%, Aqueous Iso, Potassium Salts of iso-alpha-acids) Made from CO2 Hop Extract
1.2 Supplier	Yakima Chief Hops, Inc. 306 Division St. Yakima, WA 98902 (USA) Phone: 1.509.453.4792 Email: Quality@Yakimachief.com Website: Yakimachief.com
1.3 Recommended Use	Ingredient used in brewing beer.
1.4 Restrictions on Use	None

2. HAZARD IDENTIFICATION

2.1 Hazard Classification	Not Applicable Product is natural.
2.2 Label Elements	Not Applicable
2.3 Other Hazards	Prolonged skin contact could cause dermatitis in some individuals.

3. COMPOSITION, INGREDIENT INFORMATION

3.1 Composition	An aqueous solution of the potassium salts of the iso-alpha-acids produced by isomerizing the alpha-acids in CO2 extract.
3.2 Hazard Components	Not Applicable Product is natural.

4. FIRST AID MEASURES

4.1 Oral Ingestion	Not Applicable
4.2 Eye Contact	Wash with copious amounts of water. Seek medical attention if irritation persists.
4.3 Skin Contact	Wash with warm, soapy water. Seek medical attention if irritation persists. Launder contaminated clothing before reuse.
4.4 Inhalation	Remove affected person to fresh air. Administer oxygen if necessary.
4.5 Symptoms	None Known

5. FIRE FIGHTING MEASURES

5.1 Extinguishing Media	Dry Powder, Foam, Water, CO2
5.2 Hazards from Fire	None Known

6. ACCIDENTAL RELEASE MEASURES

6.1 Procedure	Scoop/shovel spilled material into recovery container. Flush area with hot soapy water to remove final traces.
6.2 Protective Equipment	Use adequate ventilation or a respirator if in a confined area. Use rubber gloves. Wear Safety Glasses.

7. HANDLING AND STORAGE

7.1 Handling Equipment	Closed Container of Food Grade Quality Stainless Steel, Lacquered Steel or PET
7.2 Precautions	Avoid prolonged skin contact. Use personal protective equipment (Section 8)
7.3 Storage Conditions	Store in unopened container at 59°F to 77°F (15°C to 25°C)

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

8.1 Permissible Exposure Limits (PELs)	Not Applicable
8.2 Threshold Limit Values (TLVs)	Not Applicable
8.3 Engineering Controls	Provide adequate ventilation
8.4 Personal Protective Equipment (PPE)	Skin Protection: wear rubber gloves if prolonged exposure Eye Protection: wear safety glasses

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance & Odor	Pale yellow liquid w/ slight resinous odor.
9.2 Odor	Slight resinous odor.
9.3 Odor Threshold	No data available
9.4 pH	8 - 10
9.5 Freezing Point	< 0°C
9.6 Boiling Point	> 100°C
9.7 Flash Point	Not applicable
9.8 Evaporation Rate	< 1
9.9 Flammability	No data available
9.10 Upper/Lower Flammability	No data available
9.11 Vapor Pressure	No data available
9.12 Vapor Density	No data available
9.13 Density	1.02 +/-0.01 or 1.07 +/- 0.01
9.14 Solubility in Water	Complete at pH 10
9.15 Partition coefficient	No data available
9.16 Auto-ignition Temperature	No data available
9.17 Decomposition Temperature	No data available
9.18 Viscosity	No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity	Product is sensitive to oxidation in open containers, and/or under excessive temperatures
10.2 Stability	Product is stable under appropriate storage conditions, in closed containers and/or under inert atmosphere. (Section 7.3)
10.3 Possibility of Hazardous Reactions	None known
10.4 Conditions to Avoid	See Section 7.3
10.5 Incompatible Materials	None Known
10.6 Hazardous Decomposition Products	None Known

11. TOXICOLOGICAL INFORMATION

11.1 Acute Toxicity	None Known. Product is "Generally Recognized As Safe" (GRAS 21 CFR 182.20)
11.2 Routes of Exposure	Inhalation: No data available Ingestion: No data available Skin contact: No data available Eye contact: No data available
11.3 National Toxicology Program	Not listed on Report of Carcinogens

12. ECOLOGICAL INFORMATION

12.1 Toxicity	No data available
12.2 Potential for Persistence and Degradation	No data available. Product is all natural and biodegradable.
12.3 Bioaccumulation	No data available. Product is all natural.
12.4 Mobility in Soil	No data available
12.5 Other effects	No data available

13. DISPOSAL CONSIDERATIONS

13.1 Product Disposal	According to regulations in force.
13.2 Packaging Disposal	According to regulations in force; for paper/cardboard, steel and PET.

14. TRANSPORTATION INFORMATION

14.1 UN Number	Non-hazardous product
14.2 Shipping Name	Iso
14.3 Hazard Class	Non-hazardous product
14.4 Packing Group	Non-hazardous product
14.5 Environmental Hazards	Non-hazardous product
14.6 Other	Product is not classified as ADR and should not be transported along with ADR classified Cargo. Product should be stored away from engines or any heat source during transportation.

15. REGULATORY INFORMATION

15.1 Regulations	Food Safe Heavy Metals, Pesticides/Herbicides/Fungicides, Nitrates, Radioactivity: Below tolerance levels. Allergenic-Free Non-GMO Traceable
15.2 REACH	Not Applicable (No EINECS Ref.)

16. OTHER INFORMATION

16.1 Issue Date	2015-05May-26
16.2 Revision Date	2018-08Aug-20
16.3 Other	