YCHHOPS

nqa. ISO 9001 Registered Quality Management

PRODUCT DATA SHEET

Whole Leaf Hops

PACKAGED BY

Yakima Chief - Hopunion
203 Division Street, Yakima, WA 98902 USA
P 509.453.4792 // F 509.453.1551

DESCRIPTION

Whole leaf hops are the dried and pressed inflorescences of female hop plants. The cones are removed from the plants, kiln-dried to 8.5-10.5% moisture, and pressed into bales on the farms where they are grown – all within hours of being harvested in the field. Leaf hops embody the characteristics of the variety, as well as the unique aspects of their field, growing season, and farm management systems. Leaf hops are suitable for use in all stages of brewing, from kettle bittering through dry-hopping in the fermenter. They are supplied to brewers as whole, quarter, or mini bales, ready for immediate use. Leaf hops are available for most hop varieties. Informational summaries for these hop varieties are available at ychhops.com.

ALTERNATE PRODUCT NAMES

Whole leaf hops are also known as raw hops or leaf hops.

APPLICATION

Leaf hops are primarily used in kettle additions to provide bitterness and hop character to beer, or in post-fermentation dry hopping applications to provide aroma and flavor. It is generally recognized that kettle hopping with leaf hops leads to improved trub formation and improved antimicrobial and anti-foaming properties.

ADDITION PROCEDURE

Add the leaf hops into wort before or early into kettle boil for bitterness and the best utilization of alpha acid. Add aroma varieties late in kettle boil to maximize the aroma properties of beer. Leaf hops can be added into the brew kettle during kettle boil loose, or via custom designed dosing systems. Leaf hops can also be used for dry hopping during fermentation, although T-90 hop pellets are a more efficient choice for this application.

USE RATE CALCULATIONS

Addition during early kettle boil to achieve average bitterness in high gravity wort/beer will typically lead to the extraction and isomerization of about 25% of the alpha acids in the finished beer. Addition rate is thus calculated as follows:

kgA = BU x HL / 2500
Where: kgA = kg of alpha acids to add in the brew kettle
BU = the desired amount of bitterness units in the finished beer
HL = hectoliters of finished beer (1 barrel = 1.173477657999771 hectoliter)
Use rates may vary depending on the brewing process and the desired hopping level

Addition during kettle boil to provide bitterness and/or aroma will be dependent on the time of the addition and the desired hop character in the finished beer. Hop formulation and addition rates will be determined on a case-by-case basis. Also, additional rates during or post-fermentation to reinforce aroma in beer will be determined on a case-by-case basis.

AROMA

Aromatic characteristics are variety specific. The perception of hoppy character and additional aroma descriptors in beer will also be variety specific in some instances depending on the quantity of leaf hops added and the time of addition. Aroma descriptors include, but are not limited to citrus, tropical fruit, stone fruit, pine, cedar, floral, spicy, herbal, earthy, tobacco, onion/garlic and grassy.

PACKAGING

Leaf hops are delivered in burlap or plastic-fiber mesh. Standard bales weigh approximately 200 pounds (90.7 kg) and measure approximately 56" x 16" x 26" (142.2cm x 40.6cm x 66cm). Half-bales are available and are typically shrink-wrapped for transport. Quarter-bales are sealed in a nitrogen flushed, vacuum sealed foil bag, and shipped in cartons. 11 lb portions are sold in nitrogen flushed, vacuum sealed foil bags and shipped in cartons.

STORAGE

Leaf hops should be stored near-freezing, preferably between 30°F and 41°F (-1°C and 5°C). They will remain stable in closed containers under the following conditions: 1 year in bales or 3 years in nitrogen flushed, vacuum sealed packaging.

Storage stability does vary per variety and can be negatively affected by exposure to oxygen, heat and/or light.

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SPECIFICATION SHEET

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	METHOD	TYPICAL ANALYSIS
ALPHA ACIDS ASSAY*	UV Spectro. by ASBC HOPS-6A	2.5 - 17.5% (w/w)
BETA ACIDS ASSAY*	UV Spectro. by ASBC HOPS-6A	3.0 - 9.0% (w/w)
HOP STORAGE INDEX	ASBC HOPS-12	Varies by variety & time from harvest
LEAD		< 1.0 ppm
ARSENIC		< 0.5 ppm
CADMIUM		< 0.03 ppm
TOTAL HEAVY METALS (as Pb eq.)		< 10 ppm
PESTICIDES	US regulations and EC Dir. 90/642/EEC w/ amendments	

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

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SAFETY DATA SHEET

Whole Leaf Hops

1. PRODUCT IDENTIFICATION

1.1 Product Name	Whole Leaf Hops (raw hops, leaf hops) Whole, kiln-dried hop cones without leaf and stem
1.2 Supplier	Yakima Chief - Hopunion, LLC 203 Division St. Yakima, WA 98902 (USA) Tel.: 800 952 4873 555 West South Hill Road PO Box 209 Sunnyside, WA 98944 (USA) Tel.: (509) 839-9022
1.3 Emergency Contact	Yakima Chief - Hopunion, LLC 203 Division St. Yakima, WA 98902 (USA) Tel.: 800 952 4873 Website: ychhops.com
1.4 Recommended Use	Ingredient used in brewing beer
1.5 Restrictions on Use	None

2. HAZARD IDENTIFICATION

2.1 Hazard Classification	Not applicable; product is natural, unrefined and contains no additives
2.2 Label Elements	Not applicable
2.3 Other Hazards	Dust may be a mild irritant to the eyes Prolonged skin contact could cause dermatitis in some individuals Dust generated during sweeping of spilled product may cause severe respiratory distress in some individuals

3. COMPOSITION, INGREDIENT INFORMATION

3.1 Composition	Compressed, kiln-dried hop cones without leaf and stem
3.2 Hazard Components	Not applicable; product is natural, unrefined and contains no additives

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	Move affected person to fresh air Administer oxygen if necessary
4.5 Symptoms	None known

5. FIRE FIGHTING MEASURES

5.1 Extinguishing Media	Water, CO_2
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, laminated aluminum foils or PET pouches
7.2 Precautions	Avoid generating excessive dust and prolonged skin contact Use personal protective equipment (Section 8)
7.3 Storage Conditions	Store in dry, odor free environment at temperature range of 30°F to 41°F (-1°C to 5°). Remains stable for 3 years when vacuumed sealed in foils; 1 year in whole bale form. Prolonged exposure to high temperatures may cause foils to burst and reduced quality.

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 Respiratory Protection: wear facemask if dust will be generated

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance	Green or yellow compressed cones
9.2 Odor	Pungent, herbal, vegetative odor
9.3 Odor Threshold	No data available
9.4 pH	No data available
9.5 Freezing Point	No data available
9.6 Boiling Point	No data available
9.7 Flash Point	No data available
9.8 Evaporation Rate	Not applicable; solid
9.9 Flammability	No data available
9.10 Upper/Lower Flammability	No data available
9.11 Vapor Pressure	Not applicable; solid
9.12 Vapor Density	Not applicable; solid
9.13 Density	Varies with variety
9.14 Solubility in Water	Insoluble
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	Not applicable; solid

10. STABILITY AND REACTIVITY

10.1 Reactivity	Product is sensitive to oxidation and drying 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	Whole Leaf Hops
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	26 May 2015
16.2 Revision Date	
16.3 Other	