



YAKIMA CHIEF HOPS®



AMERICAN NOBLE HOPS™

PRODUCT DATA SHEET

PACKAGED BY

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

DESCRIPTION

American Noble Hops™ is produced from whole leaf hops using Yakima Chief Hops' proprietary cryogenic separation process that preserves all components of each fraction. American Noble Hops™ is the leafy part of the hop cone (bract and strig) which has had most of the lupulin removed resulting in a "de-bittered" hop. It is a high quality, low alpha alternative to provide noble character to beer. Analytically, American Noble Hops™ appears similar in character to noble hops but may be derived from higher resin Northwest varieties such as Simcoe® Brand, Mosaic® Brand and Cascade. American Noble Hops™ may be used anywhere pellets may be used in any style but particularly in Pilsner, Kölsch, Blonde, and sour styles including Gose, Gueuze, and Berliner Weisse.

PACKAGING & STORAGE

American Noble Hops™ is packaged inside polyethylene pouches and/or metallic polyester foils ranging from 11lb (5kg) to 44lb (20kg) capacities and shipped in cardboard cartons. Packaging is done with a nitrogen flush under inert atmosphere. American Noble Hops™ is packaged based on kg net weight or kg alpha acids. A complete list of packaging information can be obtained upon request. American Noble 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: 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

APPLICATION & USAGE

American Noble Hops™ may be used anywhere pellet hops can be used. It is best used for kettle additions where it can be separated in the whirlpool trub. When formulating recipes the alpha content of the lot should be used to calculate bittering as would be done for whole leaf or pellet hops:

kg product = IBU / 30 x hl / Alpha%

Where: IBU = international bitterness unit desired, hl = is hector liters of finished beer (1 barrel = 1.173 hectoliter), Alpha % = equals alpha %w/w content from CofA as a whole number. Use rates may vary depending on the brewing process and the desired hopping level.

American Noble Hops™ is best used in beer styles with mild bitterness and pleasant but not dominant hop flavors and aromas. Because of the low alpha content American Noble Hops™ is a good choice for sour beer production because it will have a minimal effect on lactic acid bacteria while contributing polyphenols and glycosides typical of low alpha hops. Some brewers have found success using American Noble Hops™ in the mash to aid runoff and contribute antioxidants on the theory they will limit mash oxidation.

BENEFITS

American Noble Hops™ enables a brewer to use classic US aroma varieties in beer styles which typically are brewed with noble hops. American Noble Hops™ resembles a noble hop in alpha content but the bract itself still contains many other aromatic and brewing characteristics of the variety. When used, American Noble Hops™ contributes pleasant noble bitterness and many aspects of the whole cone's aroma thanks to extraction of water soluble flavor compounds like glycosides and polyphenols.

- Noble hop replacement with reliable supply
- High quality low alpha hop product
- Unique flavor profiles from high resin hops
- Source of polyphenols and antioxidants
- Low cost



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SPECIFICATION SHEET

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| | METHOD | TYPICAL ANALYSIS |
|---------------------------------------|---|---------------------------------------|
| Alpha Acids Assay* | UV Spectro. by ASBC HOPS-6A | 0.5 - 6.0% (w/w) |
| Beta Acids Assay* | UV Spectro. by ASBC HOPS-6A | 0.5 - 2.0% (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 | Comply with US Regulations & EC Directive 396/2005 Amendments | |

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



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SAFETY DATA SHEET

1. PRODUCT IDENTIFICATION

| | |
|-------------------------|--|
| 1.1 Product Name | American Noble Hops™ (Bract of hop cones) Made from dried and ground hop cones |
| 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, 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 | A course powder or pellets composed of ground hops, produced by milling and sieving, dried, hop cones. |
| 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 | Remove affected person to fresh air. Administer oxygen if necessary. |
| 4.5 Symptoms | None Known |

5. FIRE FIGHTING MEASURES

| | |
|-------------------------|------------|
| 5.1 Extinguishing Media | 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, 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°C). 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

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|--------------------------------|---|
| 9.1 Appearance & Odor | Yellow, green or brown powder or pellet with an herbal, pungent odor. |
| 9.2 Odor | Typical hoppy, depends on variety |
| 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 production parameters |
| 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 in open containers, in absence of inert atmosphere 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

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|--|--|
| 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

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|-------------------------|--|
| 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

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|----------------------------|---|
| 14.1 UN Number | Non-hazardous product |
| 14.2 Shipping Name | Milled Bract |
| 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

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|------------------|---|
| 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

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|--------------------|---------------|
| 16.1 Issue Date | 2015-11Nov-10 |
| 16.2 Revision Date | 2021-02Feb-11 |
| 16.3 Other | |