YAKIMA CHIEF HOPS™

April 09, 2024

To: Yakima Regional Clean Air Agency
186 Iron Horse Court, Suite 101
Yakima, WA. 98901-2303

Fr: Salvador Benitez
VP, Operations
Yakima Chief Hops, LLC
306 Division Street
Yakima, WA. 98902

Number of Copies (including this cover page): 44 Pages

Attn: Dr. Hasan Tahat, Ph. D

Re: New Source Review Application (NSR)

Attached is the NSR form for 555 W South Hill Road facility of Yakima Chief Hops, LLC. The packet includes the following:

- Cover Letter (1 page)
- Purchase Order for the NSR Application Fee (1 page)
- Company Check (1 page)
- NSR Form (7 pages)
- SS Cryo Pilot Line Site Layout & Emission Points (2 Page)
- Process Flow Diagram – Cryo Pilot Line PFD 2024 (2 pages)
    - Cryo Main Line PFD Rev 2024
- Equipment List – Cryo Pilot Line (1 Page)
- Operations & Equipment Manuals – Cryo Pilot Line (10 pages)
    - Cyclone, Blower and Dust Collector Documents
- Product Data Sheets (14 pages)
    - Whole Leaf Hops & CryoHops
- Section II – Emissions Estimations and Calculations (1 page)
- Section III – Emission Data (1 page)
- Section IV – Air Pollution Control Equipment – Baghouse (1 page)
- Section IV – Air Pollution Control Equipment – Cyclone (1 page)
- Air Pollution Emissions Calculation (1 Page)

Any question about the report, I can be reached at (509) 901-8287 or call Art Ortega at (509) 839-9274.

Regards,

Salvador Benitez

Yakima Regional Clean Air Agency
INSTRUCTIONS FOR PERMIT APPLICATION

Use this sheet as a checklist to determine when your application is substantially complete.

☛ Each PERMIT APPLICATION for the construction, installation or establishment of a new air contaminant source, or modification of existing air pollution source or control equipment or permit, needs to be accompanied by the following information to be considered complete:

Included	N/A	
☒	☐	Process flow sheets and equipment layout diagrams.
☒	☐	Control equipment manufacturer, model number, size, serial numbers (for each piece of control equipment).
☒	☐	Quantify average and maximum hourly throughput values, average yearly totals, and maximum concentrations for each pollutant.
☒	☐	Applicant's calculation of the kinds and amounts of emissions for each emission point, materials handling operation or fugitive category (both controlled and uncontrolled).
☒	☐	Plot plan including identification of proposed emission points to the atmosphere, distance to property boundaries, height of buildings and stack height above ground level.
☒	☐	Identification of raw materials and/or product specifications (physical and chemical properties) and typical ranges of operating conditions as related to each emission point (toxic air contaminants require a separate summary); Material Safety Data Sheets (MSDS) should be included in the PERMIT APPLICATION for all compounds used.
☒	☐	Identification of the methods/equipment proposed for prevention/control of emissions to the atmosphere.
☒	☐	Information sufficient to demonstrate the ability of the emission controls proposed as being consistent with those provided in the applicable regulations (BACT/NSPS/RACT/NESHAPS/LAER analysis). See attached worksheet for typical layout of BACT analysis information.
☐	☒	The kinds and amounts of emission offset credits proposed for assignment when operations are within a non-attainment boundary (see WAC 173-400-120 and 131).
☐	☒	Estimates of the proposed project ambient impact under average and least favorable conditions where pertinent to PSD (WAC 173-400-720) or Toxic Air Pollutants (WAC 173-460) requirements.
☒	☐	Additional information, evidence, or documentation as required by the Board of Directors, or the Control Officer, to show that the proposed project will meet federal, state and local air pollution control regulations.
☐	☒	For applications that include equipment that has previously been approved, authorized or registered, a lapse is considered to have occurred if the registration fees are delinquent for more than one calendar year or the source has not operated within five years prior to the receipt of any required PERMIT APPLICATION (WAC 173-400-110).
☐	☒	Applications that include previously approved or authorized equipment require that additional information regarding previous owners or approvals be provided so that YRCAA records can be updated. Equipment registered and/or approved for a given company cannot be authorized without a legal name change, purchase of company or equipment, or a legal contract or subcontract to do business with or for the approved source. Responsibility for operation of authorized equipment rests with the registered source.
☐	☒	All applications need to be accompanied with a completed SEPA checklist or SEPA determination. YRCAA may process the SEPA determination, if no other agency has done it. In this case a SEPA checklist with the proper fees must be submitted with the NSR application.

☛ The application transmittal shall conform to YRCAA review requirements wherever possible as detailed in the General Regulations for Air Pollution Sources (WAC 173-400).

☛ Each drawing, document, or other form of transmittal considered by the applicant to be proprietary and confidential must be suitably identified as confidential in red ink, and signed and dated by the applicant or its agent. Be aware that YRCAA follows the requirements in 40 CFR 2 for determination of confidentiality. YRCAA may not process company sensitive information as confidential.

☛ Orders of Approval (to construct, modify, or install) are issued for specific equipment or processes described in the application. Changes to the processes or control equipment are not allowed without new source review (Permit Application and Permit) if these changes result in an emission of a different type or an increase in emissions (WAC 173-400-110). Process equipment changes that result in decreased emissions require notification to YRCAA.

☛ The SIC code is identified as the four digit major group classification in the 1987 Standard Industrial Code Classification Manual listing of SIC codes can be obtained for free from the internet.

☛ Mail or deliver in person the completed application package to:

Yakima Regional Clean Air Agency
186 Iron Horse Court, Suite 101
Yakima, WA 98901-2303

☛ **Application fees must accompany application for the application to be considered complete. An invoice will be sent out for the Engineering review after final decision on the application. Make checks payable to "Yakima Regional Clean Air Agency" or "YRCAA".**

☛ **The PERMIT APPLICATION package submitted must be complete. All applications are screened for completeness before processing. Applicants submitting incomplete application packages will be notified of their incomplete status and may result in a delay in processing the application.**

Yakima Regional Clean Air Agency

PERMIT APPLICATION / NEW SOURCE REVIEW

BACT ANALYSIS WORKSHEET

Facility Name: Yakima Chief Hops, LLC **Date:** 04/05/2024

CONTROL ALTERNATIVE	EMISSIONS [lbs/hr] & [tons/yr]	EMISSIONS REDUCTION (a) [tons/yr]	INSTALLED CAPITAL COST (b) [$]	TOTAL ANNUALIZED COST (c,g) [$]	AVERAGE COST EFFECTIVENESS OVER BASELINE (d) [$/ton]	INCREMENTAL COST EFFECTIVENESS (e) [$/ton]	ENERGY INCREASE OVER BASELINE (f) [mmBtu/yr]	TOXICS IMPACT [Yes/No]	ADVERSE ENVIRONMENTAL IMPACT [Yes/No]
1) See attached documents									
2)									
3)									
4)									
5) Uncontrolled Baseline (worst case - no controls)									

(a) Emissions reduction over baseline control level.
(b) Installed capital cost relative to baseline.
(c) Total annualized cost (capital, direct, and indirect) of purchasing, installing, and operating the proposed control alternative. A capital recovery factor approach using a real interest rate (i.e., absent inflation) is used to express capital costs in present-day annual costs.
(d) Average cost effectiveness over baseline is equal to total annualized cost for the control option divided by the emissions reductions resulting from the uncontrolled baseline.
(e) The optional incremental cost effectiveness criterion is the same as the average cost effectiveness criteria except that the control alternative is considered relative to the next most stringent alternative rather than the baseline control alternative.
(f) Energy impacts are the difference in total project energy requirements with the control alternative uncontrolled baseline expressed in equivalent millions of Btus per year.
(g) Assumptions made on catalyst life may have a substantial affect upon cost effectiveness.

Notes:

The number of alternatives to be evaluated will vary depending on application.
Values for each variable should be provided as they are applicable. Use N/A if not applicable.
Emission rates are the expected or predicted emission rates.
Calculations should provide for a range of alternatives.
Emissions reduction should use estimated efficiency if actual efficiency is unknown - should so state.
Attach worksheets as necessary to substantiate above values.

YAKIMA REGIONAL CLEAN AIR AGENCY

186 Iron Horse Court, Suite 101. Yakima, WA. 98901
Phone: (509) 834-2050 Fax: (509) 834-2060
Website: http://www.yakimacleanair.org

Filing Fee: $400.00*

***Pursuant to WAC 173-400-111(1) (e)-an application is not complete until the permit application filling fee required by YRCAA has been paid.**

OFFICAL USE ONLY

YRCAA NSR No: NSRP-06-YCH-24 Date Fee Paid: 06/03/2024

Received by: e-mail 06/19/24 Filing Fee: **$400.00** ✓

☐ YRCAA is the lead agency for the SEPA process. Processing Fee $400.00

Review of the application will not begin, until the application filling fee is paid. A surcharge fee for the time required for preparing and processing the application for approval will be invoiced after the permit to operate is issued.

New Source Review (NSR) Application General

Stationary/Permanent Source

INSTALLATION OR ESTABLISHMENT OF NEW AIR CONTAMINANT SOURCES

NSR Application is Required for Construction, Installation or Establishment of an Air Pollution Source
Or
Replacement or Substantial Alteration of Emission Control Technology on an Air Pollution Source or Equipment

I. General Information:

BUSINESS NAME Yakima Chief Hops, LLC

NATURE OF BUSINESS Hop Processing - From Leaf to Pellets

MAILING ADDRESS 306 Division St. Yakima, WA 98902

FACILITY ADDRESS (if different): 555 W. South Hill Road, Sunnyside, WA 98944

PHONE and FAX NUMBERS ( ) 509-839-9022 Email: salvador.benitez@yakimachief.com

TYPE OF PROCESS, EQUIPMENT, OR APPARATUS Baghouses & Blowers - See Attached Process Flow Diagram

LIST OF AIR CONTAMINANT(S) WHICH WILL BE PRODUCED AND/OR CONTROLLED Fugitive Hop Dust

ESTIMATED STARTING DATE: 05/05/2024

ESTIMATED COMPLETION DATE: 8/31/2024

Compliance with SEPA (State Environmental Policy Act) - Check One of the Options Below:

- ☐ A DNS or EIS has been Issued by Another Agency for this Project and a Copy is Attached.
- ☐ If no DNS or EIS Exists for this Project, a Completed Checklist for this Project and the SEPA Processing Fee are Attached. *YRCAA SEPA checklist is available by phone, or by our website.*
- ☐ The city/county has established an exemption for this project.
- ☐ I certify that the SEPA has been satisfied or this project is exempt:

_____ *by* _____
Date *Government Agency*

Previous NSR/Air Permits Number issued by YRCAA for the Facility, if any _____

Describe Input to Output Process (Attach drawings, schematics, prints, or block diagrams) See attached Process Flow Diagram (Cryo Pilot Line). Note the Process begins at the Bale Breaker when the Leaf Hops are removed from Burlap and are placed on the equipment.

ESTIMATED COSTS: OF BASIC SOURCE EQUIPMENT $ 25,000

OF CONTAMINANT CONTROL APPARATUS $ 25,000

Process: Production Output per Year (tons, pounds, etc) 1.5 Million Pounds Annually

Maximum Output per Hour (tons, pounds, etc) 700lbs/hr

Percentage of Production (%)

Dec - Feb 50% Mar – May _____

Jun - Aug _____ Sep – Nov 50%

Operating Schedule: Hrs/Day 24 Days/Wk 5 Wks/Yr 20

*The other 32 Weeks Varies, but Mostly the Plant is Shutdown

II. Emissions Estimations and Calculations:

1. Criteria Pollutants (gr/dscf, tons/yr, lbs/hr., ppm, etc.)

Particulate (PM_{10},$PM_{2.5}$) PM2.5 (Also, See Attached)

Volatile Organic Compounds N/A

Nitrogen Oxides N/A

Sulfur Oxides N/A

Carbon Monoxide N/A

Lead N/A

2. Toxic Air Pollutants (Name) Quantity (in gr/dscf, tons/yr, lbs/hr. ppm, etc.)

N/A

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- ☐ If no DNS or EIS Exists for this Project, a Completed Checklist for this Project and the SEPA Processing Fee are Attached. *YRCAA SEPA checklist is available by phone, or by our website.*
- ☑ The city/county has established an exemption for this project.
- ☐ I certify that the SEPA has been satisfied or this project is exempt:

6/17/24 *Date* by [signature] *Government Agency* City Planner, Sunnyside WA

Previous NSR/Air Permits Number issued by YRCAA for the Facility, if any _____

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Volatile Organic Compounds N/A

Nitrogen Oxides N/A

Sulfur Oxides N/A

Carbon Monoxide N/A

Lead N/A

2. Toxic Air Pollutants (Name) — Quantity (in gr/dscf, tons/yr, lbs/hr. ppm, etc.)

N/A

*Air Pollution Equipment

3. Fugitive Pollutants (Source) | Quantity (in gr/dscf, tons/yr, lbs/hr. ppm, etc.)

Hop Leaf / Dust for Anex #1, Sweco Shaker, Weigh Rite Scale | This product is returned for reprocessing into the product stream. See Attached Documents

4. Air Pollution Modeling

Results

Computer Printout Attached? ☐Yes ☒No

III. Emission Data:

1. Stack

Height (Feet) N/A Inside Diameter (feet) N/A

Gas Exit Temp (degrees F) N/A Gas Exit Velocity (ft/min) N/A

Flow Rate (cfm) N/A

Shared Stack? If a shared stack, identify process (es) or point(s) which share the stack.

Distance from Stack to Property Line N/A

2. Discharge Point or points (if no stack or other than stack) (SEE ADDITIONAL ATTACHED DOCUMENTS)

Height (feet) 11.5 Inside Diameter (feet) 1.4

Gas Exit Temp (degrees F) ~20 Gas Exit Velocity (ft/min) 981

Flow Rate (cfm) 1,500

Shared discharge point? If a shared discharge point, identify process (es) or point(s) which share the discharge point. No Shared Emission Points

Distance from discharge point to Property Line N/A

3. Fuel

Type N/A % Sulfur N/A

% Ash N/A Unit of Measure (gal./cu.ft./etc.) N/A

BTU per Unit of Measure N/A Consumption Units per Year N/A

Maximum Consumption Units per Hour N/A

4. Building Dimensions

Height (feet) 25 Length (feet) 38 Width (feet) 24

Air Pollution Equipment Item #1

IV. Air Pollution Control Equipment:

Baghouse
SEE ATTACHED

Type Donaldson — Model #, Serial # FB-30 Dust Collector

Efficiency 99.95 @ 2 Micron — $PM_{2.5}$: .004 gr/dscf — and PM_{10}:

Bag Height (feet) 4.96 — Bag Diameter (feet) 1.03

Filter Area (feet squared) 129 — Blower Flow Rate (cfm) 1,500

Filter Media Dura-Life Oleophobic — Dimensions (feet) 2.17x 4.50 x 10.08

Discharge Area Dimensions (feet) 3.1sq ft

Cleaning Mechanism (shake) (air psi) Shake

Other Data

Scrubber

Type N/A — Model #, Serial # N/A

Efficiency

Gas Differential Pressure (psi) — Liquor Differential Pressure (psi)

Liquor Flow (gpm) — Discharge Area Dimensions ($feet^2$)

Gas Flow (cfm) — Other Data

Cyclone
SEE ATTACHED

Type — Model #, Serial #

Efficiency — $PM_{2.5}$: — and PM_{10}:

Gas Flow (cfm) — Discharge Area Dimensions ($feet^2$)

Other Data

Precipitator

Type N/A — Model #, Serial # N/A

Efficiency

Gas Flow (cfm) — Gas Velocity (ft/sec)

Residence Time — Gas Differential Pressure (psi)

Precipitation Rate (ft/sec) — Discharge Area Dimensions ($feet^2$)

Other Data

Ad/Absorp

Type N/A — Model #, Serial # N/A

Efficiency

Gas Flow — Gas Velocity (ft/sec)

Gas Temp (degree F) — Bed Volume (ft^3)

Bed Dimensions (feet) — Capacity (hours)

Contaminant (lb/day) — Regeneration time (hours)

Other Type NYB Pressure Blower Model #, Serial # NYB 1808-9ARR

Efficiency

Gas Flow (cfm) 1,500cfm Discharge Area Dimensions (feet) 1.4 sq ft

Other Data

V. Additional Information:

1. Attach Related Information on Chemicals or Materials that will be emitted. (MSDS Sheets, Company Information, etc.)

   Note: Indicate how much quantity are used per MSDSs

   ☒ Yes ☐ No, if not why? Hop Dust

2. Fugitive Dust Control Plan (Attach if Necessary)
3. Attach Operation and Maintenance Manual of Pollution Control Equipment.

   ☒ Yes ☐ No, if not, why? See attached Equipment Information
4. Attach Vendor Information or Manufacturer's Instructions on Pollution Control Equipment.

   ☒ Yes ☐ No, if not, why? See attached Equipment Information

APPLICANT: I hereby certify that the information contained in this application, including supplemental forms and data, when required, is, to the best of my knowledge, complete and correct. I also agree to all fees for processing this permit and grant permission for YRCAA staff to enter the premises for inspection.

Signature Date

Title VP, Operations Date 4/09/2024

Name and Title of Individual Filling out Form:

Name (print) Salvador Benitez

Signature

Name and Title of Contact Person, if Different than Above:

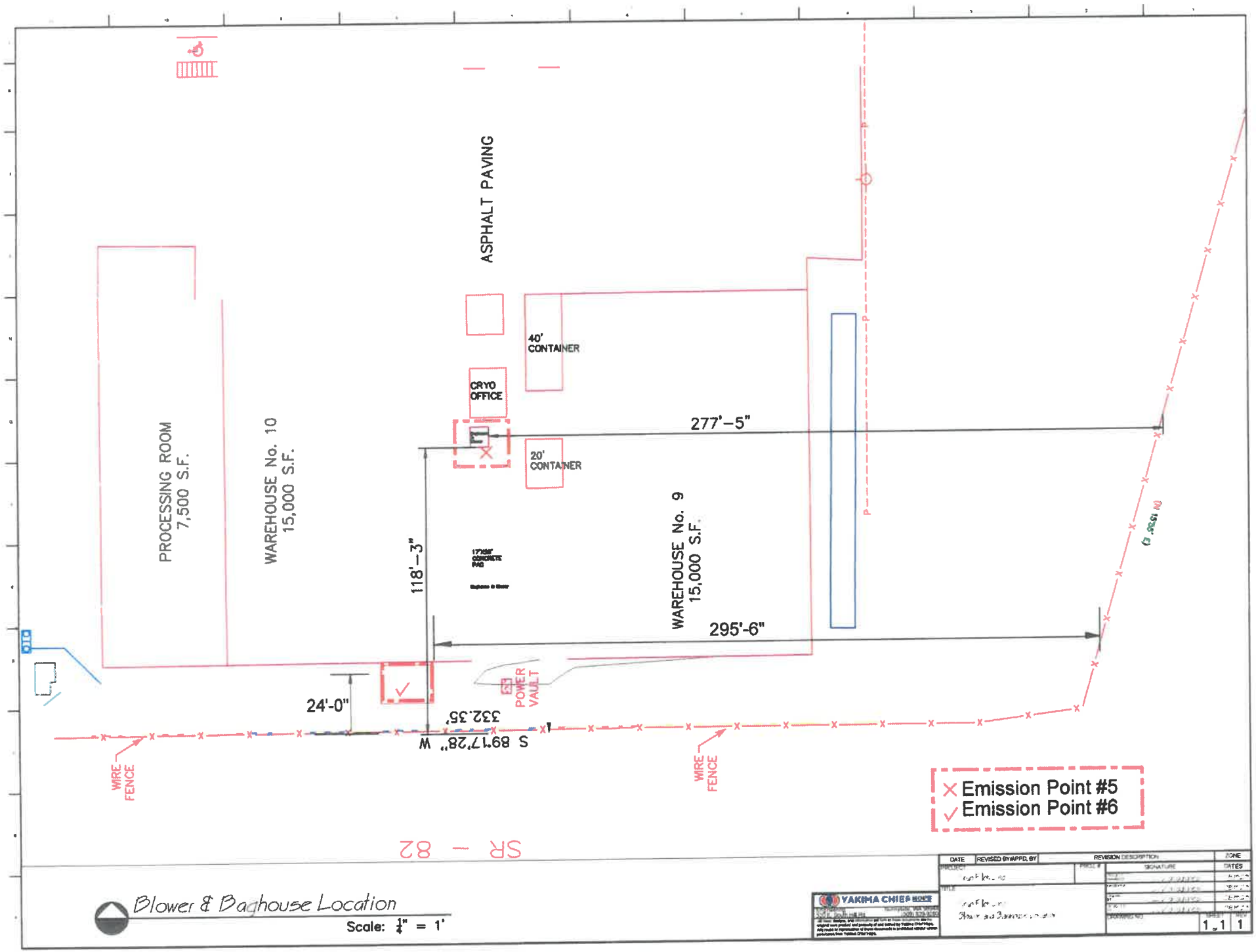
Name Art Ortega

Title Director of Facilities & Regulatory Compliance

Name and Title of the Responsible Official for the permit, if Different than Above:

Name

Title

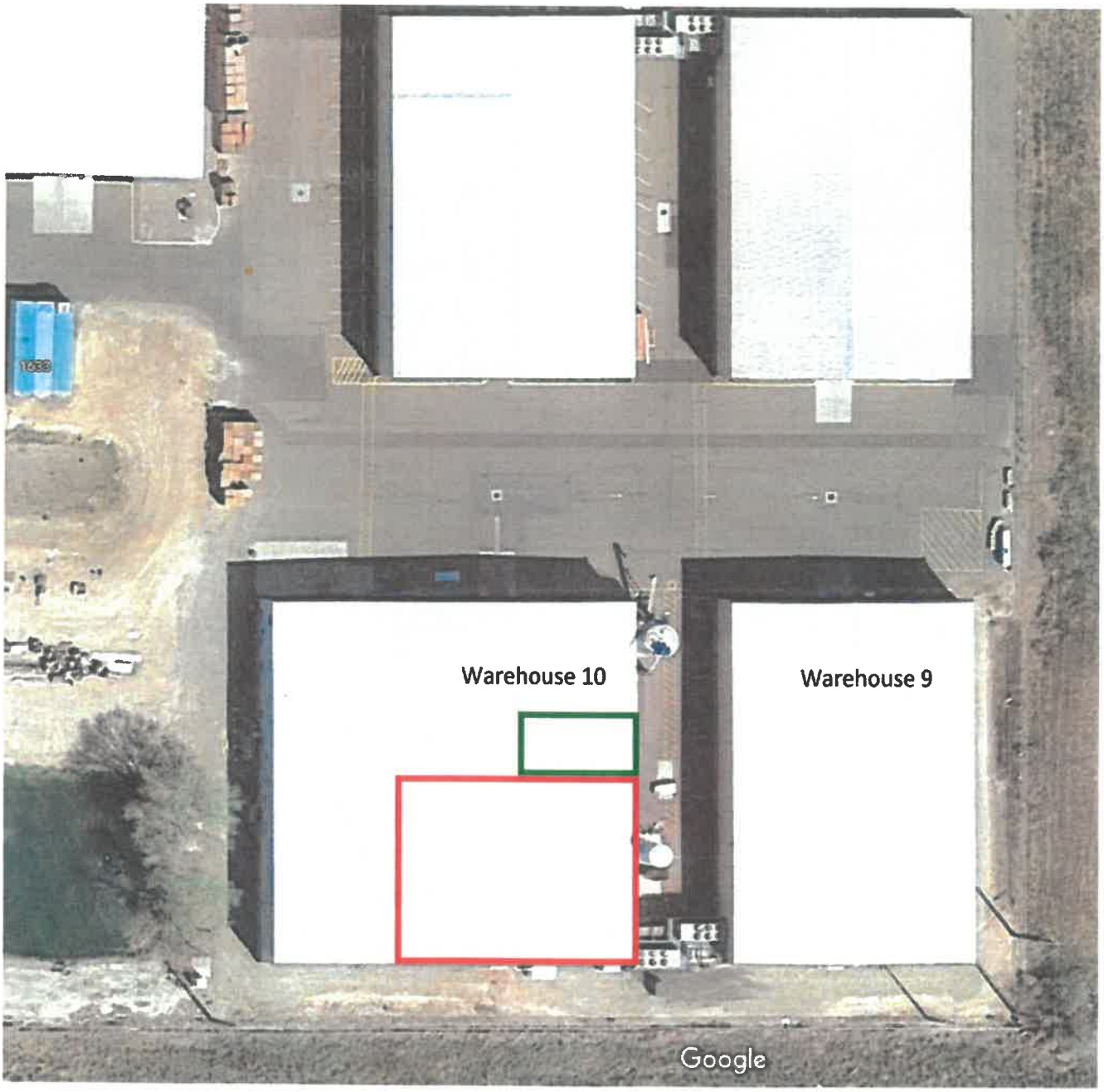

ASPHALT PAVING
PROCESSING ROOM
7,500 S.F.
WAREHOUSE No. 10
15,000 S.F.
WAREHOUSE No. 9
15,000 S.F.
40'
CONTAINER
CRYO
OFFICE
20'
CONTAINER
277'-5"
118'-3"
295'-6"
24'-0"
POWER
VAULT
332.35'
S 89°17'28" W
WIRE
FENCE
WIRE
FENCE
SR - 82
Emission Point #5
Emission Point #6
Blower & Baghouse Location
Scale: 1" = 1'
YAKIMA CHIEF HOPS
DATE
REVISED BY/APPD. BY
REVISION DESCRIPTION
ZONE
SIGNATURE
DATES
1 of 1
1

Yakima Chief Hops

555 W. South Hill Road, Sunnyside, WA 98944

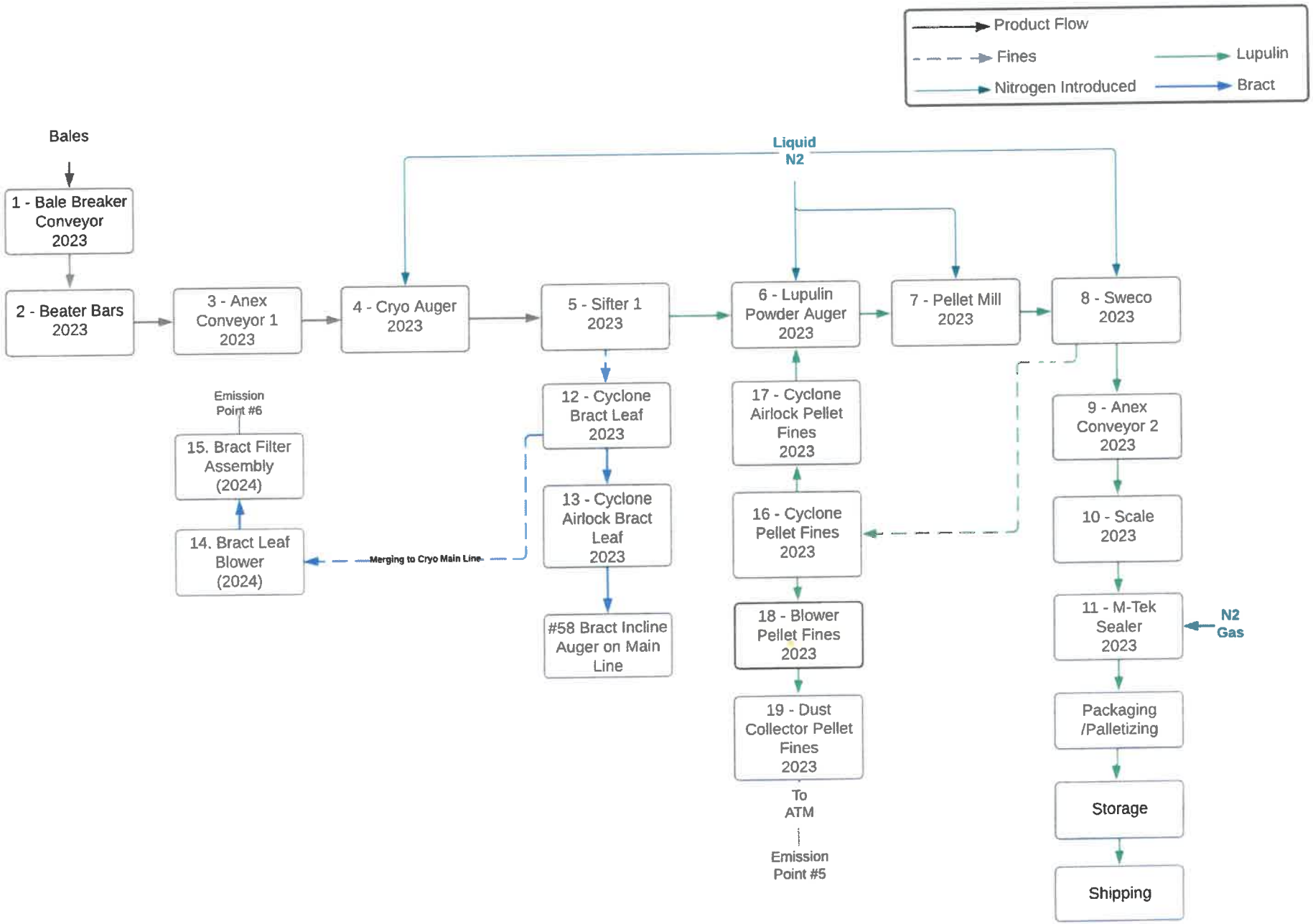
Outlined in Red is the entire Cryo Facility

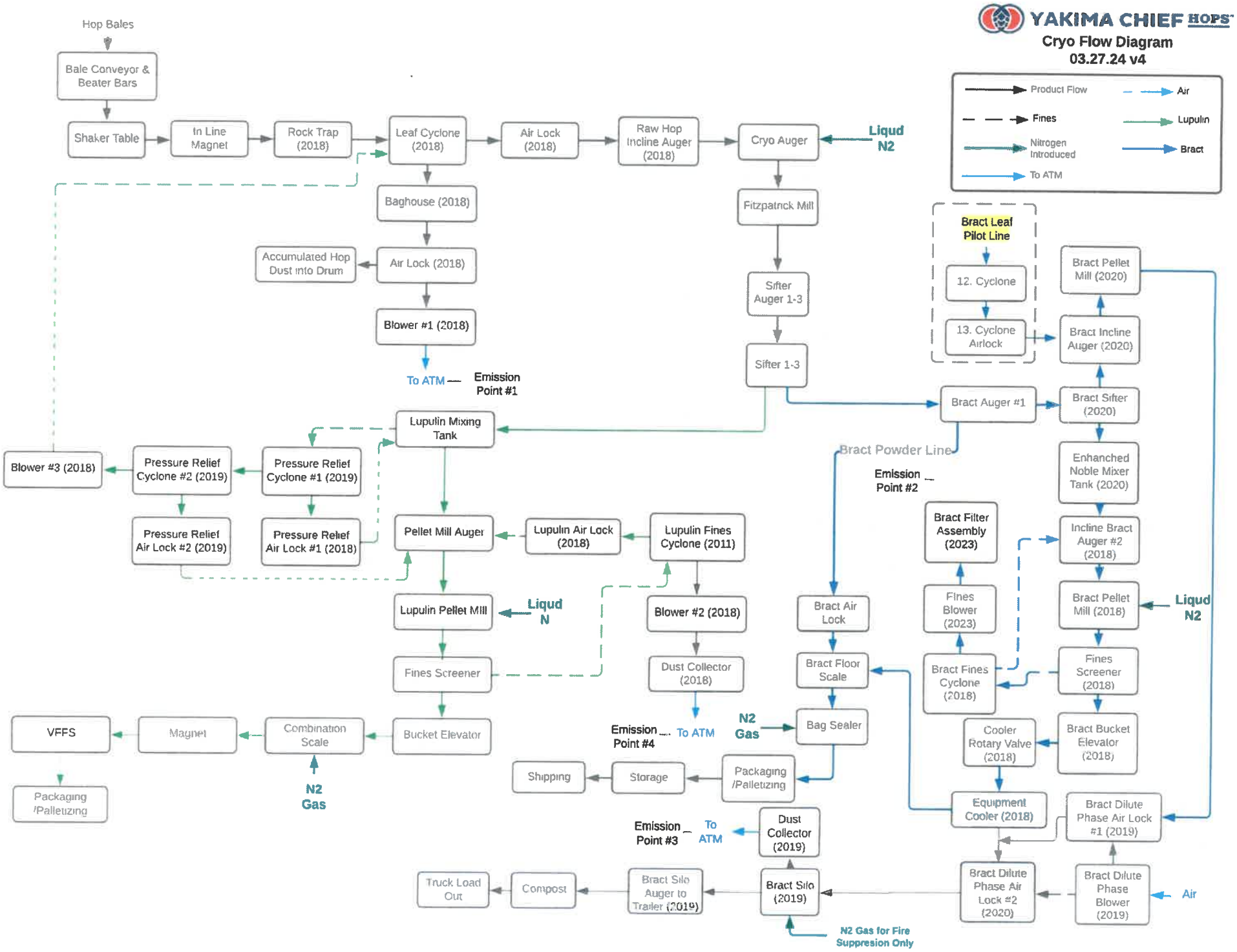
Outline in Green is the Cryo Pilot Line



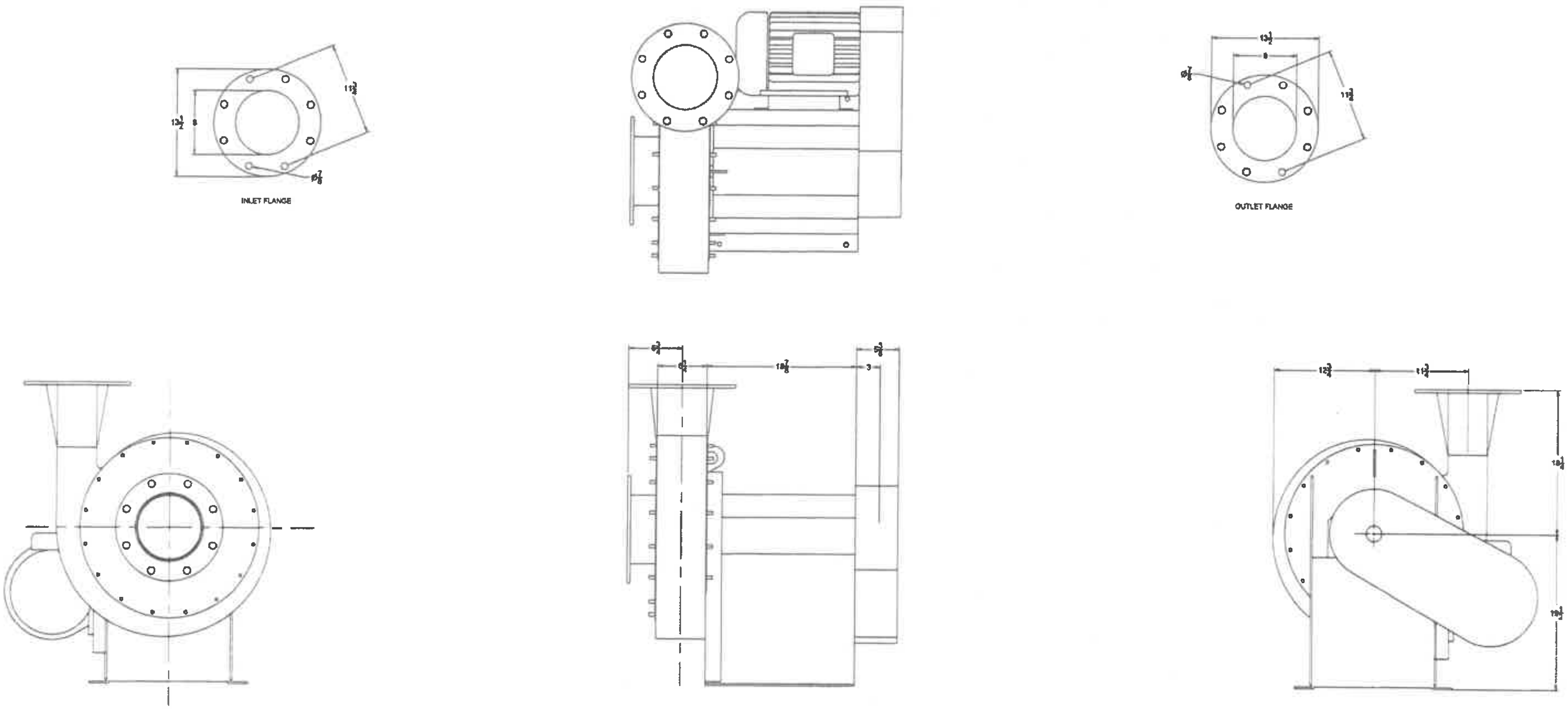
YAKIMA CHIEF HOPS

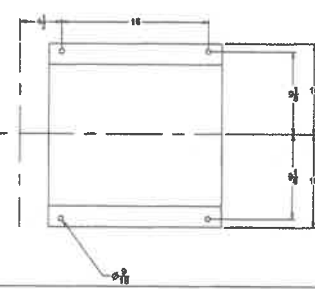
Cryo Pilot Line Flow Diagram
03.27.2024 v3




YAKIMA CHIEF HOPS
Cryo Flow Diagram
03.27.24 v4
Product Flow
Air
Fines
Lupulin
Nitrogen Introduced
Bract
To ATM
Hop Bales
Bale Conveyor & Beater Bars
Shaker Table
In Line Magnet
Rock Trap (2018)
Leaf Cyclone (2018)
Air Lock (2018)
Raw Hop Incline Auger (2018)
Cryo Auger
Liqud N2
Baghouse (2018)
Fitzpatrick Mill
Accumulated Hop Dust into Drum
Air Lock (2018)
Sifter Auger 1-3
Blower #1 (2018)
Sifter 1-3
To ATM
Emission Point #1
Bract Leaf Pilot Line
12. Cyclone
13. Cyclone Airlock
Bract Pellet Mill (2020)
Bract Incline Auger (2020)
Bract Auger #1
Bract Sifter (2020)
Lupulin Mixing Tank
Bract Powder Line
Emission Point #2
Enhanced Noble Mixer Tank (2020)
Blower #3 (2018)
Pressure Relief Cyclone #2 (2019)
Pressure Relief Cyclone #1 (2019)
Bract Filter Assembly (2023)
Incline Bract Auger #2 (2018)
Pressure Relief Air Lock #2 (2019)
Pressure Relief Air Lock #1 (2018)
Pellet Mill Auger
Lupulin Air Lock (2018)
Lupulin Fines Cyclone (2011)
Fines Blower (2023)
Bract Pellet Mill (2018)
Liqud N2
Lupulin Pellet Mill
Liqud N
Blower #2 (2018)
Bract Air Lock
Bract Floor Scale
Bract Fines Cyclone (2018)
Fines Screener (2018)
Fines Screener
Dust Collector (2018)
Emission Point #4
To ATM
N2 Gas
Bag Sealer
Cooler Rotary Valve (2018)
Bract Bucket Elevator (2018)
VFFS
Magnet
Combination Scale
Bucket Elevator
Shipping
Storage
Packaging /Palletizing
Equipment Cooler (2018)
Bract Dilute Phase Air Lock #1 (2019)
Emission Point #3
To ATM
Dust Collector (2019)
Truck Load Out
Compost
Bract Silo Auger to Trailer (2019)
Bract Silo (2019)
Bract Dilute Phase Air Lock #2 (2020)
Bract Dilute Phase Blower (2019)
Air
N2 Gas for Fire Suppresion Only

CRYO PILOT LINE				
No.	**Equipment Name**	**Manufacturer**	**Model Number**	**Year in Service**
1	Bale Breaker Conveyor	Perault Manufacturing	No Marking	2023
2	Beater Bars Bale Breaker	Perault Manufacturing	No Marking	2023
3	Anex Conveyor 1	Anex Manufacturing	SBL-15 "S"	2023
4	Cryo Auger	RS Mechanical	Custom Built	2023
5	Sifter 1	Buhler	MKZH-6012-H-S	2023
6	Lupulin Powder Auger	Precision Manufacturing	AJM834.4	2023
7	Pellet Mill	Century Mill	100C 166725	2023
8	Sweco	Sweco	HX30S66LKSDWC	2023
9	Anex Conveyor 2	Anex Manufacturing	SBL-15 "S"	2023
10	Scale	Weigh Right	PMB-1301 S	2023
11	M-Tek Sealer	Corr-Vac	PMB-1303FL	2023
12	Cyclone Bract Leaf	Baxter Air	26HV	2023
13	Cyclone Airlock Bract Leaf	Ancaster Conveying Systems	6" Round MD-QC	2023
14	**Blower Bract Leaf**	**New York Blower**	**NYB 1808-9ARR**	**2024**
15	**Dust Collector Bract Leaf**	**Donaldson Torit**	**FB-30**	**2024**
16	Cyclone Pellet Fines	Baxter Air	23HV	2023
17	Cyclone Airlock Pellet Fines	Ancaster Conveying Systems	8" Round MD-QC	2023
18	Blower Pellet Fines	New York Blower	NYB 1808-9ARR	2023
19	Dust Collector Pellet Fines	Donaldson Torit	FB-24	2023





EST FAN SHIPPING WEIGHT 463 LB
EST SHIPPING DIM 60 W X 58 L X 50 H

CUSTOMER
CUSTOMER'S NO.
FILE NO.
TAGG NO.

1808 PRESSURE BLOWER
CCW US
Arrangement 9
Motor Pos R
Pedestal 2

PROPOSAL DRAWING ONLY

DRAWN DOO | DATE 2/13/2024

DRAWING NUMBER DOD262029

The New York Blower Company
Fan-to-Size
Fan Selection Detail

Fan Design

Product:	Pressure Blower
Type:	Radial
Size:	1808
Fan Class:	N/A
Wheel Type:	Radial (open frontplate) - OPEN
Wheel Material:	Carbon Steel
Wheel Weight:	28.0 lb
Wheel WR²:	6.5 lb-ft2
Percent Width:	100%
Percent Diameter:	100.0%
Outlet Area:	.349 sq. ft.
Options:	None
Pedestal Type:	No. 2, Max Motor Frame: 256, Max C-NW: 17.3750 inches

Calculation Mode: Find Speed

Drive Type:	Belt
Arrangement:	9
Outlet Velocity:	4298 ft/min
Static Efficiency:	62.72%
Total Efficiency:	66.2%
Operating Temp:	70° F
Maximum Temp:	70° F
Maximum Speed: (1)	4000 RPM
Velocity Pressure:	1.1 in wg
Fan Static Pressure:	20 in wg
Fan Total Pressure:	21.1 in wg
Altitude:	1100 ft

Operating cost is $6740.10 for 8760 hours with a 95% efficient motor when energy unit per kW-hr is $0.13.

Axial thrust load is 63.3 lbf.

***This configuration is compliant with CEC regulations (suitable for use in California). FEI: 1.18.**

Conditions (Actual Volume; Fan Static Pressure)

	Flow	Pressure	Power	Speed	Speed Limit (2)	Density	Altitude	Inlet Temp.	FEI
	ACFM	in wg (FSP)	bhp	rpm	rpm	lb/ft3	ft	f	
Operating	1500	20	7.54	3303	4000	0.0721	1100	70	1.18
Coldstart	1500	20	7.54	3303	4000	0.0721	1100	70	1.18
Standard	1500	20.8	7.85	3303	4000	0.0750	0	70	1.18

(1) Speed Limit at Maximum Temperature (2) Speed Limit at indicated Inlet Temperature

Speed Limit Derates By Temperature

Temperature	Derate	Wheel Limit	Fan Limit
70	1.0000	4000	4000
600	1.0000	4000	4000

The New York Blower Company
Fan-to-Size
Fan Selection Detail

Sound Power Level Ratings

Sound power and sound pressure levels are shown in decibels. (Power levels reference 10-12 watts and pressure levels reference 2x10-7 microbar.) Sound power ratings are calculated per AMCA Standard 301. Ratings do not include the effects of duct end correction. Sound levels do not include motors or drives. Pressure levels are estimated. A-weighing is per ANSI S.1.42-2001 (R2011).

Fan Sound

Center Freq (Hz)	63	125	250	500	1000	2000	4000	8000	Overall
Octave	1	2	3	4	5	6	7	8	
Inlet Total Power, dB	85	93	91	92	83	80	76	72	97
A-Weighting	-26.2	-16.1	-8.6	-3.2	0	1.2	1	-1.1	
Convert To Pressure	-11.5	-11.5	-11.5	-11.5	-11.5	-11.5	-11.5	-11.5	
Inlet Total Pressure, dBA	47	65	71	78	72	70	65	59	80
Outlet Total Power, dB	85	93	91	92	83	80	76	72	97
A-Weighting	-26.2	-16.1	-8.6	-3.2	0	1.2	1	-1.1	
Convert To Pressure	-11.5	-11.5	-11.5	-11.5	-11.5	-11.5	-11.5	-11.5	
Outlet Total Pressure, dBA	47	65	71	78	72	70	65	59	80
Fan Total Power, dB	88	96	94	95	86	83	79	75	100
Housing Radiated Noise	-6	-10	-15	-17	-14	-14	-15	-16	
A-Weighting	-26.2	-16.1	-8.6	-3.2	0	1.2	1	-1.1	
Convert To Pressure	-11.5	-11.5	-11.5	-11.5	-11.5	-11.5	-11.5	-11.5	
Fan Total Pressure, dBA	44	58	59	64	61	59	53	46	68

Directivity/Reflection is a hemispherical radiation (Q = 2); Distance is 5 ft.
At 5 ft, the estimated sound pressure level:

1. outside the fan due to an open inlet OR outlet is 80 dBA.
2. housing radiated noise when inlet and outlet are ducted away from listening point is 68 dBA.

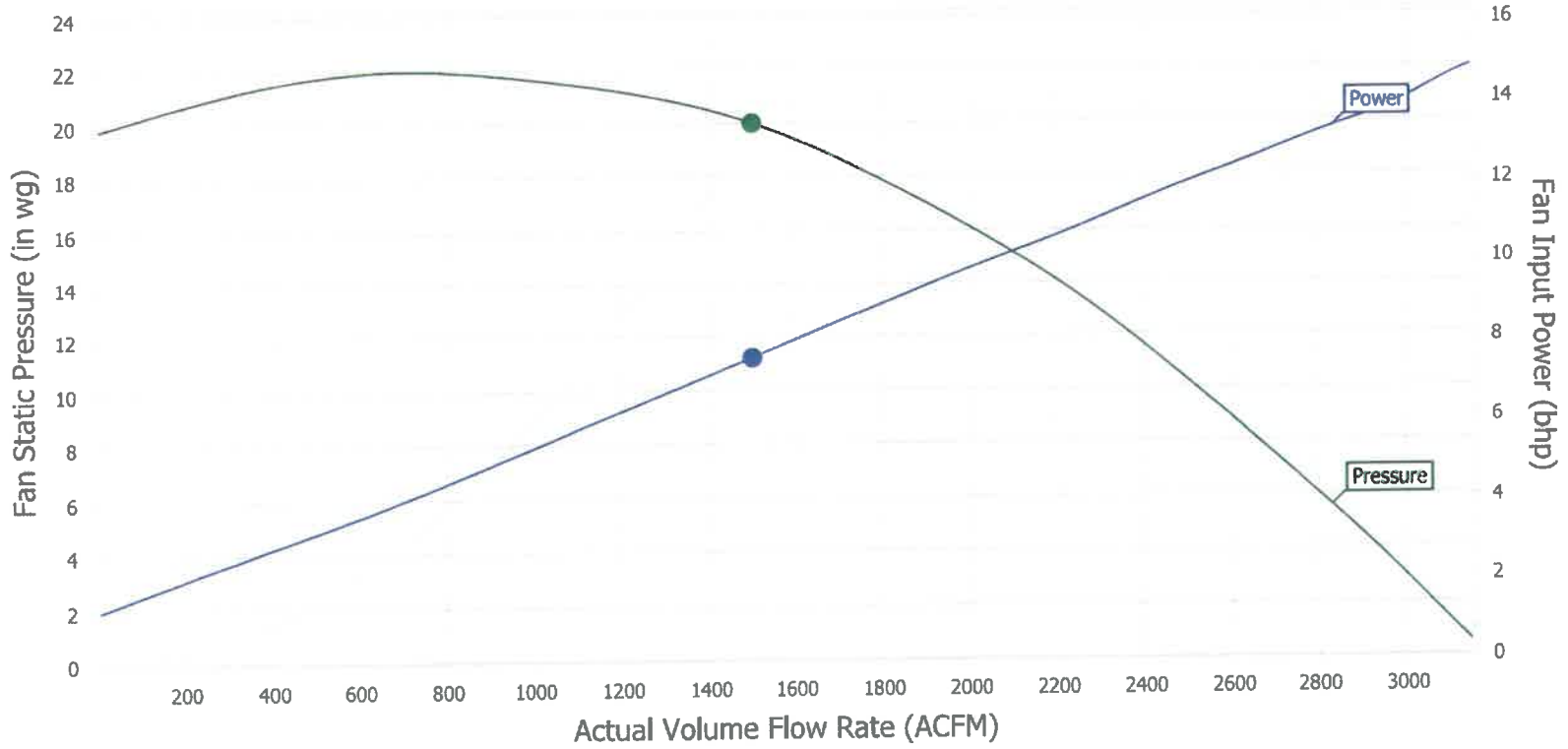
The sound power and pressure levels displayed here are estimated values based on tests and ratings conducted in accordance with AMCA standards 300 and 301. AMCA does not certify any of these ratings.

The New York Blower Company
Fan-to-Size
Fan Selection Detail

Product: Pressure Blower
Material: Carbon Steel
Fan Size: 1808
Arrangement: 9
Wheel Type: Radial (open frontplate) - OPEN
Options: None

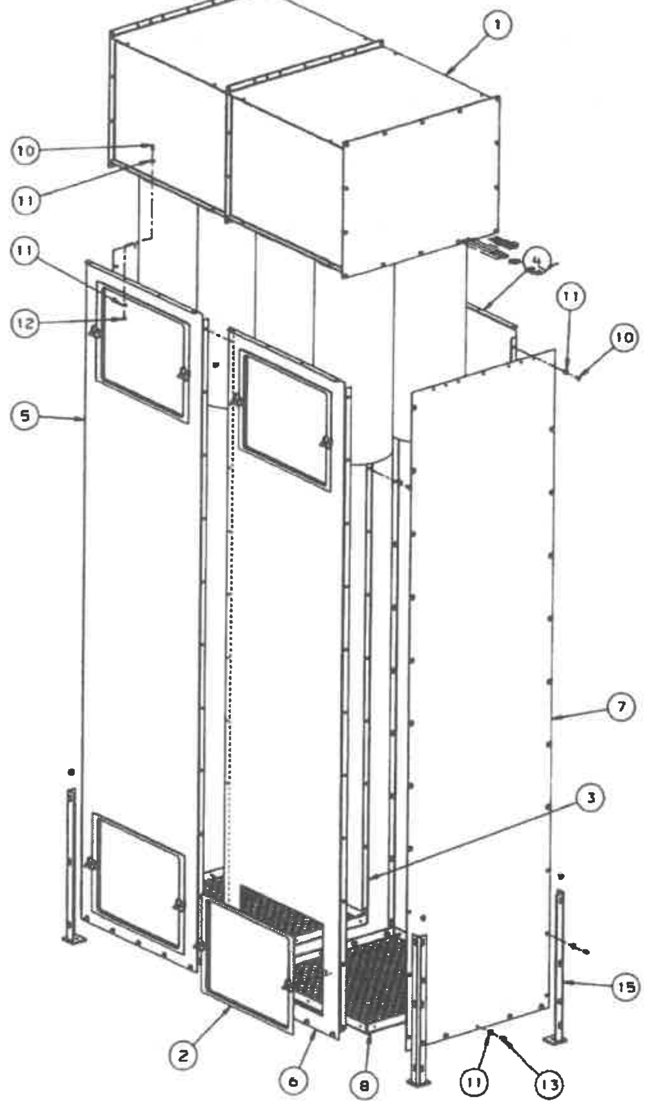
Actual Volume Flow Rate: 1500 ACFM
Fan Static Pressure: 20 in wg
Speed: 3303 rpm
Power: 7.54 bhp

Inlet Temperature: 70 °f
Altitude: 1100 ft
Density: 0.0721 lb/ft3
Outlet Velocity: 4298 ft/min



*This configuration is compliant with CEC regulations (suitable for use in California). FEI: 1.18.

REV	ZONE	REVISION DESCRIPTION	APPROVAL/DATE
8		DELETED BAGS (REF: SEE MBM) 2009A6046	BK NOV 04, 2008



NOTE:

1. SHIP 1 PRINT OF 2SG 1290401 (ITEM 13) WITH EACH UNIT.

ITEM	QTY	PART NO.	DESCRIPTION
1	1	2SG-45565-15	FB PACK UNLIN 30-60 CYCL
2	4	3EA-00162-02	DOOR ASY TOP/BOT 60/70
3	1	4MA-12533-02	REAR WELD FB ENCL 24 CYCL
4	1	4MA-12533-03	REAR WELD FB ENCL 30 CYCL
5	1	4MA-12534-02	FRONT WELD FB ENCL 24 CYCL
6	1	4MA-12534-03	FRONT WELD FB ENCL 30 CYCL
7	2	6MM-12530-02	PANEL SIDE FB ENCL 24-30 CYCL
8	2	6MM-12532-00	PANEL BOTTOM OPEN FB ENCL
9	8	8PP 0909101	RIVNUT S31-H-105 5/16-18
10	82	8PP-09003-01	BOLT HEX STL ZP G2 1/4-20 X 1/2
11	133	8PP-09006-06	WASH FLT STL TYPE A 1/4
12	16	8PP-09011-08	NUT HEX STL ZP 1/4-20
13	35	8PP-09037-40	SCREW TC TAPPING HWHD TYPE T
14	1	FOO-MFG	SHIP 1 PRINT OF THIS DRAWING
15	1	SEE MBM	LEG PK FB 08 ENCL

MATERIAL

REFERENCE SEE MBM

APPROX. WT : 479.2 LB

PREVIOUS DRAWING NO.

DO NOT SCALE — TOLERANCES UNLESS OTHERWISE SPECIFIED: 2 PL ±.03, 3 PL ±.015, ANGLES ±2°

RELEASE NO. 68-223 DATE APR 3, 1968

EXP DATE

DRN RUCHIN DATE MAY 23, 2002

CHK PPO

APVD KULZER DATE OCT 23, 1968

DATE OCT 29, 1968

THIRD ANGLE PROJECTION

TITLE FB PACK W/08 ENCL UNLIN 30 CYCL

NUMBER 2SG 1290401

SCALE NONE SHEET 1 OF 1 REVISION 8

C/C UG/CADD

SECTIONAL SIZE | DRAWING SIZE | 1AF

DESIGN CONTROL ADDN | DWG LOCATION A101 | VERSION A

Donaldson Company, Inc. Minneapolis, MN USA

max 11/9/08

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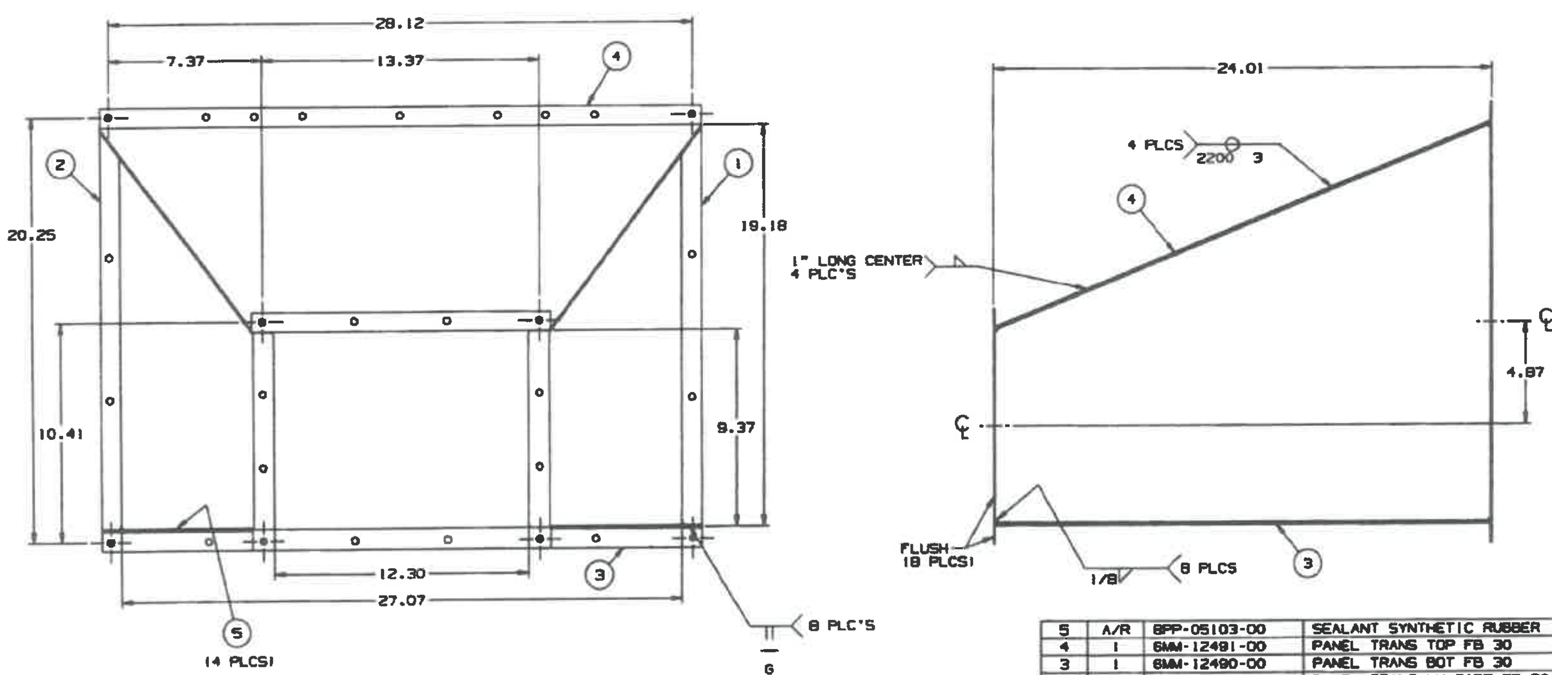
REV	ZONE	REVISION DESCRIPTION	APPROVAL/DATE
11		ADDED 2 WELD SYMBOLS 2010A8000	E. MAGGARD AUG 12, 2009



ITEM	QTY	PART NO.	DESCRIPTION
5	A/R	8PP-05103-00	SEALANT SYNTHETIC RUBBER
4	1	6MM-12491-00	PANEL TRANS TOP FB 30
3	1	6MM-12490-00	PANEL TRANS BOT FB 30
2	1	6MM-12489-02	PANEL TRANS LH SIDE FB 30
1	1	6MM-12489-01	PANEL TRANS RH SIDE FB 30

TITLE: TRANS WELD FB 30 CYCL 10HP-60HZ / 15HP-60HZ

NUMBER: 4MA 1248802

REFERENCE: 250-A031139-06

APPROX WT : 42.6 LB

DRN: SUNIL — DATE: DEC 10, 2001

CHK: DAN H. — DATE: FEB 08, 1970

SCALE — SHEET 1 OF 1

NX/CADD

DO NOT SCALE

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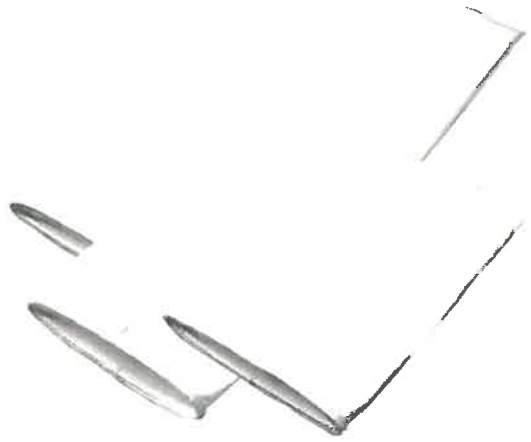
Kal Ekehat 8-13-09

Donaldson
FILTRATION SOLUTIONS

Product Specifications

P031016-016-210

1.5M DALAMATIC DURA-LIFE OLEOPHOBIC BAG 495 MM FLAT WIDTH X 1506 MM L (19.49" FLAT WIDTH X 59.29" L)



Attributes

Outer Diameter	12.41 inch (315 mm)
Flat Width	19.49 inch (495 mm)
Length	59.29 inch (1506 mm)
Media Type	Dura-Life Oleophobic
Filter Area	16.15 ft^2 (1.50 m^2)
Temperature Limit	275.00 °F (135 °C)
Fabric Weight	10.00 oz/yd^2 (339 g/m^2)
Top Construction	Felt Cuff
Bottom Construction	Flat Sewn
Anti-Static	No
Oleophobic	Yes
Shape	Envelope

Current Brand	Donaldson Torit
Former Brand	DCE

Packaged Dimensions

Gross Length	62 IN
Gross Width	19.5 IN
Gross Height	2IN
Gross Weight	1.4 LB
Gross Volume	1.3993 FT3

Other Information

Country of Origin	United States
NMFC Code	069100-06
HTS Code	5911900080

The information contained herein is general in nature and may not reflect actual information regarding the part at time of shipment. Parts may originate in more than one country – the actual country of origin and HS Code will be reflected on the Commercial Invoice(s) that accompanies the goods.

Donaldson.
Filtration Solutions

Donaldson Company, Inc.
Industrial Air Filtration
1400 West 94th Street
Bloomington, MN
55431-2370

Mailing Address:
P.O. Box 1299
Minneapolis, MN
55440-1299 U.S.A.

Tel 952-887-3847
Fax 952-698-2479
www.Donaldson.com
www.donaldsontorit.com

Donaldson Company, Inc. Emissions Statement for Industrial Dust Collectors with Dura-Life™ Filter Media

Donaldson Company, Inc. offers an extensive variety of dust collectors and filter media designs to the market to address the wide variety of dust control applications and project needs.

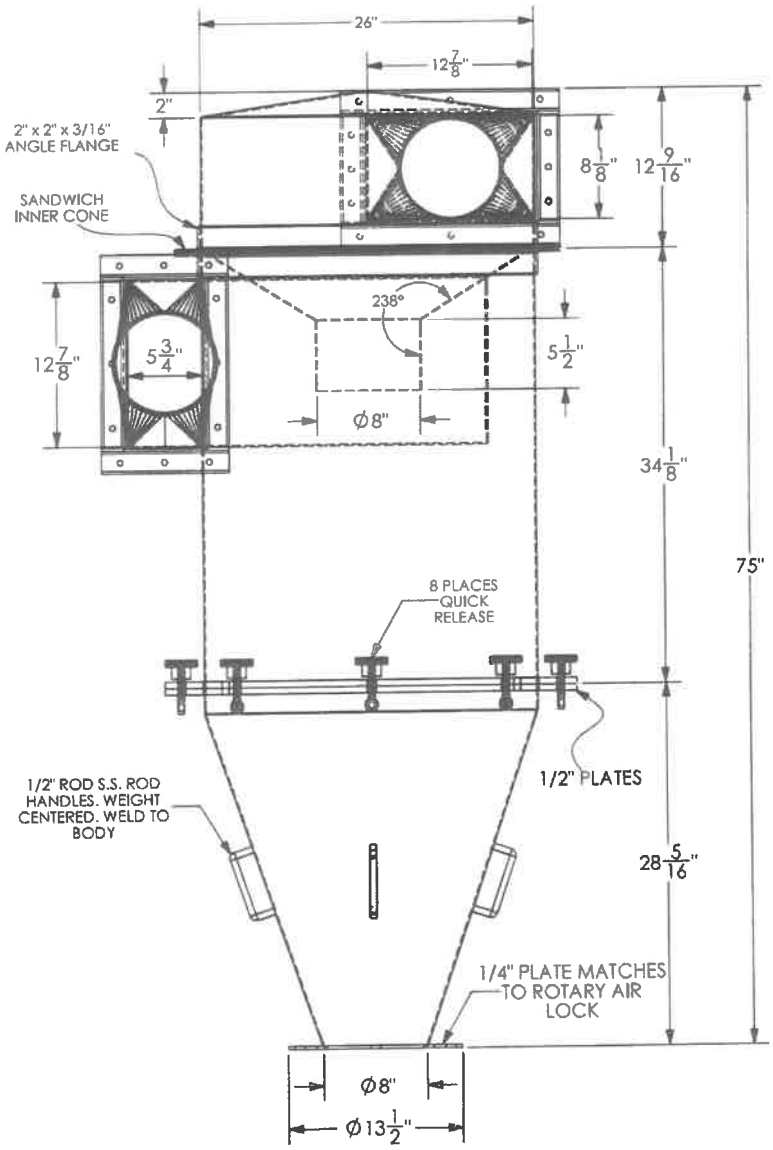
Because dust control projects sometimes demand unique collector selection or location strategies or may involve complex filter media performance considerations it is difficult to make general statements of emission performance. However, Donaldson generally expects total (filterable) particulate emissions from Continuous-Duty Baghouse Collectors using Donaldson Dura-Life filter media to be capable of achieving average emission levels of no more than 0.004 grains per dry standard cubic foot. This level of performance expectation excludes any contributions to emissions from condensable materials (*which will pass through filter media in a vapor state*), and it assumes filters are installed properly and are operated and maintained in accordance with industry best practice and in accordance with the manufacturer's Installation, Operation, and Maintenance manuals for the collector.

Factors which may contribute to unexpected collector emissions include: misuse, accident, abuse, modification, improper installation or operation, inadequate maintenance, and operation beyond recommended selection/sizing guidance or useful life. Emissions may also occur as a result of damage to collectors or filters due to accidents, fires, corrosion, abrasion, or other physical abuse.

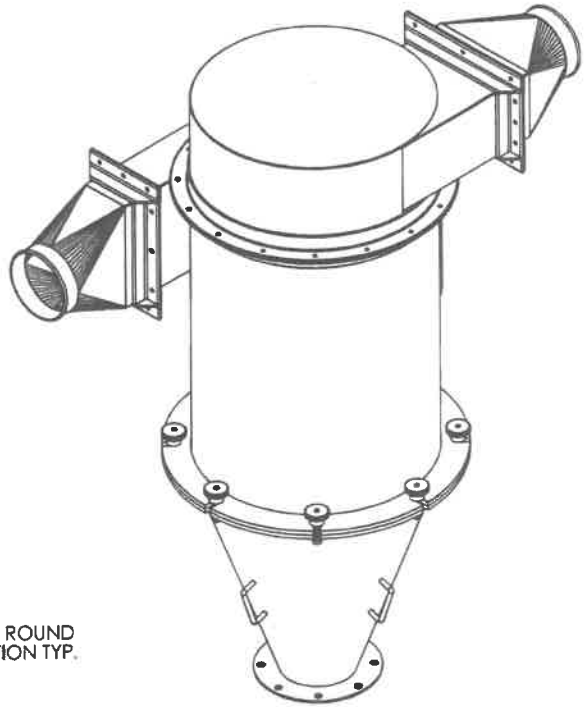
Emission performance is also influenced by the style or size of collector selected, by the selection of filter media, and by choices in accessories or features for collectors.

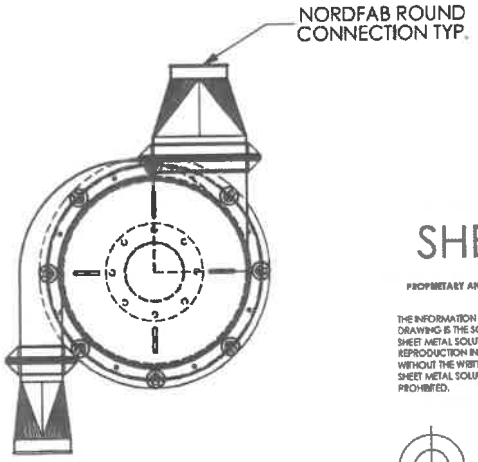
Important Notice: Many factors beyond the control of Donaldson can affect the use and performance of Donaldson products in a particular application, including the conditions under which the product is used. Since these factors are uniquely within the user's knowledge and control, it is essential the user evaluate the Donaldson products to determine whether the product is fit for the particular purpose and suitable for the user's application. This Emissions Statement shall not be construed as or relied upon as a health and safety statement. Donaldson does not require or recommend exhausting emissions into the indoor environment without consultation with a qualified professional to evaluate and address all attendant health and safety risks. It shall be the end user's continued and sole responsibility to provide a safe and healthful environment for its employees.

Donaldson's terms and conditions of sale, as stated in our current quotation, contain the sole obligation and exclusive remedy for any issues that arise regarding information that Donaldson provides in this statement.



12 GAUGE STAINLESS STEEL T-304
- QTY 1





SHEET METAL SOLUTIONS

CUSTOMER: BAXTER AIR

TITLE: 26HV CYCLONE

3RD ANGLE - PROJECTION

QTY 1

JOB NUMBER:

MATERIAL T-304 S.S.

SCALE: 1:8

WEIGHT:

SHEET 1 OF 1

YAKIMA CHIEF HOPS™

WHOLE LEAF HOPS

PRODUCT DATA SHEET

WHOLE LEAF HOPS CLASSIC

nqa ISO 9001 ISO 14001 Registered

PACKAGED BY

Yakima Chief Hops
306 Division Street, Yakima, WA 98902 USA
Phone (509) 456-4792, Fax (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 www.yakimachief.com

PACKAGING & STORAGE

Whole 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. Whole 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.

APPLICATION & USAGE

Whole 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. Add the Whole 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. Whole Leaf Hops can be added into the brew kettle during kettle boil loose, or via custom designed dosing systems. Whole 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 = 1.1734776579999771 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.

YAKIMA CHIEF HOPS™

WHOLE LEAF HOPS

SPECIFICATION SHEET

WHOLE LEAF HOPS CLASSIC

nqa. ISO 9001 ISO 14001 Registered

PACKAGED BY

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

	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	Comply with US Regulations & EC Directive 396/2005 Amendments	

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

YAKIMA CHIEF HOPS

WHOLE LEAF HOPS

SAFETY DATA SHEET

1. PRODUCT IDENTIFICATION

1.1 Product Name	Leaf Hops (raw hop cones, whole hop cones) Dried hop cones without leaf and stem.
1.2 Supplier	Yakima Chief Hops, LLC 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	Compressed dried raw 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 -3°C to 5°C (25°F to 41°F). Remains stable for 3 Years when vacuumed sealed in foils; 18 months in whole bale form (duration is important from a commercial point of view). 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 & Odor	Yellow, green or brown compressed cone 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 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	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	2015-05May-26
16.2 Revision Date	2018-08Aug-20
16.3 Other	

YAKIMA CHIEF HOPS™

CRYO 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

CRYO HOPS® pellets are produced from whole leaf hops using Yakima Chief Hops' proprietary cryogenic separation process that preserves all components of each fraction.

CRYO HOPS® pellets are the purified lupulin powder containing most of the resin compounds and aromatic oils derived directly from whole hop flowers. It is ideal for use in the whirlpool or fermenter for imparting intense hop flavor and aroma with minimal vegetal flavor and improved yield.

Used in combination with CO_2 hop extract, CRYO HOPS® pellets can add hop aroma and flavor to the end of boil or in dry hopping for a twofold approach to achieving superior brewery efficiency without sacrificing flavor. Depending on how much pellet or whole leaf is replaced by either of these products, breweries may see significant improvements in beer yield which contribute to both the bottom line and sustainability mission of Yakima Chief Hops and many of our customers.

PACKAGING

CRYO HOPS® pellets are packaged inside nitrogen flushed, flexible, foil pouches and shipped in cardboard cartons.

STORAGE

CRYO HOPS® pellets should be stored near-freezing, preferably between 30°F and 35°F (-1°C and 2°C).
For best results, CRYO HOPS® pellets should be used within three (3) years of package date.
Storage stability does vary per variety and can be negatively affected by exposure to oxygen, heat and/or light.

APPLICATION AND USAGE

CRYO HOPS® pellets may be used anywhere T-90 hop pellets can be used and are best used for late kettle and dry hop additions. As a starting point for recipe formulation or modification dose rate is estimated at 50% of pellets by weight. It is best used in beers defined by their hop flavor and aroma with hop loads of at least 1 lb/bbl in late kettle or dry hop additions where a larger yield increase will occur from substituting out pellets or whole leaf.

ADDITION	CURRENT RECIPE	CRYO HOPS®
60 or 90 Minutes	CO_2 Hop Extract / Hop Pellets	CO_2 Hop Extract / Hop Pellets
15 Minute	Hop Pellets	Hop Pellets
Whirlpool	1 lb / bbl Pellets	0.5 lb / bbl CRYO HOPS®
Dry Hop	1 lb / bbl Pellets	0.5 lb / bbl CRYO HOPS®

An example substitution for a Double IPA hop bill. Actual data will vary per brewery and beer recipe.

YAKIMA CHIEF HOPS™

CRYO HOPS®

SPECIFICATION SHEET

CRYO HOPS INTENSITY

nqa. ISO 9001 ISO 14001 Registered

PACKAGED BY

Yakima Chief Hops
306 Division Street, Yakima, WA 98902 USA
Phone (509) 458-4792, Fax (509) 453-1551

	METHOD	TYPICAL ANALYSIS
Alpha Acids Assay*	UV Spectro. by ASBC HOPS-6A	5 - 30% (w/w)
Beta Acids Assay*	UV Spectro. by ASBC HOPS-6A	4 - 15% (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*

YAKIMA CHIEF HOPS™

CRYO HOPS®

SAFETY DATA SHEET

1. PRODUCT IDENTIFICATION

1.1 Product Name	Cryo Hops® (Concentrated Hop Powder) 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 fine powder or pellet 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 -1°C to 2°C (30°F to 35°F). 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 & Odor	Yellow, green or brown powder 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

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	CRYO 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	2015-11Nov-10
16.2 Revision Date	2020-01Jan-31
16.3 Other	

II. Emissions Estimations and Calculations

Item	Location	Description	#1) Criteria Pollutants	Particulate	Volatile Organic Compounds	Nitrogen Oxides	Sulfur Oxides	Carbon Monoxide	Lead
1	Cryo Pilot Line	Cyclone Bract Leaf		PM2.5 =	N/A	N/A	N/A	N/A	N/A
2	Cryo Pilot Line	Dust Collector FB-30		0000000064 lbs/hr	N/A	N/A	N/A	N/A	N/A
					N/A	N/A	N/A	N/A	N/A
					N/A	N/A	N/A	N/A	N/A

#2) Toxic Pollutants (Name)	Quantity
N/A	N/A

Item	Location	Description	#3) Fugitive Pollutants (Source)	Quantity
1	Cryo Pilot Line		Anex Conveyor #1	The product from these equipment returns back to processing. Therefore, the value to be used is the Particulate. Note: process flow rate is ~1,500 lbs/hr
2	Cryo Pilot Line		Sweco Shaker	
3	Cryo Pilot Line		Weight Right Scale	

III. Emission Data - #2. Discharge Point or Points (if no stack or other than stack)

Item	Location	Description	Height (feet)	Inside Diameter (feet)	(*) Gas Exit Temp (deg F)	Gas Exit Velocity (ft/min)	Flow Rate (cfm)	Distance from Discharge Point to Property Line	Equipment	Model
1	Cryo Pilot Line	*Cyclone Bract Leaf	11.5	1.4	~20	981	1,500	~24'	From Sifter Shaker	26HV

Shared dischared Point? No Shared Emisson Points, Modification in 2024

IV. Air Polution Control Equipment - BAGHOUSE

Item	Location / Description	Type	Efficiency (%)	Bag Height (feet)	Bag Diameter (feet)	Filter Area (sq.ft)	Blower Flow Rate (cfm)	Filter Media	Dimensions (feet)	Discharge Area Dimensions (sq.ft.)	Cleaning Mechanism (shake) (air psi)	Other Data
1	Cryo Pilot Line	FB-30*	99.95 @ 2 micron	4.96	1.03	129	1,500	Dura-Life Oleophobic	2.17' x 4.50' x 10.08' (h)	3.1	Shake	

Note - No Baghouse on Cryo Pilot Line
(*) - New Donaldson FB-30 Collector / 8 Bag Quantity
(**) - New Donaldson FB-24 Dust Collector / 4 Bag Quantity

IV. Air Pollution Control Equipment - CYCLONE

Item	Location	Description	Type	(*) Efficiency (%)	Gas Flow (cfm)	Discharge Area Dimensions (sq.ft.)	Other Data
1	Cryo Pilot Line	Cyclone Bract Leaf	26HV	see chart	1,500	2.2	Discharged to FB-30 Dust Collector

Use this column!		
	Cryo Pilot Line - Bract Leaf Fines	
700	Lbs/hr Process	- Raw hop throughput
2.1	lbs/hr to cyclone	- 0.3% of pellet hop mass diverted as fines after the Cyclone
0.105	lbs/hr to baghouse	- Cyclone efficiency = 95%; 5% reaches baghouse as fines
5	lb/DSCF	- Average density of bract fines
0.021	DSCF/hr	- Volume of fines reaching baghouse per hour
0.0040	grain/DSCF	- Mfr. emission rating for baghouse filter media
0.0001	grains/hr emitted	
0.0001429	grain to lb conversion factor	
0.00000001	lbs/hr emitted	
0.00000029	lbs/day emitted	- multiplied by 24 to calculate per day
	Cryo Pilot Line -	
	Lbs/hr Process	- Pellet hop throughput
0	lbs/hr to cyclone	- 0.3% of pellet hop mass diverted as fines at SWECO separator
0	lbs/hr to baghouse	- Cyclone efficiency = 95%; 5% reaches baghouse as fines
25	lb/DSCF	- Average density of pellet fines
0	DSCF/hr	- Volume of fines reaching baghouse per hour
0.0040	grain/DSCF	- Mfr. emission rating for baghouse filter media
0.00000	grains/hr emitted	
0.000142857	grain to lb conversion factor	
0.000000000	lbs/hr emitted	
0.00000000	lbs/day emitted	- multiplied by 24 to calculate per day