Development Services

From Concept to Construction

Phone: 503-823-7300 Email: bds@portlandoregon.gov 1900 SW 4th Ave, Portland, OR 97201
More Contact Info (http://www.portlandoregon.gov//bds/article/519984)

APPEAL SUMMARY

Status: Hold for Additional Information

Appeal ID: 20430	**Project Address:** 2901 NE Columbia Blvd
Hearing Date: 5/22/19	**Appellant Name:** Rahim A. Abbasi
Case No.: M-001	**Appellant Phone:** 5038169466
Appeal Type: Mechanical	**Plans Examiner/Inspector:** Peter Drake, Thomas Ng
Project Type: commercial	**Stories:** 1 **Occupancy:** F-1, M, B **Construction Type:** V-B
Building/Business Name: CURA CS, LLC	**Fire Sprinklers:** No
Appeal Involves: Alteration of an existing structure	**LUR or Permit Application No.:** 18-153022-CO
Plan Submitted Option: pdf [File 1] [File 2] [File 3] [File 4] [File 5]	**Proposed use:** Manufacturing of Cannabis

APPEAL INFORMATION SHEET

Appeal item 1

Code Section	OMC 301.4
Requires	Appliances regulated by this code shall be listed and labeled for the application in which they are installed and used, unless otherwise approved in accordance with Section 105.
Proposed Design	The proposed equipment and appliances to be utilized have been reviewed for compliance and use for the proposed operations. The equipment has been reviewed by a 3rd party Engineering team, 3pCertz as well as a Hazardous Materials Specialist to ensure that the use of ethanol to produce concentrates at this facility is done in a controlled environment and within the limitations allowed by the applicable building codes with equipment that is not labeled or listed by an NRTL at this time. Hazardous materials to be stored onsite shall not exceed the quantities listed in the attached HMIS. The maximum proposed quantities do not exceed the allowable amounts listed in tables 414.2.5(1) & 414.2.5(2).
Reason for alternative	The applicant has submitted a Technical Report on the equipment to be utilized in the processing at this facility. The submitted Technical Report has been utilized in other jurisdictions and in other states for obtaining approvals to install and operate equipment. Please refer to the accompanying HMIS, Engineering Report, and Facility Narratives. Please also note that this facility is already in permit review. The drawings provided are the originally submitted permit drawings with revisions made to match narratives and better describe the control areas, locations of hazardous material storage/use onsite, and to identify any proposed equipment.

APPEAL DECISION

Use of non-listed and labeled extraction equipment: Hold for additional information.
Appellant may contact Thomas Ng (503 823-7434) with questions.

ZONING ANALYSIS TITLE 33

ZONE: IG2 (GENERAL INDUSTRIAL 2)

OVERLAYS: h

SITE AREA: 28,965 (0.665 ACRE)

NEIGHBORHOOD CONTACT: NOT REQ'D

TABLE 140-3 ANALYSIS

REQUIREMENT		PROPOSED
MAX FAR:	NO LIMIT	COMPLIANT
MAXIMUM HEIGHT:	NO LIMIT	22'-0"
BUILDING SETBACKS		
-MIN REQ'D:	0 FT	COMPLIANT
-FRONT/STREET/REAR MAX:	25 FT	NOT COMPLIANT - 18'-11"
BLDG COVERAGE:	<85%	7,714 / 41,254 SF = 18.7%
MIN LANDSCAPED AREA:	>15% (4348 SF)	18,575 / 41,254 SF = 45%
GROUND FLOOR WINDOWS:	NO	N/A
PEDESTRIAN STANDARDS:	NO	N/A

PARKING AND LOADING PER 33.266 TABLE 266-2

USE CATEGORIES	STANDARD A (MIN)	STANDARD B (MAX)	CG PROPOSED (NBA)	MIN/MAX
OFFICE (GENERAL OFFICE)	1 PER 500 SF OF NBA	1 PER 294 SF OF NBA	3016 SF	6/10
MANUFACTURING AND PRODUCTION	1 PER 750 SF OF NBA	1 PER 500 SF OF NBA	4389 SF	6/9
TOTAL				12/19

THERE ARE CURRENTLY 14 EXISTING PARKING STALLS ON SITE. NO PROPOSED CHANGES TO EXISTING PARKING BESIDES RESTRIPING WEATHERED LINES AS REQ'D

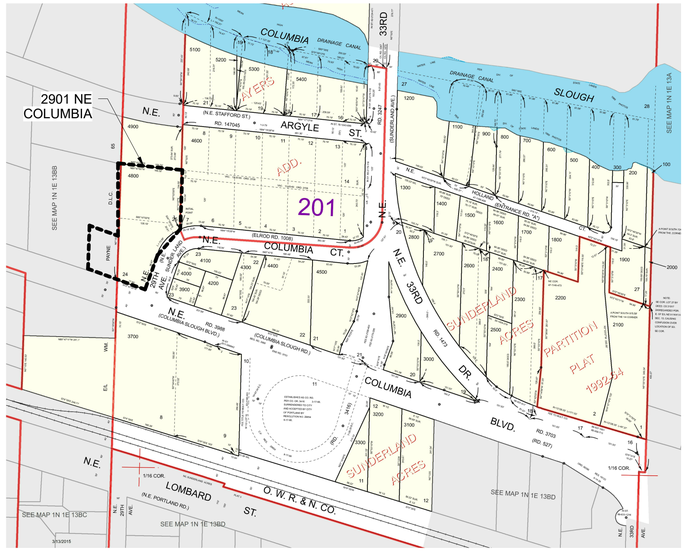
BICYCLE PARKING PER 33.266.200

USE CATEGORIES	LONG TERM		SHORT TERM	
	REQUIREMENTS	EXISTING	REQUIREMENTS	EXISTING
OFFICE (GENERAL OFFICE)	2, OR 1 PER 10,000 SF OF NET BLDG AREA	1	2, OR 1 PER 40,000 SF OF NET BLDG AREA	1
MANUFACTURING AND PRODUCTION	2, OR 1 PER 15,000 SF OF NET BLDG AREA	1	NONE	0
TOTAL	2		1	

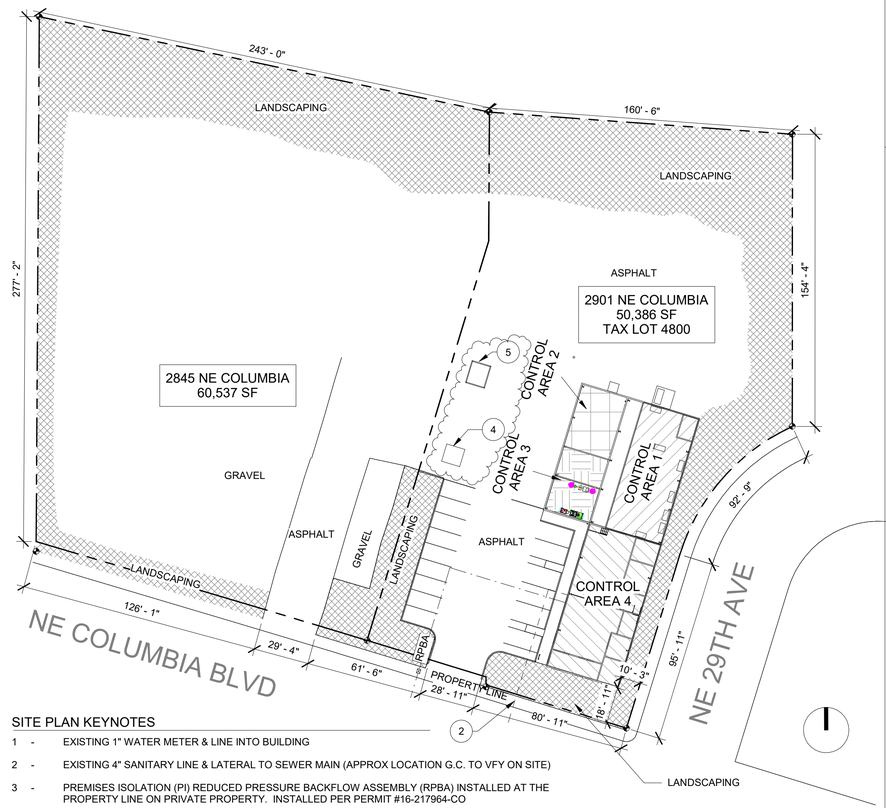
ACCESSIBILITY CONFORMANCE PER ORS 447.241

CHANGES ARE PROPOSED TO THE EXISTING BUILDING TO MEET THE REQUIREMENTS OF THE ACCESSIBILITY CODE AS FOLLOWS:

1. PARKING: EXISTING ADA PARKING STALL W/ SIGNAGE PER #16-217964-CO
2. ACCESSIBLE ENTRANCE: ALL EXISTING DOOR THRESHOLDS MEET THE REQUIREMENTS.
3. ACCESSIBLE ROUTE: PATH FROM PARKING TO MAIN ENTRY IS FULLY ACCESSIBLE
4. ACCESSIBLE RESTROOMS: ADA CODE COMPLIANT GRAB BARS EXIST W/IN TWO EXISTING RESTROOMS
5. ACCESSIBLE TELEPHONE: NOT APPLICABLE.
6. ACCESSIBLE DRINKING FOUNTAINS: NOT APPLICABLE, NO DRINKING FOUNTAINS.



1 SITE VICINITY MAP
1" = 200'-0"



SITE PLAN KEYNOTES

1 - EXISTING 1" WATER METER & LINE INTO BUILDING

2 - EXISTING 4" SANITARY LINE & LATERAL TO SEWER MAIN (APPROX LOCATION G.C. TO VFY ON SITE)

3 - PREMISES ISOLATION (PI) REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) INSTALLED AT THE PROPERTY LINE ON PRIVATE PROPERTY. INSTALLED PER PERMIT #16-217964-CO

4 - PROPOSED OUTDOOR TRASH ENLCLOSURE

5 - PROPOSED OUTDOOR STORAGE AREA

2 SITE PLAN
1" = 40'-0"

PROJECT NAME: CURA EHO PROCESSING
PROJECT TYPE: TENANT IMPROVEMENT

LEGAL DESCRIPTION

PROPERTY ID - R279983
SUNDERLAND AC & PLAT 3, LOT 24& 25 TL 4800

SCOPE OF WORK

THE SITE IS LOCATED ON 2901 NE COLUMBIA BLVD, BOUNDED BY NE 29TH AVE TO THE EAST WITH ADJACENT PROPERTIES 2900 ARGYLE ST & 2845 NE COLUMBIA BLVD TO THE NORTH & WEST, RESPECTIVELY. THE LOT IS ZONED IG2. EXISTING OFFICE & RETAIL SPACE TO REMAIN. EXISTING MARIJUANA PROCESSING FACILITY (F-1) TO BE REORGANIZED AND NEWLY PROPOSED ETHANOL CONCENTRATION TO BE ADDED. NO CHANGE OF OCCUPANCY IS PROPOSED. NO CO2 PROPOSED ON SITE

NOTE:
ALL EHO CONCENTRATION EQUIPMENT TO BE INSPECTED BY MECHANICAL ENGINEER AND SUBMIT A SIGNED AND SEALED INDEPENDENT COMMISIONING REPORT. REPORT TO BE SUBMITTED PRIOR TO FINAL INSPECTION PER CITY OF PORTLAND CODE GUIDE FOR CANNABIS FACILITIES.

ENTIRE BUILDING TO BE OCCUPIED BY SINGLE TENANT

TRADE SPECIFIC WORK TO BE PERMITTED SEPERATELY

ELECTRICAL: UNDER SEPARATE PERMIT #TBD

MECHANICAL: UNDER SEPARATE PERMIT #17-196510-REV-01-MT

PLUMBING: UNDER SEPARATE PERMIT #TBD

FIRE: ANY WORK TO BE SUBMITTED AS SEPARATE PERMIT

HAZARDOUS MTLS: HAZARDOUS MATERIAL STORAGE TANKS & PIPING

SEPARATE PERMITS

1. - OUTDOOR STORAGE AREA & TRASH ENCLOSURE (STRUCT & ARCH)

APPLICABLE

JURISDICTION: CITY OF PORTLAND, OREGON
MULTNOMAH COUNTY, OREGON

APPLICABLE CODES: TITLE 33 PORTLAND ZONING CODE
2014 OREGON STRUCTURAL SPECIALTY CODE
2014 OREGON ENERGY EFFICIENCY CODE
2014 OREGON MECHANICAL SPECIALTY CODE
2014 OREGON FIRE CODE
2014 STORMWATER MANAGEMENT MANUAL
2016 PORTLAND FIRE CODE

SITE/BUILDING CODE

ZONE:	IG2
OVERLAY:	h
EXISTING OCCUPANCY:	F-1, B, M (PER PERMIT #16-217964-CO)
PROPOSED OCCUPANCY:	F-1, B, M
FIRE SPRINKLERED:	NO
CONSTRUCTION TYPE:	V-B
MAXIMUM BUILDING HEIGHT:	NO LIMIT
MAXIMUM FAR:	NO LIMIT

SITE COVERAGE (PROPOSED)

SITE BUILDING COVERAGE	8,334 SF	20.2%
BUILDING FOOTPRINT	7,714 SF 620 SF	
EXTERIOR WALKWAY	18,575 SF	45.0%
IMPERVIOUS HARDSCAPE	14,345 SF	34.8%
PERVIOUS LANDSCAPE	41,254 SF	100%
TOTAL		

STORMWATER NARRATIVE

-PRIVATE: NO WORK/CHANGES PROPOSED
-PUBLIC: NO WORK/CHANGES PROPOSED

PROJECT

ENGINEER OF RECORD

RAHIM A. ABBASI, P.E.
ABBASI DESIGN WORKS, LLC
510 SW 5TH AVE #400
PORTLAND, OR 97204
rahim@abbasidesign.com
T:503.816.9466

OWNERS

TRANSPORT PROPERTIES, LLC
P.O. BOX 10748
PORTLAND, OR 97296

TENANT

CURA
1133 SE 82ND AVE
PORTLAND, OR 97216

GENERAL CONTRACTOR

R. TAYLOR CONSTRUCTION, LLC
CCV #209905
360.601.5366

ABBREVIATIONS

SIM	SIMILAR CONDITION
BLW	BELOW CURRENT LEVEL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
ABV	ABOVE CURRENT LEVEL
MIN	MINIMUM
MAX	MAXIMUM
DIM	DIMENSION
CONT	CONTINOUS
ARCH	ARCHITECTURE
DTL	DETAIL
STRUCT	STRUCTURAL
CONC	CONCRETE
DEMO	DEMOLISHED
ELEC	ELECTRICAL
SAN	SANITARY SEWER
GC	GENERAL CONTRACTOR
EL	ELEVATION
FT	FEET
OCC	OCCUPANCY

SHEET INDEX

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Jan. 13, 2009
RAHIM A. ABBASI
EXPIRES: 12/31/2019

No.	Date
1	7/1/2018
2	8/9/2018
3	8/12/2018
5	3/6/2019

CURA PROCESSING
2901 NE COLUMBIA BLVD

ADW # 16017.00

PERMIT DOCUMENTS

COVER SHEET/ SITE PLANS

Dat	1/23/2017
Drawn	MAP
Checked	RAA

CS1.0

As indicated

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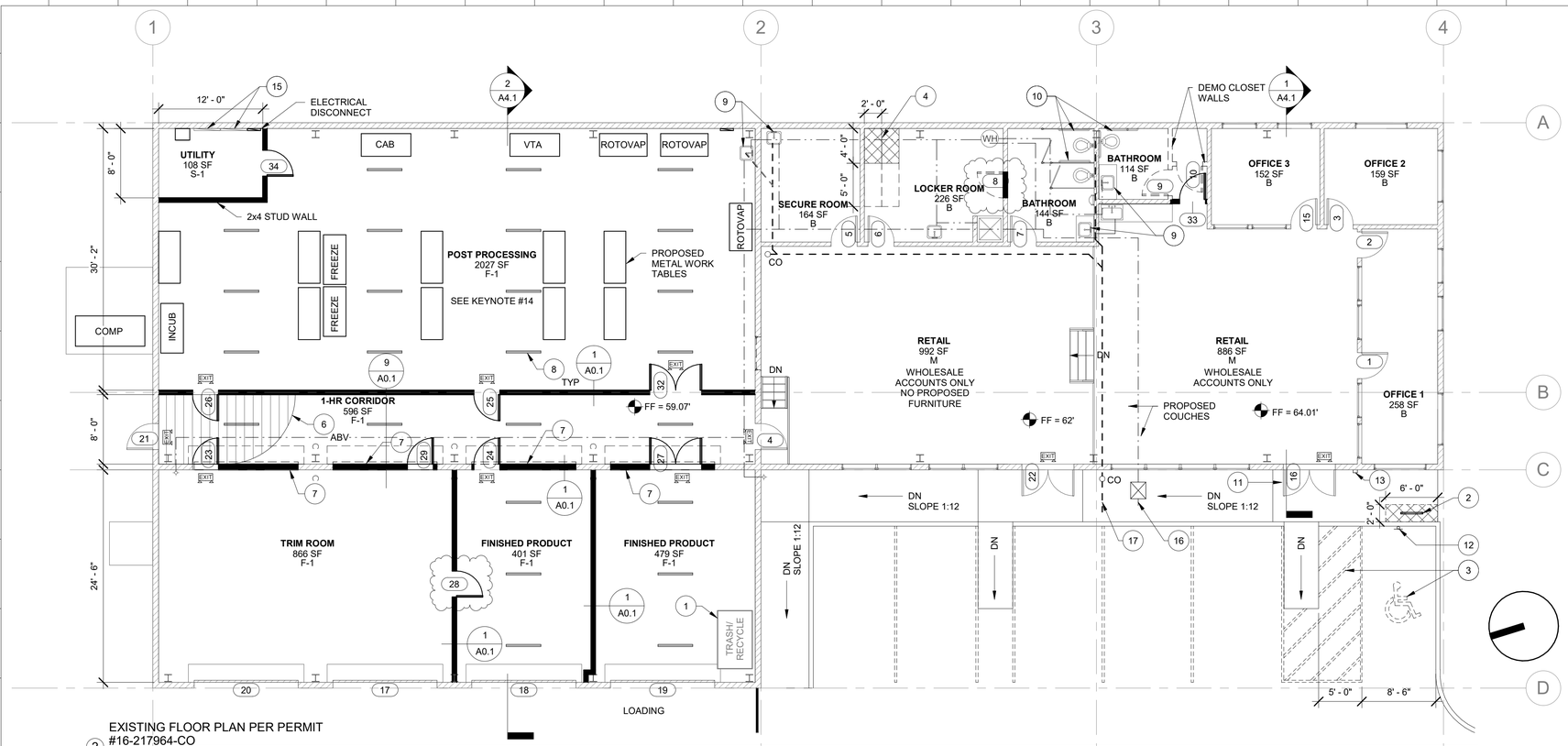

2 EXISTING FLOOR PLAN PER PERMIT #16-217964-CO
1/8" = 1'-0"

EXISTING

1 - EXISTING TRASH AND RECYCLING. TO BE RELOCATED

2 - EXISTING SHORT TERM BIKE PARKING STALL

3 - EXISTING ADA PARKING STALL PER # 16-217964-CO

4 - (2) EXISTING LONG TERM WALL MOUNTED BIKE PARKING STALLS

5 - NOT USED

6 - EXISTING FRAMED CEILING W/IN CORRIDOR PER DETAIL 9/A0.1

7 - INTERIOR ROLLING GARAGE DOORS REMOVED & INFILLED W/ STUD WALL PER #16-217964-CO

8 - NOT USED

9 - EXISTING WALL MOUNTED SINKS

10 - GRAB BARS PER #16-217964-CO

11 - EXISTING MAIN ENTRY W/ SIGN STATING "DOORS TO REMAIN UNLOCKED DURING BUSINESS HOURS"

12 - EXISTING ADA PARKING SIGN ON METAL POLE PER #16-217964-CO

13 - EXISTING AUTOMATIC DOOR ACTUATOR PER #16-217964-CO

14 - NO EXISTING OR PROPOSED FLOOR DRAINS IN ROOM

15 - ELECTRICAL PANELS

16 - EXISTING WATER LINE INTO BLDG

17 - EXISTING SANITARY LINE OUT OF BLDG

EXISTING PLAN LEGEND

EXISTING WALL

DEMOLISHED WALL UNDER PERMIT #16-217964-CO

BUILT WALL UNDER PERMIT # 16-217964-CO

EXIT — SELF ILLUMINATED EXIT SIGN

ø 5' - 0" — 5'-0" ADA TURNAROUND

ROOM NAME
150 SF
OCCUPANCY — ROOM TAG
TOP ROW - NAME
MIDDLE ROW - NET FLOOR AREA
BOTTOM ROW - ROOM OCCUPANCY

4'-0" LENGTH LED STRIP LIGHTING

WH — WATER HEATER

HOSE BIBB

C — CLEAN OUT

WATER LINE (COLD)

WATER LINE (HOT)

SANITARY LINE OUT

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Jan. 13, 2009
RAHIM A. ABBASI
EXPIRES: 12/31/2019

No.	Date
5	3/6/2019

CURA PROCESSING

2901 NE COLUMBIA BLVD

ADW #
16017.00

PERMIT DOCUMENTS

EXISTING FLOOR PLAN

Dat 1/23/2017
Drawn MAP
Checked RAA

A1.1

As indicated

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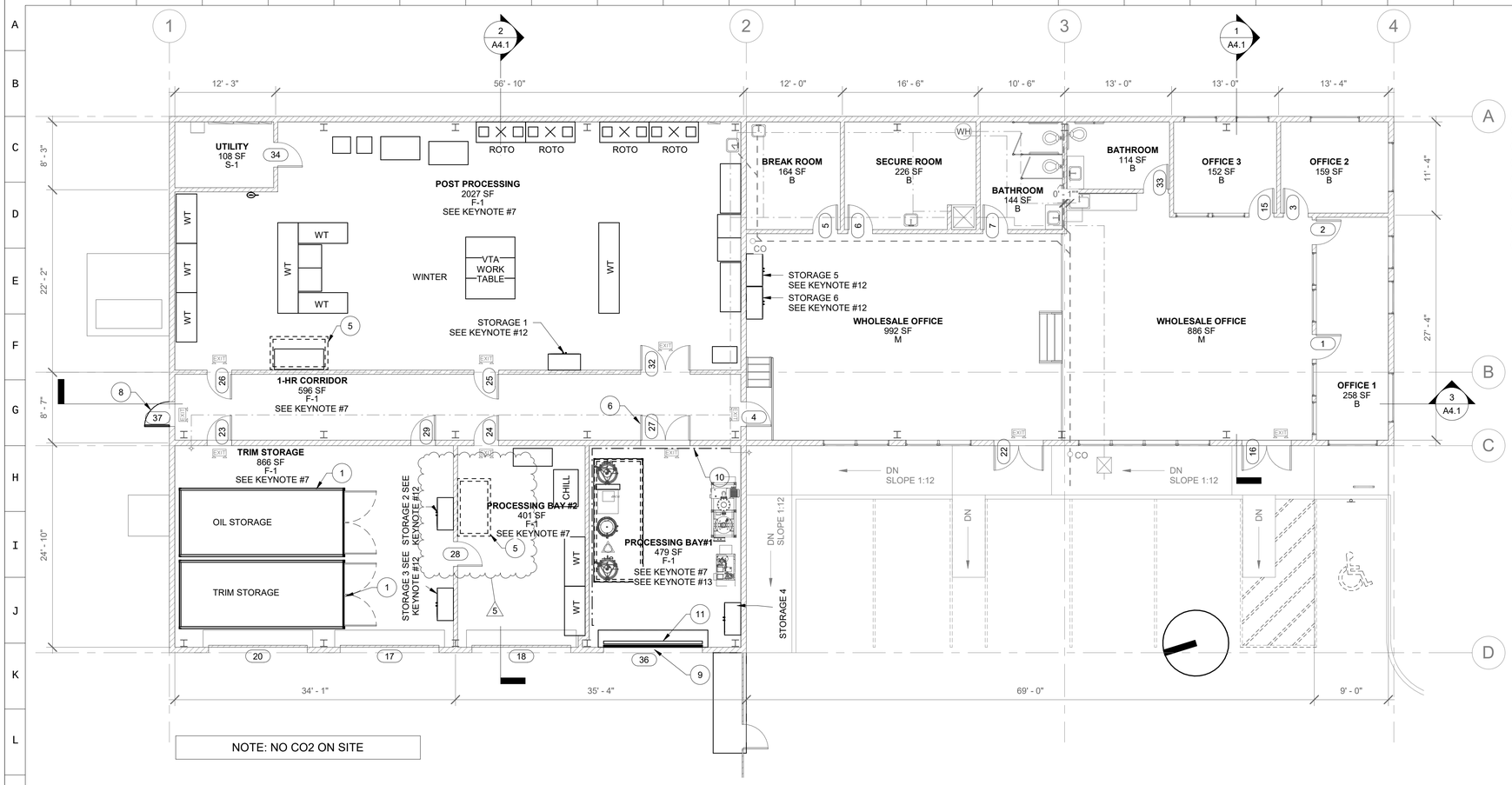

NOTE: NO CO2 ON SITE

15 PROPOSED FLOOR PLAN
1/8" = 1'-0"

PROPOSED

1 - PROPOSED 20-FT STORAGE CONTAINERS TO BE USED TO SECURELY STORE TRIM AND FINISHED OIL PRODUCTS

2 - NOT USED

3 - NOT USED

4 - NOT USED

5 - DOUBLE DASHED LINE REPRESENTS PROPOSED OVERHEAD FUME HOOD

6 - AUTOMATIC DOOR CLOSERS TO BE INSTALLED ON DOUBLE DOORS LEADING TO EHO EXTRACTION ROOM

7 - EXISTING CONCRETE SLAB-ON-GRADE FLOOR TO BE FINISHED WITH SEMI GLOSS EPOXY. EXISITING FLOORS ARE TO BE VACUUMED, POWER WASHED, ACID ETCHED, AND EQUIPMENT TO BE INSTALLED BEFORE APPLYING EPOXY COATING. REFER TO A2.4 FOR MANUFACTURER AND FURTHER INFO

8 - REMOVE EXISTING EXIT DOOR AND REPLACE W/ NEW SECURITY DOOR. PROVIDE PANIC HARDWARE FOR EGRESS

9 - REMOVE EXISTING ROLL UP DOOR AND REPLACE W/ 90 MIN FIRE RATED ROLL UP DOOR

10 - NEW WATER COLD WATER LINE EXTENSION IN EXTRACTION. REFER TO PLUMBING PLAN.

11 - NEW FLOOR TRENCH DRAIN. REFER TO PLUMBING PLAN.

12 - FLAMMABLE LIQUID STORAGE CABINET. MEETS UL 1275 AND 29 OSHA CFR 1910.106 REQUIREMENT. CABINET CAPACITY IS 110 GALLONS.

13 - GAS DETECTION SYSTEM TO BE INSTALLED IN PROCESSING BAY #1 PER TECHNICAL & ENGINEERING REPORT FOR EHO EXTRACTION.

PROPOSED PLAN LEGEND

- EXISTING WALL
- DEMOLISHED WALL
- PROPOSED WALL
- SELF ILLUMINATED EXIT SIGN
- 5'-0" ADA TURNAROUND
- ROOM TAG
  TOP ROW - NAME
  MIDDLE ROW - NET FLOOR AREA
  BOTTOM ROW - ROOM OCCUPANCY
  (ROOM NAME, 150 SF, OCCUPANCY)
- WATER HEATER
- HOSE BIBB
- CLEAN OUT
- (E) WATER LINE (COLD)
- (E) WATER LINE (HOT)
- (E) SANITARY LINE OUT
- (N) WATER LINE (COLD)
- (N) SANITARY LINE OUT

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CURA PROCESSING
2901 NE COLUMBIA BLVD

ADW #
16017.00

PERMIT DOCUMENTS

PROPOSED FLOOR PLAN

Dat 1/23/2017
Drawn MAP
Checked RAA

A2.1

As indicated

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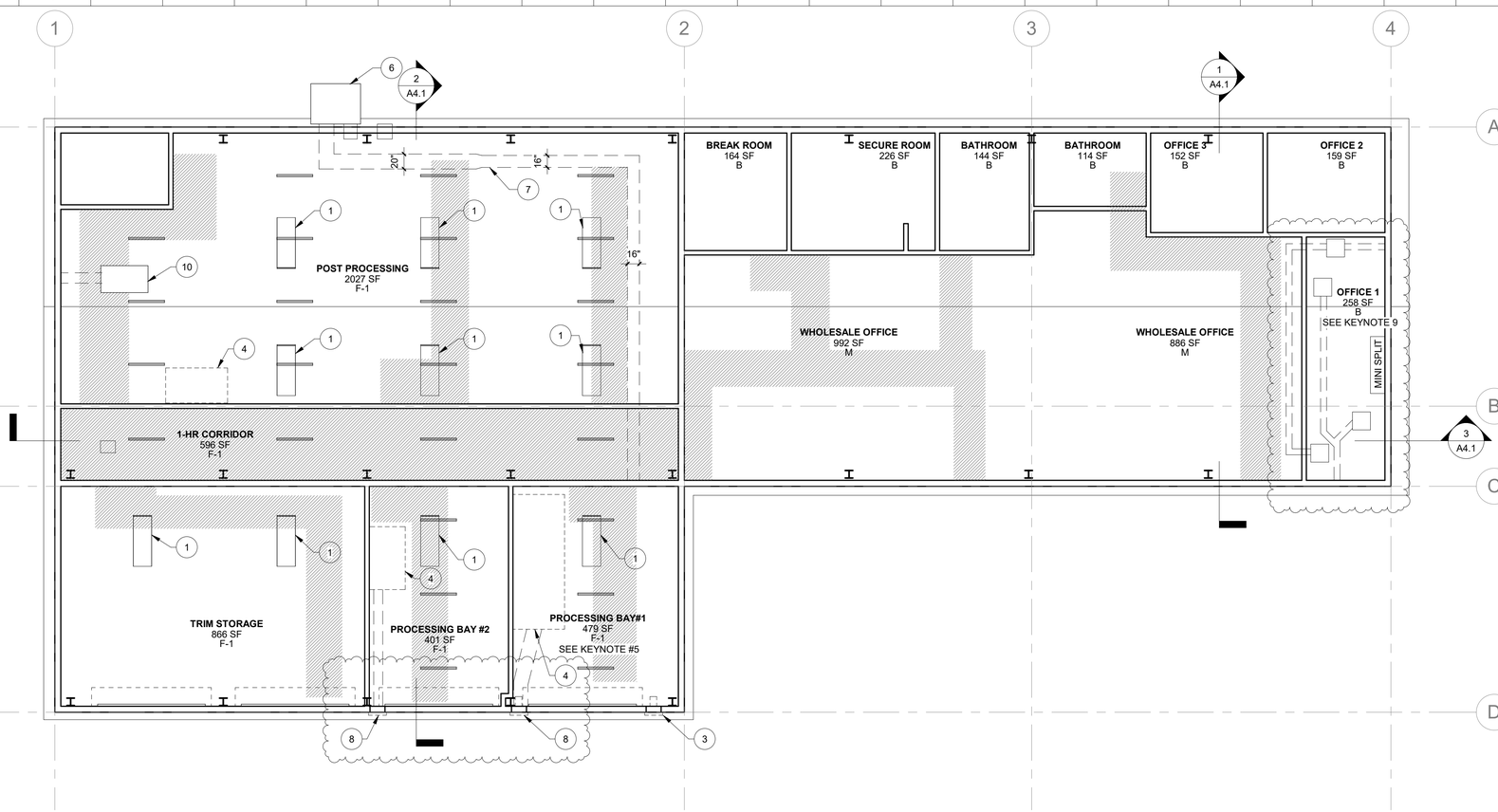

PROPOSED

1 - ALL EXISTING SKYLIGHTS TO BE FITTED W/ EXPANDED STEEL BARS FOR SECURITY PURPOSES.

2 - NOT USED

3 - PROPOSED EXTERIOR WALL VENTS FITTED W/ 1400 CFM CARBON FILTERS. ALL VENTILATION TO BE CLASS 1 DIV ELECTRICAL. REFER TO SEPARATE MECH PERMIT #17-196510-REV-01-MT FOR FURTHER INFO

4 - FUME HOODS & VENTING. REFER TO SEPARATE MECH PERMIT #17-196510-REV-01-MT FOR FURTHER INFO

5 - GAS DETECTION SYSTEM TO BE INSTALLED IN PROCESSING BAY #1 PER TECHNICAL & ENGINEERING REPORT FOR EHO EXTRACTION.

6 - RHEEM 7 TON COMBINED HVAC UNIT. REFER TO SEPARATE MECH PERMIT # 17-196510-REV-01-MT

7 - HVAC SUPPLY DUCT TO PROCESSING BAY #1

8 - EXTERIOR WALL VENT REFER TO SEPARATE MECH PERMIT #17-196510-REV-01-MT FOR FURTHER INFO

9 - OFFICE 1 HVAC DUCTS AND MINISPLIT. REFER TO MECH PERMIT #17-1965510-REV-01-MT FOR FURTHER INFO

10 - 3 STAGE CARBON FILTER REFER TO MECH PERMIT #17-1965510-REV-01-MT FOR FURTHER INFO

PROPOSED PLAN LEGEND

EXISTING WALL

DEMOLISHED WALL

PROPOSED WALL

EXIT — SELF ILLUMINATED EXIT SIGN

ø 5'-0" — 5'-0" ADA TURNAROUND

ROOM NAME
150 SF
OCCUPANCY

ROOM TAG
TOP ROW - NAME
MIDDLE ROW - NET FLOOR AREA
BOTTOM ROW - ROOM OCCUPANCY

EXISTING EGRESS LIGHTING. REFER TO NOTES ON CS1.2 FOR FURTHER INFO.

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1	7/1/2018
5	3/6/2019

CURA PROCESSING

2901 NE COLUMBIA BLVD

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PERMIT DOCUMENTS

REFLECTED CEILING PLAN

Dat 1/23/2017
Drawn MAP
Checked RAA

A2.2

As indicated

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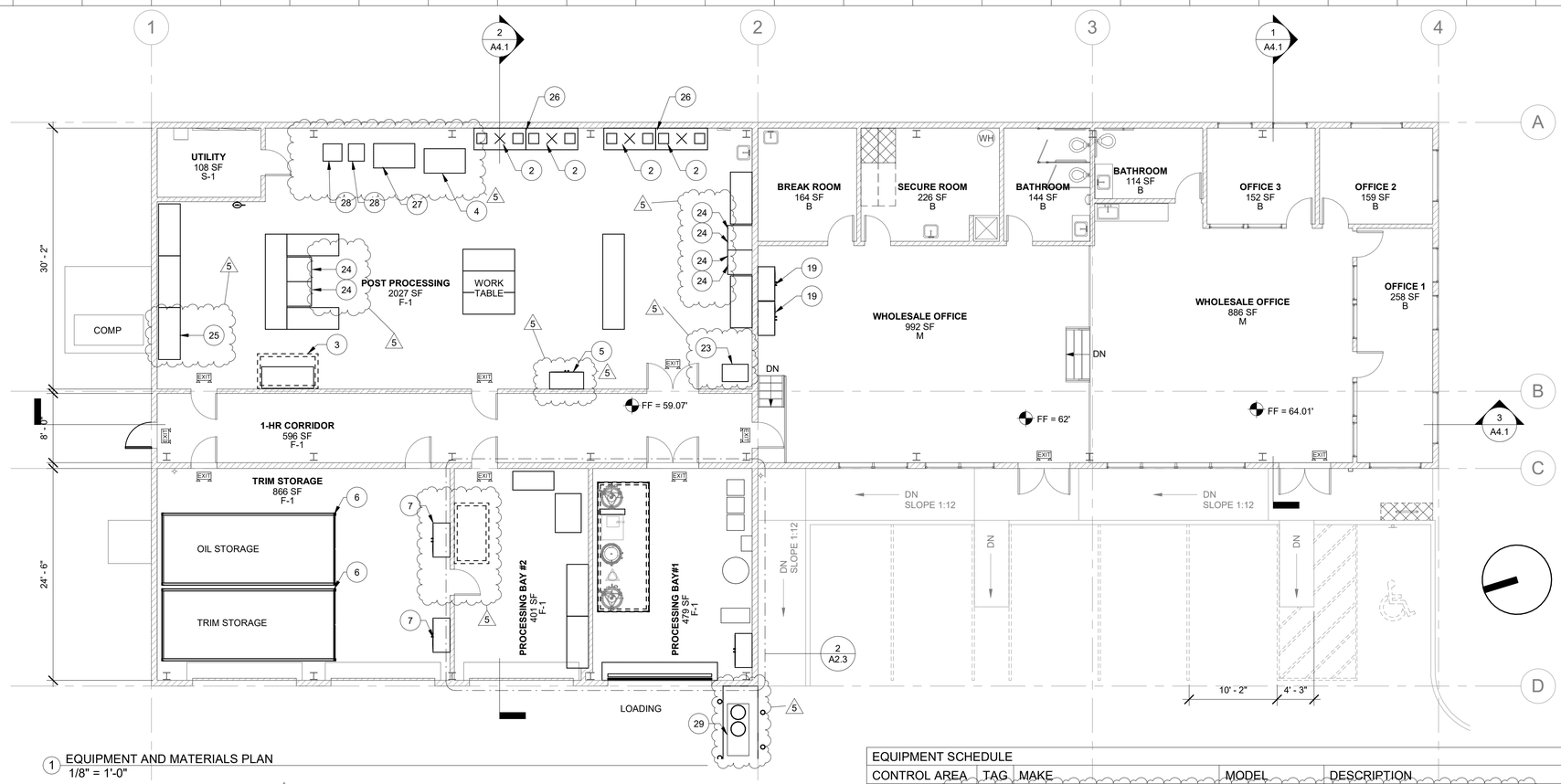
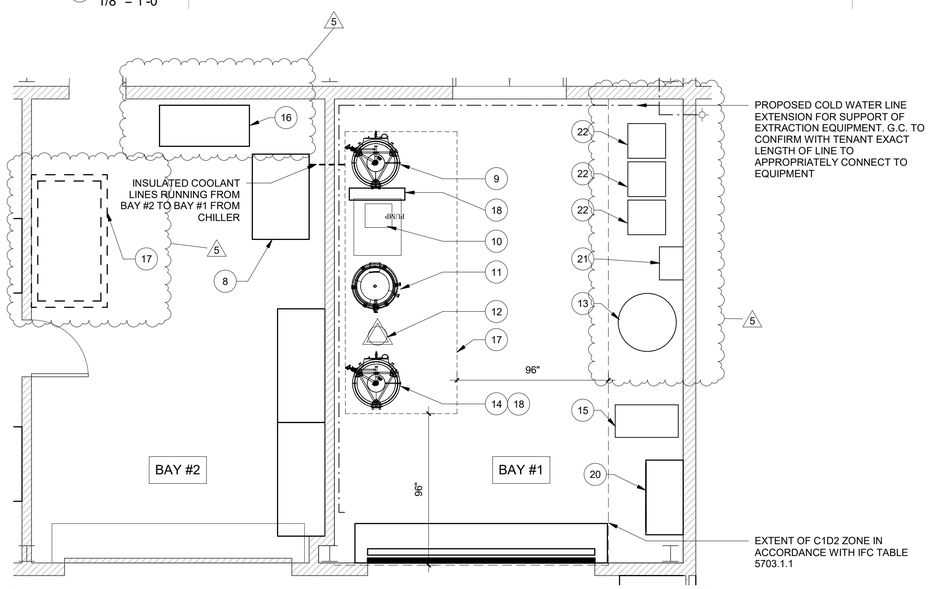


1 EQUIPMENT AND MATERIALS PLAN
1/8" = 1'-0"



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2 ENLARGED CONTROL AREA 3 PLAN
1/4" = 1'-0"

PROPOSED PLAN LEGEND

- EXISTING WALL
- DEMOLISHED WALL
- PROPOSED WALL
- SELF ILLUMINATED EXIT SIGN
- 5'-0" ADA TURNAROUND
- **ROOM NAME** / 150 SF / OCCUPANCY — ROOM TAG: TOP ROW - NAME; MIDDLE ROW - NET FLOOR AREA; BOTTOM ROW - ROOM OCCUPANCY

ROOM FINISH

ROOM	FLOOR	WALL
POST PROCESSING	(E) CONCRETE SLAB-ON-GRADE	(E) GYPSUM WALLBOARD
1-HR CORRIDOR	(E) CONCRETE SLAB-ON-GRADE	(E) GYPSUM WALLBOARD
TRIM STORAGE	(E) CONCRETE SLAB-ON-GRADE	(E) GYPSUM WALLBOARD
PROCESSING BAY #1	(E) CONCRETE SLAB-ON-GRADE W/ (N) EPOXY FINISH APPLIED	(E) GYPSUM WALLBOARD (W) FIRE RATED PANELING
PROCESSING BAY #2	(E) CONCRETE SLAB-ON-GRADE W/ (N) EPOXY FINISH APPLIED	(E) GYPSUM WALLBOARD (W) FIRE RATED PANELING
BREAK ROOM	(E) TILE	(E) GYPSUM WALLBOARD
SECURE ROOM	(E) TILE	(E) GYPSUM WALLBOARD
WHOLESALE OFFICE	(E) TILE	(E) GYPSUM WALLBOARD
WHOLESALE OFFICE	(E) TILE	(E) GYPSUM WALLBOARD
BATHROOM	(E) TILE	(E) GYPSUM WALLBOARD
BATHROOM	(E) TILE	(E) GYPSUM WALLBOARD
OFFICE 1	(E) CARPET	(E) GYPSUM WALLBOARD
OFFICE 2	(E) CARPET	(E) GYPSUM WALLBOARD
OFFICE 3	(E) CARPET	(E) GYPSUM WALLBOARD

EQUIPMENT SCHEDULE

CONTROL AREA	TAG	MAKE	MODEL	DESCRIPTION	QUANTITY	POWER
1	1	NOT USED	NOT USED	NOT USED	N/A	
	2	ACROSS INTERNATIONAL	SE53	ROTARY EVAPORATOR	4	
	3	JAMESTOWN METAL PRODUCTS	F-100-36G5	FUME HOOD	2	
	4	ROOT SCIENCES VTA	VKL 70-5	VTA	2	
	5	ULINE	H-3686S	FLAMMABLE STORAGE CABINET	1	
	23	VINCENT CORPORATION	CP-4	SCREW PRESS	1	
	24	ACROSS INTERNATIONAL	AT32-UL	VACUUM OVEN	6	
	25	THERMO SCIENTIFIC	IMH750-S	THERMO OVEN	1	
	26	HENAN TOUCH SCIENCE	C30-40-50L	CHILLER	2	380V, 3PHASE, 60 H
	27	BEAKER & WRENCH	POPE 6"	WIPE FILM DISTILLATION STILL	1	
	28	ACROSS INTERNATIONAL	R50	JACKETED REACTOR	2	
2	6	CONEX	20-FT CONTAINER	STORAGE CONTAINER	2	
	7	ULINE	H-3686S	FLAMMABLE STORAGE CABINET	2	
3	8	HENAN TOUCH SCIENCE	C30-40-50L	CHILLER	1	
	9	GLACIER TANKS LLC	-	SOLVENT TANK	1	
	10	CPE SYSTEMS INC	KBDA-27D	CENTRIFUGAL PUMP	1	
	11	ABM ENGINEERING	NB OLER	EXTRACTION CHAMBER	1	
	12	ERTOL ALSOP	12PY1	LENTICULAR FILTER CARTRIDGE	1	
	13	BIZZY BEE	FFE-1	FALLING FILM EVAPORATOR	1	
	14	GLACIER TANKS LLC	GLACIER TANK	SOLUTE HOLDING TANK	1	
	15	ACS	TCU300	WATER TEMP CONTROL TOWER	1	
	16	ACROSS INTERNATIONAL	G27	FREEZER	1	
	17	AIR SCIENCE	EDU-M0-60	FUME HOOD	2	
	18	NONWESCO	N-42051	SPILL CONTAINMENT BASIN FOR EQUIPMENT #9 & #14	2	
	20	ULINE	H-3686S	FLAMMABLE STORAGE CABINET	1	
	21	FUSION MARINE TECHNOLOGIES	182-19-02-SE	GEAR PUMP CONTROL PANEL	1	
	22	BALDOR RELIANCE	IDXM7010	GEAR PUMP	3	
4	19	ULINE	H-3686S	FLAMMABLE STORAGE CABINET	2	
OUTSIDE	29	MTA	EVO-101	AIR COOLED CHILLER	1	

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CURA PROCESSING
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ADW # 16017.00

PERMIT DOCUMENTS

EQUIPMENT& FINISHES SCHEDULES

Dat 1/23/2017
Drawn MAP
Checked RAA

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Date: May 13, 2019

From: Rahim A. Abbasi, PE rahim@abbasidesign.com c.503.816.9466

Abbasi Design Works, LLC

Attention: Administrative Appeal Board
Bureau of Development Services
City of Portland

Reference: Mechanical Code Appeal for 2901 NE Columbia Blvd Cannabis Manufacturing Facility

Building Permit #2018-153022-000-00-CO was issued on 10/15/2018 for the marijuana manufacturing and processing facility located at 2901 NE Columbia Blvd. This permit was an alteration to the previously permitted post processing facility to include ethanol extraction and associated raw product storage. During the construction, some of the original equipment proposed has become obsolete requiring revisions to the permit. A revision, Permit #2018-153022-Rev-01-CO, was submitted for review identifying the specific equipment changes and reorganization of equipment within the previously permitted and constructed 1-hr control areas. A round of plan review comments was received including questions related to the specified equipment not being labeled and listed in accordance with the Oregon Mechanical Code. As is common in this industry, much of the equipment has not gone through formal certification processes with UL or other Nationally Recognized Testing Laboratories due to the speed of innovation in this industry. As such, it has been necessary to pursue direct approval from the Local Jurisdiction for the installation and operation of such equipment through a building code appeal process.

This purpose of this letter is to provide background code analysis of the applicable sections of the 2014 Oregon Structural Specialty Code, 2014 Oregon Fire Code, and the 2014 Oregon Mechanical Code in support of the proposed use of equipment that is not currently Listed and Labeled by a Nationally Recognized Testing Laboratory nor has been Field Certified.

It is the professional opinion of ADW that the ethanol extraction system as proposed conforms to the safety and technical requirements of the 2014 Oregon Fire Code, 2014 Oregon Structural Specialty Code, the Oregon Mechanical Code, and NFPA 30. While some of the equipment is not UL or similarly listed, a Technical Engineering Analysis and accompanying Report has been prepared by 3PCertz for the proposed extraction system and equipment. Additionally, a Hazardous Materials Technical Opinion and Report with supporting Hazardous Materials Inventory Statement was prepared by hazardous materials consultant, Rich Miller Consultants based in Portland, Oregon.

The facility retains its current Certificate of Occupancy for the purposes of post processing of cannabis oils and extracts. The facility was originally constructed to allow for up to (4) distinct control areas separated by 1-hr fire rated walls which span from the concrete slab-on-grade to the bottom of the roof deck. The proposed revisions including the already issued building permit, would allow for non-volatile extraction and post-processing lab with associated storage and accessory uses such as an employee breakroom and office areas. The building does not have a fire suppression system. Within the Processing Bay #1, a flammable hazardous liquid, ethanol, is utilized for distillation of cannabis oil, ethanol. Ethanol is listed as a Class IB flammable liquid.

Code/Ordinance Requirements:

The following sections of the Oregon Fire Code provide specific guidance regarding the use and storage of flammable liquids:

- Section 5003.2.3 states "equipment, machinery and required detection and alarm systems associated with the use, storage or handling of hazardous materials shall be listed or approved."
- Section 5703.1.1 states that "areas where flammable liquids are stored, handled, dispensed or mixed shall be in accordance with Table 5703.1.1. A classified area shall not extend beyond an unpierced floor, roof or other solid partition. The extent of the classified area is allowed to be reduced, or eliminated, where sufficient technical justification is provided to the fire code official that a concentration in the area in excess of 25 percent of the lower flammable limit (LFL) cannot be generated."
- In accordance with Table 5703.1.1, there appears to be two distinct categories that this site is subject to:
    - "drum and container filling" with adequate ventilation
        - Class I Division I electrical is required "within 3 feet of vent and fill opening, extending in all directions"
        - Class I Division II electrical is required in "areas within 3 feet and 5 feet of vent and fill opening, extending in all directions. Also up to 18 inches above finished floor or grade level within a horizontal radius of 10 feet from vent of fill opening."
    - "indoor equipment where flammable vapor/air mixtures could exist under normal operations":
        - Class I Division I electrical is required in all areas "within 5 feet of any edge of such equipment, extending in all directions".
        - Class I Division II electrical is required in all areas "between 5 feet and 8 feet of any edge of such equipment, extending in all directions, and the area up to 3 feet above floor or grade level within 5 feet to 25 feet horizontally from any edge of such equipment.
- Section 5705.4.1 states "Solvent distillation units used to recycle Class I, II or IIIA liquids having a distillation chamber capacity of 60 gallons (227 L) or less shall be listed, labeled and installed in accordance with Section 5705.4 and UL 2208."

Alternative Code Compliance:

1. Areas Subject to Section 5703.1.1:

As a Class 1B flammable liquid, ethanol is proposed to be stored, handled, dispensed, and mixed within this facility in accordance with the applicable building, fire, electrical, and mechanical codes.

- Storage: All storage of ethanol is proposed to occur within 55 gallon drums and located in locked and rated Flammable Liquid Storage Cabinets manufactured by Uline that complies with 29 OSHA CFR 1910.106. These storage cabinets are identified on the accompanying plans as FLSC-1 through FLSC-4. A total of (4) cabinets are located within the facility consisting of (1) cabinet per control area as identified on the accompanying equipment plan, A2.3. The storage cabinets shall be affixed with signage indicated the hazardous nature of the contents and identifying the flammable liquid stored inside along with hazard categorizations. A maximum of 110 gallons will be stored in Control Area #1, a maximum of 220 gallons stored in Control Area #2, and a maximum of 220 gallons in Control Area #4. Control Area #3 is the only area where the flammable liquid is proposed to be utilized as part of the processing system, this area has a maximum limit of 95 gallons in use at any given time with no storage of flammable materials within the control area. Please refer to the Hazardous Materials Technical Opinion and Report by Rich Miller for a Maximum Allowable Quantities analysis.
- Handling: The 55 gallon drums of ethanol will be moved by hand from the storage cabinets to the non-volatile extraction lab for use in the extraction process using roll carts with 4 wheels to ensure there is no risk of spilling or opening of the drums. Opening of the drums will only occur within the enclosed lab and underneath the proposed fume hood within the defined Class I Division II zone.
- Dispensing and Mixing: Dispensing and mixing of the ethanol will only occur within the non-volatile extraction lab where it is to be utilized as a solvent in the initial extraction process. The ethanol is washed over the marijuana plant materials in a chilled state at -20 degress Celsius. The process is more thoroughly described in the technical reports by 3pCertz and Rich Miller Consulting. Proposed safety measures to meet or exceed the current building codes standards are addressed further below in the Drum and Container Filling comments.

2. Drum and Container Filling Subject to Requirements of Table 5703.1.1

The lab is proposed to be located within a 1-hr fire-rated Control Area with designated zones for components to be both Class I Division I electrical as well as Class I Division II Electrical. Based on the reports from 3pCertz and Miller Safety & Health Consulting, some of the proposed equipment is subject to the requirements of Table 5703.1.1. Specifically, the storage tanks by Glacier Tanks, LLC would qualify as "drum and container filling". These tanks store ethanol to be utilized as a solvent and are connected to a chiller. The chiller reduces the temperature of the solvent and once chilled to -20 degrees Celsius, the solvent is transferred to the extraction chamber using a nozzle at the base of the vessel. Transferring of ethanol into and out of the solvent tanks is achieved using nozzles which result in a possible risk of exposure to ambient air temperatures when placed in an open position. Due to this risk, the solvent tanks are proposed to be located underneath a fume hood. The solvent tanks are fabricated out of Stainless Steel, A304 Grade.

Located adjacent to the solvent tanks is the extraction chamber. The solvent is pumped into the extraction chamber at -20 degrees Celsius at a rate of 1 gallon of ethanol to 1 pound of cannabis material. The extraction chamber has a manway lid located on top of the chamber for inserting the cannabis material and another manway lid located at the bottom to provide access for cleaning the chamber. This lid is only

opened when the equipment is not in use to pack plant material into the top of the chamber. Once the lid is closed and sealed, the cannabis material is bathed in the chilled solvent at low pressure using a CPE C-Series Portable Centrifugal Pump. The pump is located just outside the fume hood and more than 3-feet from the solvent tanks and extraction chamber. The pump is Class I, Division II rated as required in accordance with Table 5703.1.1.

The solvent tank and extraction chamber are the only equipment which do not qualify as a completely closed-loop system and as such appear to be subject to the requirements of Table 5703.1.1. In accordance with this table, the following is proposed in accordance with Chapter 57 of the 2014 Oregon Fire Code:

- All electrical components within 3 feet of vent and fill opening shall be Class I, Division I electrical. - As can be seen from the accompanying equipment layout plan, there is no proposed electrical components within 3-feet of this equipment.
- All electrical components between 5 feet and 8 feet of vent and fill opening shall be Class I, Division II electrical. – As noted above, the pump is the only electrical equipment located within this zone and is Class I, Division II rated.
- A fume hood is proposed to encase the entire work area of this equipment with 3 ventilation exhaust fans.
    - The exhaust fans will operate such that the entire supported flow rate within the hood is a minimum of 1 cfm per SF of floor area served under normal operating conditions.
    - The exhaust fans will be interlocked with the proposed gas LEL detection system such that the exhaust fans will ramp up to ensure the flow rate for the hood will equate to 3 cfm per SF of floor area which is approximately equivalent to a velocity of 60 feet per minute.
    - The exhaust fans will be connected to emergency battery power backup in the event of a power failure.
    - The filters on the exhaust fans will be set off from the ground approximately 12 inches.
- For further protection, a Class I, Division II electrical zone of 5-ft from edge of the proposed fume hood has been proposed to exceed the requirements of Chapter 57 of the Oregon Fire Code.
- Make-up air for the ventilation exhaust system is proposed at the far end of the lab to ensure negative pressure is incorporated into the air flow so that there is no risk of ethanol exposure non-rated equipment.
- As ethanol is denser than air, any electrical components, including receptacles, shall be located a minimum of 36” above finished floor level.
- A manual shutoff valve for all equipment in the laboratory is proposed to be located near the exit doors and a manual shutoff for the extraction chamber, centrifugal pump, and solvent tanks will be located within 8 feet of the equipment.
- All egress lighting is proposed to be on emergency battery power back up.
- The gas LEL detection system is proposed to be on emergency battery power back up.
- All equipment weighing more the 400-lbs will have seismic anchorage to the concrete slab-on-grade

3. Indoor Equipment subject to requirements of Section 5705.4.1

The only proposed equipment subject to this specific code section is the Solvent Distillation Unit: The proposed Solvent Distillation Unit, the

Myers Vacuum Centrifugal Distillation System, and its installation method are in conformance with the requirements of Section 5705.4 except that the unit is not specifically listed or labeled in accordance with UL 2208. The equipment complies with all of the other requirements as follows:

- 5705.4.4 Labeling: The equipment shall have a label indicating the maximum capacity of the distillation chamber, the products for which the units is approved for use, and identifying the distance away from ignition sources the equipment shall be installed.
- 5705.4.5 Manufacturer's Instruction Manual: An instruction manual is readily available for review and has been included as an Appendix to this AMMR for review in the Standard Operating Procedures document.
- 5705.4.6 Location: The Solvent Distillation Unit is proposed to be located within the enclosed laboratory space, a 1-hr rated environment and more than 11-feet from any equipment that utilizes ethanol in a procedure that is not entirely closed loop.
- 5705.4.7 Storage of Liquids: Distilled liquids are stored in accordance with Section 5704 within Flammable Liquid Storage Cabinets listed and classified for storage of ethanol.
- 5705.4.8 Storage of Residues: Residual solvent material is pumped out of the distillation unit and into storage drums for collection and removal by a hazardous materials company.
- 5705.4.9 Portable Fire Extinguishers: A portable fire extinguisher having a rating of not less than 40-B is proposed to be located between 10 feet and 30 feet of the distillation unit near the double doors of the lab.

Please refer to the accompanying equipment and floor plans as well as the Standard Operating Procedures for the lab. Note that the accompanying floor plans contain revisions to the previously submitted building plans. Final updated tenant improvement plans including mechanical and electrical plans are currently being prepared for submittal to the City of Sacramento in response to plan review comments and shall include the fire and life safety protection measures discussed in this narrative.

Please also refer to the accompanying copies of the Engineering Report for the extraction equipment and system by 3pCertz and the Hazardous Material Technical Opinion and Report by Rich Miller Consultants.

Sincerely,

Rahim A. Abbasi, P.E.

cc. David Thompson, Kelsie Davis, Mark Kelley – CURA CS, LLC

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Attention: Rahim Abbasi

5/15/19

Re: Hazardous Materials and Process Technical Opinion and Report, Rev. 5.19

Dear Rahim,

Following is a Hazardous Materials Technical Opinion and Report, Rev.5.19, as requested by you as relates to hazardous materials storage and use at the existing CURA CS processing facility. This facility is located at 2901 NE Columbia Blvd. in Portland. This Report reflects discussions with yourself and information received from Cura CS, LLC personnel.

Discussion: Facility

Cura CS LLC proposes to operate a closed-loop ethanol cannabis processing facility, together with related packaging, distribution, and office uses. The primary business is the manufacture and wholesale distribution of cannabis concentrates and related products. This facility has received a recreational processor license with a concentrate endorsement as administered by the Oregon Liquor Control Commission (OLCC) and currently holds an active City of Portland Processor license.

The facility will occupy a 7715SF one-story, non-sprinklered building located at 2901 NE Columbia Blvd. The non-volatile extraction and processing area of the facility is classified as F1 occupancy. Use for the non-volatile extraction and processing of cannabis should be classified as an F1 occupancy. There will be no flammable gasses used or stored on-site.

Process Description: Cannabis Processing

Control Area #3 (Cannabis Processing):

Control Area #3 is where the first stage of cannabis oil processing occurs. Bay #1 will be used for processing cannabis trim into crude oil. After trim has been processed into crude oil, it will undergo the first step in post-processing in Post-Processing Room (Control Area #1).

Bay #2 will be used for housing solvent tank Chillers and miscellaneous equipment. There will be not cannabis processing, or activities of any kind in the space.

Bay #1 Processing (Stage 1: Cannabis Processing): Cannabis processing will occur in 6 steps - outlined below. The non-volatile extraction system is a use-closed system. Please refer to attached Engineer Report for equipment schematics and operational diagrams.

1. **Glacier Jacketed Solvent Tanks**: Processing begins with Ethanol Alcohol that is stored in Jacketed Solvent Tank with a capacity of 95-gallons supplied by Glacier Tanks. This vessel stores the Ethanol Alcohol Solvent and provides cooling via external shell and transfer of the chilled solvent through the base of the vessel using standard sanitary clamps. The vessel construction is of Stainless Steel 304 Grade. The 95 G Jacketed Solvent Tank use a Henan Touch Science Chiller to chill the Ethanol Alcohol to subzero temperatures (-40 F).
    a. **Across International C-30-40-50L:** The non-volatile extraction system chiller shall be located inside of Bay #2. The coolant lines shall are piped into Bay #1 using 1-hour fire rated penetrations. All coolant lines shall be insulated and identified as being coolant lines. A typical maximum distance of 5 Ft and 1-hour fire rated wall separates the chiller from the solvent tanks.

1. **CPE C-Series Portable Centrifugal Pump**: The non-volatile extraction system uses a CPE C-Series portable centrifugal pump Model Number KBDA-27D with speed control for the transfer of solvent from solvent tank to the material tank. The pump may be connected to either orifice or nozzle on the vessel for filling operations or transfer operations between tanks. The pump is electrically a class 1 division 2 and ATEX approved.

2. **N.B. Oler Material Tank:** The material tank is used to store cannabis material to be processed using Ethanol. The solvent is pumped into the Material Tank at -20 degrees Celsius at a quantity of 1 gallon ethanol per 1 pound of cannabis material. The material and solvent soak for 10 minutes after which the solute is transferred to the filtration stage. The solute consists of mixed Ethanol and cannabis oils. The material tank is a top feed bottom exit process flow. The ethanol enters at the top port and the solute exits through the bottom of the tank. The tank has a top man way lid and a bottom man way lid to ease the cleaning and filling process when not in operation. The material tank will operate at -20 degrees Celsius. ASME BPVC does not apply due to the low vapor pressure for the Solvent.

3. **Glacier Jacketed Solute Holding Tank**: The Solute Holding tank is supplied by Glacier Tanks, LLC and has a capacity of 95-gallons. This vessel stores the Solute and provides a means for cooling

via an external shell and transfer of the chilled solute through the base of the vessel using standard sanitary tri-clamps. The vessel construction is of Stainless Steel 304 Grade. A top man way provides access for cleaning the vessel prior to use.

4. **Ertel Alsop Lenticular Filtration System:** The non-volatile extraction system utilizes the 12PY1 Lenticular Filter Cartridge. The solute flows from the N.B. OLER material tank through the lenticular filter. This process removes unwanted particulates, fats and waxes acting as an inline winterization system. The solute then flows into the solute holding tank for transfer to the BizzyBee Falling Film Evaporator.

5. **BizzyBee Falling Film Evaporator (FFE-1)**: The solute is transferred pumped from the Glacier Jacketed Solute Holding Tank into the BizzyBee FFE-1. The feedstock is pumped into the system and dispersed over a tube and shell jacketed column.

   The first column is heated such that the solvent temperature increases as the chamber pressure is reduced. The combination of heating to feedstock and reducing the pressure assists in the vaporization of the ethanol solvent which encourages the solvent to be removed. The vapor solvent or ethanol leaves the chamber in vapor state and condenses in the first cooling column (still within a closed environment). The remaining ethanol is subjected to the same process in the second heating/cooling columns.

   All solvent that was recovered is returned to the original solvent holding tank for subsequent uses in material processing. The solvent is recovered at 99.9% of its original purity.

   The remaining residue is the cannabis crude oil, this oil collects at the base of the chamber and is transferred to the next piece of equipment the Beaker and Wrench 6" Distillation Still located in Post-Processing (Control Area #1). Based on analytical testing there are zero PPM's of residual solvent is the cannabis crude feedstock.

Bay #2 (Utilities and Misc. Storage)

Control Area #3 Safety:

1. Personal Protection equipment and steel-toed boots or equivalent are required by all employees that work in the area.
2. Eye protection is required at all times during production
3. Nitrile gloves must be worn during all production.
4. 2 x Fire extinguishers will be located in the area.

Control Area #3 Hazardous Materials

1. Control Area is separated from other control areas by a 1-hour fire separation and a 1-hour fire corridor connecting to Control area #1.
2. Ethanol and Isopropyl Alcohol will be the only hazardous materials located in the control area, and only during production. There will be a total of 95 gallons in use during initial cannabis crude oil processing. The ethanol/isopropyl alcohol will only be used in a use-closed system.

3. SDS sheets will be located next to Bay #1 processing equipment.

Control Area #1 (Stage 2: Post-Processing):

Post processing is the last step - outlined below. Post processing begins by the decarboxylation of cannabis crude feedstock. After feedstock undergoes the decarboxylation process, the material will undergo the distillation process. Distillation removes any unwanted fats, lipids, waxes and chlorophyll from the crude cannabis feedstock, leaving behind a purified cannabis distillate.

1. **Decarboxylation:** This is the 8th step in initial Cannabis distillate processing. This is the first step that occurs before post-processing. Crude Cannabis feedstock is exposed to heat (135-155 F) for 8-12 hours. Decarboxylation is a chemical reaction that removes a carboxyl group, converting THCA into a more stable form: THC. The crude cannabis feedstock is placed into one of two pieces of equipment depending on the size of the batch - both pieces are covered below.
    i. **Across International Jacketed Reactor - R20L**: The R20L is used for larger batches of cannabis crude feedstock. The feedstock is transferred into the Jacketed Reactor and heated to 153 F under a vacuum. The feedstock is agitated using a motor driven paddle mixer. The m
    ii. **Across International Rotary Evaporator - SE53-S1:** The SE53-S1 is used for the decarboxylation of smaller batches of crude cannabis feedstock. The material is placed in the 20L round bottom receiving flask. After which the flask is submerged under a water bath at 150 F under vacuum, 10-12 hours.

2. **Wipe Film Distillation:** Wipe Film Distillation is the 9th and final step in processing cannabis oil distillate. After the **Cannabis** crude feedstock has completed the decarboxylation process, it's transferred to one of the two pieces of equipment outlined below. These devices are used to further refine cannabis distillate oil into a higher purity concentrate.
    i. **Beaker and Wrench 6" Wipe Film Distillation Still - BW1:** The BW1 is used in distilling larger batches of cannabis crude feedstock. The feedstock is transferred to a 5L hopper. Feedstock is pumped via peristaltic metering pump into the 6" in wiped film evaporator column. As the material spreads across the sides of the column, the cannabis crude oil evaporates. The vapor that condenses is the purified cannabis distillate oil and is expelled out of the still via distillation spout.

    The remaining crude byproducts (fats, lipids, waxes, and chlorophyll) that do not evaporate are expelled through the residue spout. This material essentially contains no cannabinoids and is considered an inert biomass.

    ii. **Root Sciences VTA - VKL 70-5:** The VKL 70-5L is used for smaller batches of cannabis crude feedstock. The feedstock is transferred to a 2L feed vessel pumped via metering pump to the 4" evaporator column. The material spreads across the sides of the column and evaporates identical to the BW1. The vapor that condenses is the purified cannabis distillate oil and is expelled out of the still via distillation spout. Remaining crude

byproducts (fats, lipids, waxes, chlorophyll are expelled via the residue spout and collect for disposal.

Control Area #1 Safety:

1. Personal Protection equipment and steel-toed boots or equivalent are required by all employees that work in the area.
2. Eye protection is required at all times during production
3. Nitrile gloves must be worn during all production.
4. 2 x Fire extinguishers will be located in the area.
5. Area contains 1 hard plumbed eyewash station.

Control Area #1 Hazardous Materials

1. Control Area is separated from other control areas by a 1-hour fire separation and a 1 hour fire corridor from control area's #2 and #3. Ethanol and Isopropyl Alcohol will be the only hazardous materials located in the control area. There will be no hazardous materials used in this control area. Hazardous materials will only be stored in the area.
2. Ethanol and Isopropyl Alcohol will be stored in Flammable liquid storage cabinets. Maximum quantities stored at most will be two 55 gallon drums.
    a. There will be 2 self-closing Flammable liquid storage cabinets (that meet 29 OSHA CFR 1910.106 requirements with written certification from the Manufacturer) located in the control area each with a capacity of two 55 gallon drums. Each cabinet meets UL 1275 requirements.
3. SDS sheets will be located next to flammable liquid storage cabinets.

Control Area #2 (Storage of Cannabis Product and Hazardous Materials):

This area is a storage area for Cannabis Trim (Conex #1) that is awaiting processing and Finished Oil (Conex #2) that has already been processed. Product will be stored in Steel shipping containers, secured with commercial grade locks, adhering to all state/local security requirements.

Conex #1 (Trim Storage)

1. Storage Conex #1 will house cannabis trim that will be used in the concentrate making process. The trim material is tested by an OLCC license laboratory, each batch of trim has a 24-digit UID tag that is listed in the CTS system (METRC)

Conex #2 (Oil Storage)

1. Storage Conex #2 is for the storage of crude cannabis feedstock awaiting refinement, and fully processed cannabis distillate. All products have a 24 digit UID affixed that is tied to seed-to-sale tracking system. Finished product is tested by an OLCC licensed laboratory, with the results

uploaded into seed-to-sale tracking system. Each batch has a 24 digit UID tag that is listed in the CTS system (METRC)

Control Area # 2 Safety:

1. Personal Protection equipment and steel-toed boots are required by all employees that work in the area.
2. 1 x Fire extinguisher will be located in the area.

Control Area # 2 Hazardous Materials

1. Control Area is separated from other control areas by a 1-hour fire barrier.
2. Ethanol will be the only hazardous material located in the control area. There will be a total of four 55-gallon drums stored in the area. Ethanol will be stored in Flammable liquid storage cabinets (see below section). There will be no hazardous materials used in this control area. Hazardous materials will only be stored in the area.
    a. There will be two self-closing Flammable liquid storage cabinets (that meet 29 OSHA CFR 1910.106 requirements with written certification from the Manufacturer) located in the control area each with a capacity of two 55 gallon drums each. Each cabinet meets UL 1275 requirements.
3. SDS sheets will be located next to flammable liquid storage cabinets.

Control Area #4 (Wholesale Office Space)

This area is retail space mixed with office, this space will be ideally utilized for administrative work. In the retail portion of the control area there are currently no retail operations. This area will be used to store overflow hazardous materials.

Control Area #4 Safety:

1. 1 fire extinguisher is located in the area.
2. Area contains 1 eyewash station
3. Area contains automated external defibrillator
4. Employees moving drums into flammable liquid cabinets are required to wear steel toed boots or equivalent.

Control Area #4 Hazardous Materials Storage

1. Control Area #4 is separated from other control areas by a 1-hour fire barrier.
2. Ethanol will be the only hazardous material located in the control area.
3. There will be a total of four 55-gallon drums stored in the area. Ethanol will be stored in Flammable liquid storage cabinets (see below section).

a. There will be 2 self-closing Flammable liquid storage cabinets (that meet 29 OSHA CFR 1910.106 requirements with written certification from the Manufacturer) located in the control area each with a capacity of two 55 gallon drums.

4. SDS sheets will be located next to flammable liquid storage cabinets.

Outside Control Area (Outside Storage Enclosure)

Overflow hazardous materials will be stored in the outside storage enclosure. The structure is composed of non-combustible materials. The structure is equipped with sloped roof, side venting and gutters.

Outside Control Area Safety:

1. All hazardous materials stored in the area will be marked with the contents of the container, in addition to any hazardous labeling requirements.
2. Warnings signs will be posted inside and outside of the storage area.
3. Storage area will be secured by commercial grade locks at all times. Only management has access to the storage area.

Outdoor Control Area Hazardous Materials Storage

1. The entire enclosure is equipped with a raised berm and graded concrete - capable of containing 550-gallons of a hazardous materials in the event of a catastrophic loss.
1. The Ethanol and Isopropyl alcohol will be the only hazardous materials stored in the area. At maximum there will five 55-gallon drums of either flammable liquid stored at one time.
2. All hazardous materials will be marked with the appropriate labels and placards.

Oregon Code/OLCC Requirements (Processing: Control Area #3 - Bay #1)

Issue	Safeguard Provided (Code Reference)	Comments
Technical Opinion and Report, HMIS and P&ID	Must be prepared by competent design professional	
Fully Enclosed Extraction Room	1-hour fire barrier (OSSC 414.2 for Control Areas) - recommendation to establish separate Control Areas	To be part of separated Control Area #3; see narrative above
Proper Ventilation in Extraction and Post Processing Rooms	1 cfm/sf as a minimum (OFC 5307.2, 5004.3, OSSC 414.3) ; with backup power; additional 3 cfm/sf for emergency)	To comply: See mechanical submittals

Issue	Safeguard Provided (Code Reference)	Comments
Exhaust Type and Location	1. Outlet 10 feet from Openings or Property Lines 2. 1 foot above floor and close to extractors 3. Scrubbed exhaust 4. Explosion proof fan	To be detailed in mechanical submittal
Control of Ignition Sources in Cannabis Extraction Area	Control sources of ignition; Control Area #3 (Bay#1) Class 1, Div. 2 (OFC Table 5703.1.1). Bay #2 contains no processing of cannabis.	Shall comply per submittals: See attached electrical submittals for Control Area #3 (see Conclusion #2 below)
Flammable Gas Detection in Extraction Room	Approved LEL detector with visible/audible alarm at 25%LEL w/ back-up power (OFC 5001.3.3.8, OSSC 414.5.2)	In process. LEL detector installed, with power back-up; See attached Extraction booth specs
Closed-loop Extraction System	Approved Oregon ME stamp required (OFC 5003.2) (see attached Report/Letter)	P&ID required to include: Iso valves, Pressure relief, materials of construction, pressures, etc
Equipment and Facilities Approved for Use	By local Building Official (per OSSC 104.1)	To be approved by Oregon ME
Emergency Eyewash	Within 25' of operations (Oregon OSHA, OLCC Div. 25, Section 845-025-3260)	2 x Eyewash stations are currently installed
Safety Data Sheets (SDS) Available	Available on-site (OFC 5003.4)	Complies. SDSs provided by 3rd party vendors are posted in facility.

Hazardous Materials Findings

Miller Safety & Health Consulting used SDSs provided by Cura CS LLC and the database HMEX to review all of the materials to be stored and used at the facility. Following are the findings as relates to the HMIS prepared for the proposed facility.

Maximum Allowable Quantity (MAQ) for Storage or Use in the non-volatile extraction facility are below national/state limits. See the attached HMIS Classifications and Summaries for details.

Conclusions, Recommendations and Requirements

1. The Cura CS LLC facility complies with the MAQ amounts allowing the all four Control Areas to be classified as a Medium Hazard facility, F1 occupancies. Four Control Areas are the maximum number allowed in the building, in regards to hazardous materials use and storage.

2. The Post Processing area in Control Areas 1 and 3 need to be ventilated and the electrical installation evaluated by an engineer in relation to use of hazardous materials and the ventilation system. Typically, a Class 1, Division 2 room or area are a requirement although adequate ventilation can assist in limiting the scope of classified electrical. (See Conclusion #8 below)

3. **Outdoor Storage of flammable liquids** is regulated in OFC 5704.4. OFC Table 5704.4.2 requires that Outdoor storage be 50 feet from the lot lines and 10 feet from public ways or alleys. Amounts are limited to 1100-gallons, provided the following conditions exist: • one-story, non-combustible construction and • a non-combustible exterior or • an exterior building wall of 2-hour construction and • there are no openings within 10 feet Note: In my experience, a two-wall that extends 18" above and to the sides of flammable liquid storage may be acceptable to the City if the other above conditions cannot be met.

4. The International Fire Code Chapter 50, applicable Sections 5001 and 5003, apply to the storage and use of hazardous materials regardless of the amount or occupancy. Among these requirements are:
    a. Proper labeling and signage
    b. SDS for all hazardous materials
    c. A storage plan, if so requested by the Fire Department, showing the types of hazardous materials and locations in tanks and on shelving.
    d. Written procedures and personnel training as relates to hazardous materials.

5. It will be the responsibility of Cura CS LLC to maintain hazardous materials amounts within the MAQ. If the MAQ Amounts are exceeded at any time in any of the four Control Areas, the space would be classified as H occupancy requiring many additional engineering and administrative controls per the Codes.

6. Will be the responsibility of Cura CS LLC to maintain the overall facility in accordance with the requirements of the Oregon Codes, OHA, OLCC, and industry standard Best Management Practices.

7. As Approved Flammable Liquid Storage Cabinets are being used to increase the MAQ amounts, these cabinets must comply with UL 1275 and be constructed of materials compatible with the hazardous materials stored. Doors must be self-closing and self-latching. New Cabinets should have the UL Listing clearly displayed.

8. Specific ventilation and electrical requirements will be determined by a licensed Mechanical Engineer and shall be a part of the Appeal (if required by the City) and project Submittals.

It has been a pleasure working with you. Please contact me if you have any questions concerning this Report. Please remember to include the attachments as noted below along with of this Report.

Sincerely,

Hazardous Materials Consultant
ICC Certified Fire Code Inspector II

Attachments: HMIS, Summaries and Explanation Sheet (11 pages)

Miller Safety & Health Consulting *Richard Miller, C.S.P.*
1631 NW Johnson; Portland, OR 97209 Tel: Office (503) 243-1040 Cell (503) 891-5961
e-mail: richmm@easystreet.net
website: millersafetyandhealth.com

EXPLANATORY STATEMENT

This explanatory statement is provided for the exclusive use of Cura CS LLC as relates to the Hazardous Materials Inventory Statement (HMIS) for the existing facility in Portland, Or.

Hazardous Materials Inventory Statement (HMIS) Explanations

PRODUCT: Name of product or chemical.

CAS #: Chemical Abstract Service number.

CRITERION: Lists (up to) three primary physical and health hazards presented by the product in order of severity, Criterion 1 being the most stringent and Criterion 2 and 3 being the less stringent. Hazard codes are:

Health	Code	Physical	Code	Physical (cont'd)	Code
Carcinogen	CAR	Combustible Liquid	CL	Organic Peroxide	OP
Corrosive	COR	Combustible Dust	CD	Oxidizer	OX
Highly Toxic	H TOX	Combustible Fiber	CF	Oxidizer Gas	OXG
Irritant	IRR	Cryogenic	CRYO	Oxidizer Gas (LIQ.)	OGL
Radioactive	RAD	Explosive	EXP	Pyrophoric	PYRO
Sensitizer	SEN	Flammable Solid	FS	Unstable Reactive	UR
Other Health Hazard	OHH	Flammable Liquid	FL		
Water Reactive	WR	Compressed Gas	COMP GAS		
Toxic	TOX	Aerosol	AERO	Non-Hazardous	NH
Flammable Gas Gaseous	FGG	Flammable Gas Liquified	FGL		

BASIS OF CLASSIFICATION: Lists the resource(s) and/or properties used to classify the product's hazard(s). These include:

- HMEX Hazardous Materials Expert Fire Code Classification (2007)
- SDS Safety Data Sheet

Additional physical and health hazards may by shown in this section.

STORAGE: Combination of the amount of product in storage, use-closed, and use-opened condition, given in pounds, gallons, and/or cubic feet.

USE-CLOSED: Amount of the product in use-closed condition.

USE-OPENED: Amount of the product in use-opened condition.

HMIS Summary Explanation

Exempt amounts for each hazard class have been not been modified for the approved use of a fire suppression sprinkler system.

CURA CS LLC
Post Processing (Control Area #1) F-1 Occupancy
Hazardous Materials Inventory Statement

PRODUCT	CAS# (Ingredients %)	Criterion 1	Criterion 2	Criterion 3	Basis of Classification (Flash Point in deg. F)	Storage Lbs	Storage Gal	Storage CF	Use-Closed Lbs	Use-Closed Gal	Use-Closed CF	Use-Opened Lbs	Use-Opened Gal	Use-Opened CF
Isopropyl Alcohol	67-63-0	FL-1B	IRR		HMEX (72)		55 [3]							
Ethanol	64-17-5	FL-1B	IRR		HMEX (60)		55 [3]							

END OF REPORT

NOTES: 1. Storage includes all Use amounts. 2. Irritants (IRR) are no longer regulated by the Codes and are included for use by Cura regarding employee health and safety. 3. Ethanol and IPA, 55-gal. each, will be stored in an approved flammable liquid cabinet. These doubled amounts will be reflected in the attached Summary.

CURA CS LLC: Control Area #1 - Post Processing **(HMIS Summary - Storage w/o Sprinklers)**

IBC/IFC HAZARD CLASSES		INVENTORY AMOUNT			AMOUNT IN I-CODE UNITS			IBC/IFC MAQ AMOUNT			AMOUNT OVER		
Material	Class	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft
Physical Hazards (IBC Table 307.7(1))													
Combustible liquid	CL-2					0			120			-120	
Combustible liquid	CL-3A					0			330			-330	
Combustible liquid	CL-3B					0			13200				
Combustible fiber (loose)	CF-L						0			100			-100
Combustible fiber (baled)	CF-B						0			1000			-1000
Cryogenic: flammable or oxidizing	Cryo					0			45			-45	
Explosives (Division dependent)	Exp				0						0		
Flammable solid	FS				0			125			-125		
Flammable gas (gaseous)	FG-G						0			1000			-1000
Flammable gas (liquefied)	FG-L											0	
Flammable liquid	FL-1A					0			30			-30	
Flammable liquid	FL-1B/C		110			110			120			-120	
Combination I-A, I-B, I-C						0			120			-65	
Organic peroxide, unclassified detonatab	OP-UD				0			1			-1		
Organic peroxide	OP-1				0			5			-5		
Organic peroxide	OP-2				0			50			-50		
Organic peroxide	OP-3				0			125			-125		
Organic peroxide	OP-4				N.L.			N.L.	N.L.		N.L.		
Organic peroxide	OP-5				N.L.			N.L.	N.L.		N.L.		
Oxidizer	Ox-4				0			1			-1		
Oxidizer	Ox-3				0			10			-10		
Oxidizer	Ox-2				0			250			-250		
Oxidizer	Ox-1				0			4000			-4000		
Oxidizer-gas (gaseous)	OxG-G						0			1500			-1500
Oxidizer-gas (liquified)	OxG-L					0			15			-15	
Pyrophoric	Pyro				0		0	4		50	-4		-50
Unstable (reactive)	UR-4				0		0	1		10	-1		-10
Unstable (reactive)	UR-3				0		0	5		50	-5		-50
Unstable (reactive)	UR-2				0		0	50		250	-50		-250
Unstable (reactive)	UR-1				N.L.		0	N.L.	N.L.	1500	N.L.		-1500
Water reactive	WR-3				0			5			-5		
Water reactive	WR-2				0			50			-50		
Water reactive	WR-1				0			N.L.			N.L.		
Health Hazards (IBC Table 307.7(2))													
Corrosives	Corr				0		0	5000	500	810	-5000		-810
Highly toxics	Htox				0		0	10		20	-10		-20
Toxics	Tox				0		0	500		810	-500		-810

1. Maximum Allowable Quantities (MAQ) are from the 2014 International Building and Fire Codes.

2.Flammable liquids will be stored in an approved cabinet and amounts in cabinets have been halved to reflect this fact.

Rev.3.15.19 prepared by Miller Safety & Health Consulting for CURA CS LLC

CURA CS LLC
Storage of Finished Goods and Hazardous Materials (Control Area #2) F-1 Occupancy
Hazardous Materials Inventory Statement

PRODUCT	CAS# (Ingredients %)	Criterion 1	Criterion 2	Criterion 3	Basis of Classification (Flash Point in deg. F)	Storage Lbs	Storage Gal	Storage CF	Use-Closed Lbs	Use-Closed Gal	Use-Closed CF	Use-Opened Lbs	Use-Opened Gal	Use-Opened CF
Ethanol	64-17-5	FL-1B	IRR		HMEX (60)		220 [3]							

END OF REPORT

NOTES: 1. Storage includes all Use amounts. 2. Irritants (IRR) are no longer regulated by the Codes and are included for use by Cura regarding employee health and safety. 3. All Ethanol will be stored in approved flammable liquid cabinets. These doubled amounts will be reflected in the attached Summary.

CURA CS LLC: Control Area #2 **(HMIS Summary - Storage w/o Sprinklers)**

IBC/IFC HAZARD CLASSES		INVENTORY AMOUNT			AMOUNT IN I-CODE UNITS			IBC/IFC MAQ AMOUNT			AMOUNT OVER		
Material	Class	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft
Physical Hazards (IBC Table 307.7(1))													
Combustible liquid	CL-2					0			120			-120	
Combustible liquid	CL-3A					0			330			-330	
Combustible liquid	CL-3B					0			13200				
Combustible fiber (loose)	CF-L						0			100			-100
Combustible fiber (baled)	CF-B						0			1000			-1000
Cryogenic: flammable or oxidizing	Cryo					0			45			-45	
Explosives (Division dependent)	Exp				0						0		
Flammable solid	FS				0			125			-125		
Flammable gas (gaseous)	FG-G						0			1000			-1000
Flammable gas (liquefied)	FG-L											0	
Flammable liquid	FL-1A					0			30			-30	
Flammable liquid	FL-1B/C		110[2]			110[2]			240			-20	
Combination I-A, I-B, I-C						0			120			-120	
Organic peroxide, unclassified detonatab	OP-UD				0			1			-1		
Organic peroxide	OP-1				0			5			-5		
Organic peroxide	OP-2				0			50			-50		
Organic peroxide	OP-3				0			125			-125		
Organic peroxide	OP-4				N.L.			N.L.	N.L.		N.L.		
Organic peroxide	OP-5				N.L.			N.L.	N.L.		N.L.		
Oxidizer	Ox-4				0			1			-1		
Oxidizer	Ox-3				0			10			-10		
Oxidizer	Ox-2				0			250			-250		
Oxidizer	Ox-1				0			4000			-4000		
Oxidizer-gas (gaseous)	OxG-G						0			1500			-1500
Oxidizer-gas (liquified)	OxG-L					0			15			-15	
Pyrophoric	Pyro				0		0	4		50	-4		-50
Unstable (reactive)	UR-4				0		0	1		10	-1		-10
Unstable (reactive)	UR-3				0		0	5		50	-5		-50
Unstable (reactive)	UR-2				0		0	50		250	-50		-250
Unstable (reactive)	UR-1				N.L.		0	N.L.	N.L.	1500	N.L.		-1500
Water reactive	WR-3				0			5			-5		
Water reactive	WR-2				0			50			-50		
Water reactive	WR-1				0			N.L.			N.L.		
Health Hazards (IBC Table 307.7(2))													
Corrosives	Corr				0		0	5000	500	810	-5000		-810
Highly toxics	Htox				0		0	10		20	-10		-20
Toxics	Tox				0		0	500		810	-500		-810

1. Maximum Allowable Quantities (MAQ) are from the 2014 International Building and Fire Codes.

2.Flammable liquids will be stored in an approved cabinet and amounts in cabinets have been halved to reflect this fact.

Rev.3.15.19 prepared by Miller Safety & Health Consulting for CURA CS LLC

CURA CS LLC
Processing (Control Area #3) F-1 Occupancy
Hazardous Materials Inventory Statement

PRODUCT	CAS# (Ingredients %)	Criterion 1	Criterion 2	Criterion 3	Basis of Classification (Flash Point in deg. F)	Storage Lbs	Storage Gal	Storage CF	Use-Closed Lbs	Use-Closed Gal	Use-Closed CF	Use-Opened Lbs	Use-Opened Gal	Use-Opened CF
Isopropyl Alcohol	67-63-0	FL-1B	IRR		HMEX (72)					45				
Ethanol	64-17-5	FL-1B	IRR		HMEX (60)					50				

END OF REPORT

NOTES: 1. Storage includes all Use amounts. 2. Irritants (IRR) are no longer regulated by the Codes and are included for use by Cura regarding employee health and safety. 3. Ethanol and IPA, 55-gal. each, will be stored in an approved flammable liquid cabinet. These doubled amounts will be reflected in the attached Summary.

CURA CS LLC: Control Area #3 **(HMIS Summary - Storage w/o Sprinklers)**

IBC/IFC HAZARD CLASSES		INVENTORY AMOUNT			AMOUNT IN I-CODE UNITS			IBC/IFC MAQ AMOUNT			AMOUNT OVER		
Material	Class	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft
Physical Hazards (IBC Table 307.7(1))													
Combustible liquid	CL-2					0			120			-120	
Combustible liquid	CL-3A					0			330			-330	
Combustible liquid	CL-3B					0			13200				
Combustible fiber (loose)	CF-L						0			100			-100
Combustible fiber (baled)	CF-B						0			1000			-1000
Cryogenic: flammable or oxidizing	Cryo					0			45			-45	
Explosives (Division dependent)	Exp				0						0		
Flammable solid	FS				0			125			-125		
Flammable gas (gaseous)	FG-G						0			1000			-1000
Flammable gas (liquefied)	FG-L											0	
Flammable liquid	FL-1A					0			30			-30	
Flammable liquid	FL-1B/C		0			0			120			-120	
Combination I-A, I-B, I-C						0			120			-120	
Organic peroxide, unclassified detonatab	OP-UD				0			1			-1		
Organic peroxide	OP-1				0			5			-5		
Organic peroxide	OP-2				0			50			-50		
Organic peroxide	OP-3				0			125			-125		
Organic peroxide	OP-4				N.L.			N.L.	N.L.		N.L.		
Organic peroxide	OP-5				N.L.			N.L.	N.L.		N.L.		
Oxidizer	Ox-4				0			1			-1		
Oxidizer	Ox-3				0			10			-10		
Oxidizer	Ox-2				0			250			-250		
Oxidizer	Ox-1				0			4000			-4000		
Oxidizer-gas (gaseous)	OxG-G						0			1500			-1500
Oxidizer-gas (liquified)	OxG-L					0			15			-15	
Pyrophoric	Pyro				0		0	4		50	-4		-50
Unstable (reactive)	UR-4				0		0	1		10	-1		-10
Unstable (reactive)	UR-3				0		0	5		50	-5		-50
Unstable (reactive)	UR-2				0		0	50		250	-50		-250
Unstable (reactive)	UR-1				N.L.		0	N.L.	N.L.	1500	N.L.		-1500
Water reactive	WR-3				0			5			-5		
Water reactive	WR-2				0			50			-50		
Water reactive	WR-1				0			N.L.			N.L.		
Health Hazards (IBC Table 307.7(2))													
Corrosives	Corr				0		0	5000	500	810	-5000		-810
Highly toxics	Htox				0		0	10		20	-10		-20
Toxics	Tox				0		0	500		810	-500		-810

1. Maximum Allowable Quantities (MAQ) are from the 2014 International Building and Fire Codes.

2.Flammable liquids will be stored in an approved cabinet and amounts in cabinets have been halved to reflect this fact.

Rev.3.15.19 prepared by Miller Safety & Health Consulting for CURA CS LLC

CURA CS LLC: Control Area #3 **(HMIS Summary - Use-Closed w/o Sprinklers)**

IBC/IFC HAZARD CLASSES		INVENTORY AMOUNT			AMOUNT IN I-CODE UNITS			IBC/IFC MAQ AMOUNT			AMOUNT OVER		
Material	Class	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft
Physical Hazards (IBC Table 307.7(1))													
Combustible liquid	CL-2					0			120			-120	
Combustible liquid	CL-3A					0			330			-330	
Combustible liquid	CL-3B					0			13200			N.L.	
Combustible fiber (loose)	CF-L						0	100					0
Combustible fiber (baled)	CF-B						0	1000					0
Cryogenic: flammable or oxidizing	Cryo					0			45			-45	
Explosives (Division dependent)	Exp				0						0		
Flammable solid	FS				0			250			-250		
Flammable gas (gaseous)	FG-G						0			1000			-1000
Flammable gas (liquefied)	FG-L				150				30		-150		
Flammable liquid	FL-1A					0			30			-30	
Flammable liquid	FL-1B/C		95			95			120			-25	
Combination I-A, I-B, I-C						0			120			-120	
Organic peroxide, unclassified detonatab	OP-UD				0			1			-1		
Organic peroxide	OP-1				0			5			-5		
Organic peroxide	OP-2				0			50			-50		
Organic peroxide	OP-3				0			125			-125		
Organic peroxide	OP-4				N.L.			N.L.	N.L.		N.L.		
Organic peroxide	OP-5				N.L.			N.L.	N.L.		N.L.		
Oxidizer	Ox-4				0			1			-1		
Oxidizer	Ox-3				0			10			-10		
Oxidizer	Ox-2				0			250			-250		
Oxidizer	Ox-1				0			4000			-4000		
Oxidizer-gas (gaseous)	OxG-G						0			1500			-1500
Oxidizer-gas (liquified)	OxG-L					0			15			-15	
Pyrophoric	Pyro				0		0	1		10	-1		-10
Unstable (reactive)	UR-4				0		0	1		2	-1		-2
Unstable (reactive)	UR-3				0		0	1		10	-1		-10
Unstable (reactive)	UR-2				0		0	50		250	-50		-250
Unstable (reactive)	UR-1				N.L.		0	N.L.	N.L.	N.L.	N.L.		
Water reactive	WR-3				0			5			-5		
Water reactive	WR-2				0			50			-50		
Water reactive	WR-1				0			N.L.			N.L.		
Health Hazards (IBC Table 307.7(2))													
Corrosives	Corr				0		0	5000	500	810	-5000		-810
Highly toxics	Htox				0		0	10		20	-10		-20
Toxics	Tox				0		0	500		810	-500		-810

1. Maximum Allowable Quantities (MAQ) are from the 2014 International Building and Fire Codes.

Rev.3.15.19 prepared by Miller Safety & Health Consulting for CURA CS LLC

Cura CS LLC
Storage of Hazardous Materials (Control Area #4) M Occupancy
Hazardous Materials Inventory Statement

PRODUCT	CAS# (Ingredients %)	Criterion 1	Criterion 2	Criterion 3	Basis of Classification (Flash Point in deg. F)	Storage Lbs	Storage Gal	Storage CF	Use-Closed Lbs	Use-Closed Gal	Use-Closed CF	Use-Opened Lbs	Use-Opened Gal	Use-Opened CF
Ethanol	64-17-5	FL-1B	IRR		HMEX (60)		220 [3]							

END OF REPORT

NOTES: 1. Storage includes all Use amounts. 2. Irritants (IRR) are no longer regulated by the Codes and are included for use by Cura regarding employee health and safety. 3. All Ethanol will be stored in approved flammable liquid cabinets. These doubled amounts will be reflected in the attached Summary.

CURA CS LLC: Control Area #4 **(HMIS Summary - Storage w/o Sprinklers)**

IBC/IFC HAZARD CLASSES		INVENTORY AMOUNT			AMOUNT IN I-CODE UNITS			IBC/IFC MAQ AMOUNT			AMOUNT OVER		
Material	Class	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft	Lbs	Gals	Cu Ft
Physical Hazards (IBC Table 307.7(1))													
Combustible liquid	CL-2					0			120			-120	
Combustible liquid	CL-3A					0			330			-330	
Combustible liquid	CL-3B					0			13200				
Combustible fiber (loose)	CF-L						0			100			-100
Combustible fiber (baled)	CF-B						0			1000			-1000
Cryogenic: flammable or oxidizing	Cryo					0			45			-45	
Explosives (Division dependent)	Exp				0						0		
Flammable solid	FS				0			125			-125		
Flammable gas (gaseous)	FG-G						0			1000			-1000
Flammable gas (liquefied)	FG-L											0	
Flammable liquid	FL-1A					0			30			-30	
Flammable liquid	FL-1B/C		110[2]			110[2]			120			-20	
Combination I-A, I-B, I-C						0			120			-120	
Organic peroxide, unclassified detonatab	OP-UD				0			1			-1		
Organic peroxide	OP-1				0			5			-5		
Organic peroxide	OP-2				0			50			-50		
Organic peroxide	OP-3				0			125			-125		
Organic peroxide	OP-4				N.L.			N.L.	N.L.		N.L.		
Organic peroxide	OP-5				N.L.			N.L.	N.L.		N.L.		
Oxidizer	Ox-4				0			1			-1		
Oxidizer	Ox-3				0			10			-10		
Oxidizer	Ox-2				0			250			-250		
Oxidizer	Ox-1				0			4000			-4000		
Oxidizer-gas (gaseous)	OxG-G						0			1500			-1500
Oxidizer-gas (liquified)	OxG-L					0			15			-15	
Pyrophoric	Pyro				0		0	4		50	-4		-50
Unstable (reactive)	UR-4				0		0	1		10	-1		-10
Unstable (reactive)	UR-3				0		0	5		50	-5		-50
Unstable (reactive)	UR-2				0		0	50		250	-50		-250
Unstable (reactive)	UR-1				N.L.		0	N.L.	N.L.	1500	N.L.		-1500
Water reactive	WR-3				0			5			-5		
Water reactive	WR-2				0			50			-50		
Water reactive	WR-1				0			N.L.			N.L.		
Health Hazards (IBC Table 307.7(2))													
Corrosives	Corr				0		0	5000	500	810	-5000		-810
Highly toxics	Htox				0		0	10		20	-10		-20
Toxics	Tox				0		0	500		810	-500		-810

1. Maximum Allowable Quantities (MAQ) are from the 2014 International Building and Fire Codes.

2.Flammable liquids will be stored in an approved cabinet and amounts in cabinets have been halved to reflect this fact.

Rev.3.15.19 prepared by Miller Safety & Health Consulting for CURA CS LLC

CURA CS LLC - 2901 NE Columbia BLVD
Outside Storage Area - S-1 Occupancy
Inventory Statement

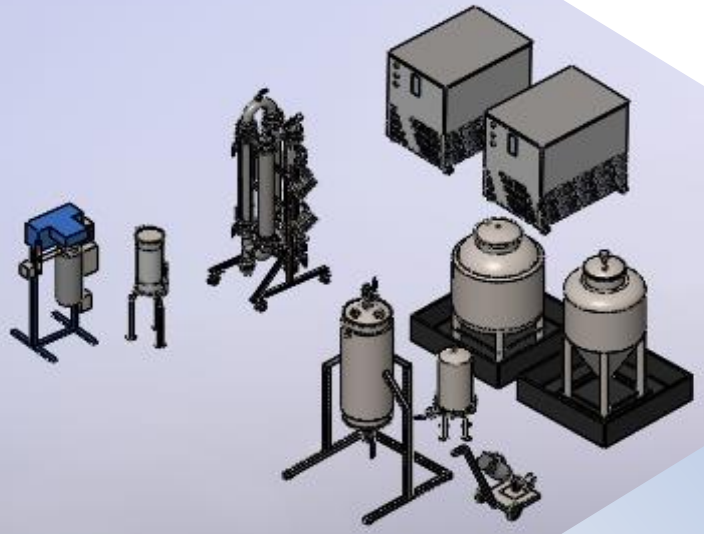
PRODUCT	CAS# (Ingredients %)	Criterion 1	Criterion 2	Criterion 3	Basis of Classification (Flash Point in deg. F)	Storage Lbs	Storage Gal	Storage CF	Use-Closed Lbs	Use-Closed Gal	Use-Closed CF	Use-Opened Lbs	Use-Opened Gal	Use-Opened CF
Isopropyl Alcohol	67-63-0	FL-1B	IRR		HMEX (72)		165 [3]			0			0	
Ethanol	64-17-5	FL-1B	IRR		HMEX (60)		110 [3]			0			0	

END OF REPORT

NOTES: 1. Storage includes all Use amounts. 2. Irritants (IRR) are no longer regulated by the Codes and are included for use by Cura CS LLC regarding employee health and safety. 3. Ethanol and Isopropyl, 55-gal. each, will be stored outside the facility in the outside storage area.

CURA
CANNABIS SOLUTIONS

CERTIFICATION REPORT | 180026
REVISION 2



PILOT SCALE SYSTEM

ETHANOL EXTRACTION SYSTEM

3P CERTz

SIGNATURE PAGE

The extraction system indicated below has been reviewed by 3P Certz and found to meet all requirements of the applicable state, national, and international codes and regulations for the environment and operating conditions described within this report. This document certifies the safety and code compliance of the reviewed system only, and is not a guarantee of the quality or performance of the extraction system.

CURA CANNABIS SOLUTIONS	*Product Manufacturer:* **CURA Cannabis Solutions** 5852 88th Street, #400 Sacramento, CA 95828 (503) 265-8241 www.curacan.com	*Equipment Information:* Model Number: **Pilot Scale System** Capacity: 50 LBS Approved Solvents: Ethanol Max Pressure Rating: 15 psi Temperature Range: -40˚ to 110˚ F

Signatures:

Preparer of Record: **Brian Kester, PE**
Date: December 17, 2018
Signature:
Email: brian@3pcertz.com

Reviewed By: **Craig Beaver**
Date: December 17, 2018
Signature:
Email: craig@3pcertz.com

Reviewed By: **Tyler Fritsch**
Date: December 17, 2018
Signature:
Email: tyler@3pcertz.com

Report Number: **180026-R2**

Included State Certifications:

LICENSED PROFESSIONAL ENGINEER BRIAN A. KESTER CALIFORNIA MECHANICAL STATE OF CALIFORNIA

*Representation only. See State Certification pages for actual certification stamps.

Revision History

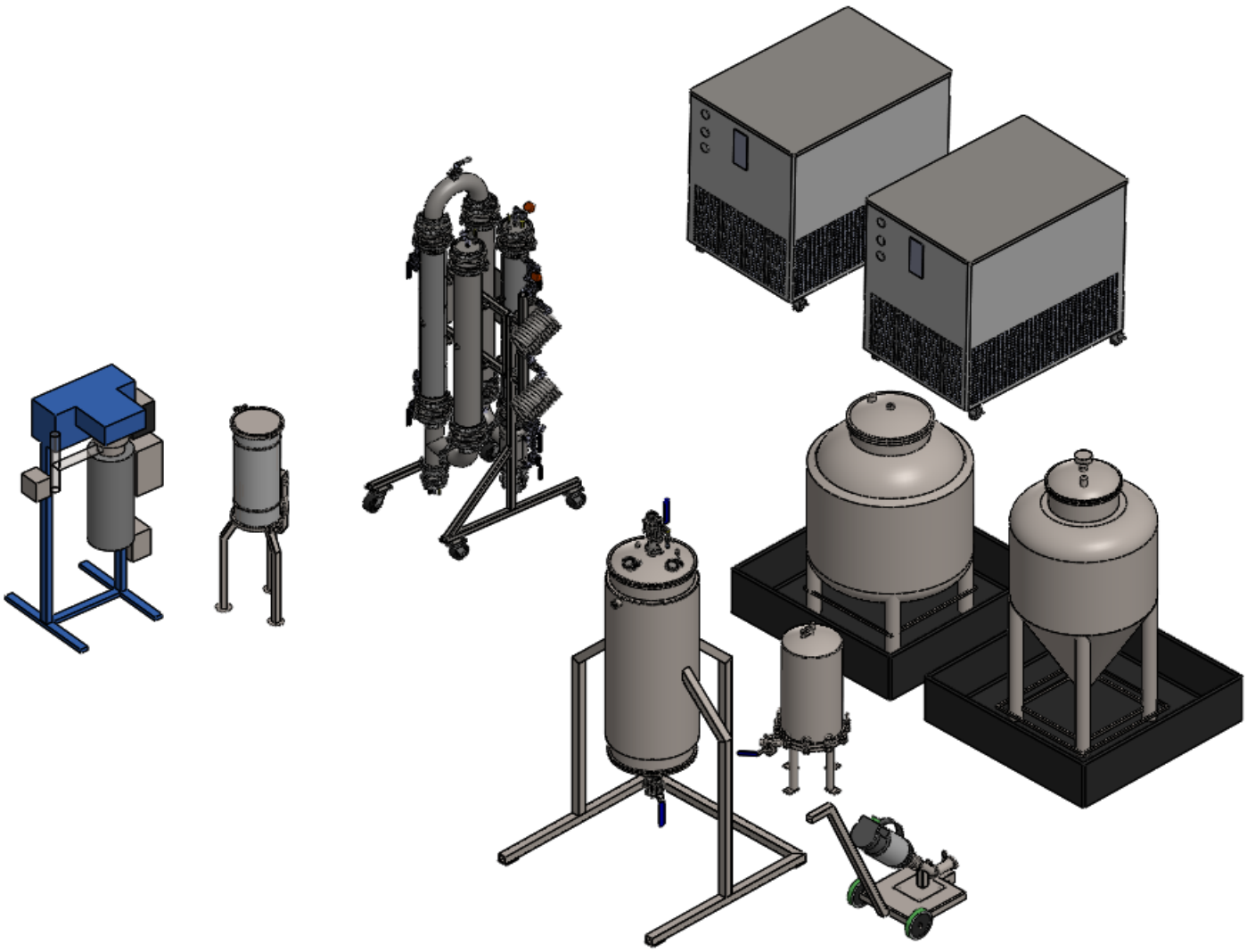
R0	-	9/17/2018	-	Initial Release
R1	-	10/1/2018	-	Added Root Sciences VTA Distillation System to approved equipment list
R2	-	12/17/2018	-	Deleted Meyers units from report. Added Bizzybee FFE and Beaker and Wrench Distillation equipment.

CONTENTS

INTRODUCTION

The Cura Cannabis Solutions Pilot Scale extraction system is used to extract cannabis concentrates using ethanol solvent. The system consists of a series of stainless steel vessels used to combine the solvent with the plant material, and then seperate the solvent from the cannabis extract. Since Ethanol is a hazardous material classified as a flammable liquid, this system has been reviewed and found to be in compliance with *IFC 2018 Section 5003.2* (Systems, equipment and processes of hazardous materials), and *NFPA 30-2018* (Flammable and Combustible Liquids Code). The maximum operating pressure of this system does not exceed 15 psi, therefore pressure vessel calculations have not been performed for the vessels within this system.

This report is a technical safety review of the equipment design only. It does not evaluate or guarantee the performance of the equipment, ensure conformance of manufactured units, or certify the facility or control area where the system will be used. Each manufactured unit shall be reviewed by 3P Certz and issued a serial number and Certificate of Conformance prior to operation.



---------- ***FIGURE 1.1*** - System Representation ----------

METHODOLOGY

This engineering review has been conducted by a Professional Engineer familiar with the extraction process and knowledgeable in the design and safety requirements for these systems. The following describes the method used to identify, and ensure compliance with, the applicable codes and minimum safety requirements for the system under review:

1). IDENTIFY THE SOLVENTS TO BE USED

Identification of the solvents used in the extraction system determines which chapter of the IFC will be used to dictate the product and safety requirements. The product reviewed in this report is designed for use with Ethanol. Ethanol is classified as a **Flammable Liquid** in IFC 2018 and therefore, must comply with *IFC, Chapter 57* (Flammable and Combustible Liquids) and *NFPA-30* (Flammable and Combustible Liquids Code). The specific properties of Ethanol are identified in the **SOLVENT INFORMATION** section of this report.

2). REVIEW THE GENERAL PRODUCT DESIGN

The general design of the product is reviewed to identify the configurations available, and establish the nomenclature used to reference the main components and elements in the assembly. The overview for the product under review can be found in the **SYSTEM OVERVIEW** section of this report.

3). PERFORM A HAZARD ANALYSIS

A hazard analysis is developed for the product which identifies the potential safety hazards of operation and describes the processes and safety features that have been, or will be, implemented in order to prevent them. For this product, many of the safety features/requirements have been dictated by *IFC 2018, Section 5003.2,* and *NFPA 30-2018, Chapter 9.* See the **HAZARD ANALYSIS** section in this report for the complete hazard analysis of the product under review.

4). REVIEW THE GENERAL COMPONENT SPECIFICATIONS

The ratings and specifications of all general components used on this product, including the pressure relief valve, sight glasses, pressure gauge, valves, fittings, and gaskets, have been reviewed and listed in this report. All components listed have been verified to meet the temperature and pressure requirements of the reviewed product, and all component materials have been confirmed to be compatible with the solvent(s) being used. For a complete list of all general components reviewed for this product, see the **GENERAL COMPONENTS** section of this report.

5). ANALYZE THE STAND OR MOUNTING METHOD

The stand or mounting method used to support the vessel is reviewed with both a structural analysis and a seismic tipping analysis. The structural analysis reviews the frame design (if applicable) and any clamp mounts or brackets to ensure their design is adequate for the weight of the vessel or component they are supporting. The seismic tipping analysis reviews the physical stability of the system based on the requirements of the *ASCE/SEI 7-10 Minimum Design Loads for Buildings and Other Structures, Third Printing.* The stand analysis for the product under review can be found in the **STAND/MOUNTING ANALYSIS** section of this report.

6). REVIEW AND CONFIRM COMPLIANCE WITH SPECIFIC STATE CODES

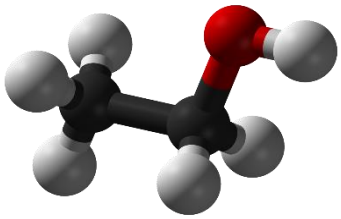
This engineering report uses international codes as the primary basis for approval and certification of the reviewed product. However, certain states and jurisdictions have adopted their own revised versions of the international codes and/or implemented additional regulations and requirements for these types of products. This section of the report provides an indepth review of any and all state specific codes and regulations and confirms compliance of the product under review. Any discrepancies or nonconformances found with the product in relation to state specific codes will be resolved prior to issuing a Certificate of Conformance for the manufactured unit. Each state certification provided in this section will bear the seal of a professional engineer licensed in that state. The state certifications provided for the product under review can be found in the **STATE CERTIFICATIONS** section of this report.

Any items found to **not** be in compliance with the governing codes or requirements during the initial review will be documented on an *Action Item List* and provided to the responsible party. The release of this report indicates that all action items have been resolved and the product design reflected herein meets all applicable safety requirements for operation.

SOLVENT INFORMATION

ETHANOL

C_2H_5-OH Ethanol



The system reviewed in this report is designed for use with Ethanol. Ethanol is a colorless, flammable, volatile liquid, and is classified as a Class IB Flammable Liquid by *NFPA 30* . The chemical properties of Ethanol, and a list of compatible materials are provided below.

CHEMICAL PROPERTIES

ETHANOL

Freezing Point:	-173.4 ˚F	(-114.1 ˚C)
Boiling Point:	173.3 ˚F	(78.5 ˚C) *At 1 atm
Flash Point:	55 ˚F	(12.8˚C)
Autoignition:	689 ˚F	(365 ˚C)
Vapor Pressure:	3 psi @ 110 ˚F	

Classification: Flammable Liquid - Class IB, Group D

CAS Number: 64-17-5 *Reference: NFPA 497, Table 4.4.2

MATERIAL COMPATIBILITY

SOLVENT: ***ETHANOL***

MATERIALS

PTFE	A-Excellent
Silicone	B-Good
Buna N	A-Excellent
EPDM	A-Excellent
Viton	A-Excellent
FKM	C-Fair

*Reference: Rubber Fab Chemical Resistance Chart

PEEK	A-Excellent
Polyurethane	D-Poor
Polycarbonate	B^2-Good
PVC	C-Fair
SS 304	A-Excellent
SS 316	A-Excellent
Brass	A-Excellent

*Reference: Cole-Parmer Chemical-Resistance

Ratings - Chemical Effect

A - Excellent

B - Good: Minor Effect, slight corrosion, or discoloration.

C - Fair: Moderate Effect, not recommended for continuous use. Softening or loss of strength, and swelling may occur.

D - Severe Effect: Not recommended for any use.

Explanation of Footnotes

1 - Satisfactory to 72 ˚F (22 ˚C)

2 - Satisfactory to 120 ˚F (48 ˚C)

Components, seals and gaskets may be made from any of the above listed materials, except for FKM, PVC, and Polyurethane.

FACILITY/INSTALLATION REQUIREMENTS

CONTROL AREA SPECIFICATIONS

The system certified in this report must be installed and operated in a **control area** meeting the requirements of the *IFC 2018, 5003.8.3/IBC 2018, 414.2* . Per *NFPA 497* and *NFPA 30* , the solvent used in this system is classified as Class IB, Group D Flammable Liquid. The maximum allowable quantities for solvents in a control area are dictated in *IFC 2018 Table 5003.1.1(1)* as follows:

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA

MATERIAL	CLASS	STORAGE	USE - CLOSED SYSTEM
Flammable Liquid	IB and IC	120 gallons [d, e]	120 gallons [d]

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, day boxes, gas cabinets, gas rooms, exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10. Where Note d applies, the increase for both notes shall be applied accumulatively.

*Reference: IFC 2018 Table 5003.1.1(1)

---------- ***TABLE 4.1*** - Max Allowable Solvent Quantity ----------

The percentage of the maximum allowable quantity and the fire-resistance rating for the walls of the control area are dependent on the location of the control area within the extraction facility. The design and number of control areas are dictated by *IFC 2018 Table 5003.8.3.2* as follows:

DESIGN AND NUMBER OF CONTROL AREAS

STORY		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	NUMBER OF CONTROL AREAS PER STORY	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS
Above grade plane	Higher than 9	5	1	2
	7-9	5	2	2
	6	12.5	2	2
	5	12.5	2	2
	4	12.5	2	2
	3	50	2	1
	2	75	3	1
	1	100	4	1
Below grade plane	1	75	3	1
	2	50	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

*Reference: IFC 2018 Table 5003.8.3.2

---------- ***TABLE 4.2*** - Control Area Specifications ----------

VENTILATION

The extraction room or area must be properly ventilated per the requirements of *IMC, Chapter 4,* by either natural ventilation or continuous mechanical ventilation while the space is occupied. Per *NFPA 30, Section 18.6,* the exhaust intake openings and make-up air inlets must both be located within 12" of the floor and on opposite sides of the room from each other.

> *"Liquid storage areas where dispensing is conducted shall be provided with either a gravity system or a continuous mechanical exhaust ventilation system. Mechanical ventilation shall be used if Class I liquids are dispensed within the room."*
>
> *- NFPA 30, Section 18.6*

SIGNAGE

Warning signs shall be placed at the entrance to the extraction control area per *IFC 2018, Section 5003.5* and *5003.6.* The following are examples of the signage to be posted. The local fire code official must approve the actual warning signs used.

---------- ***FIGURE 4.3*** - Example Warning Signs ----------

GAS DETECTION SYSTEM

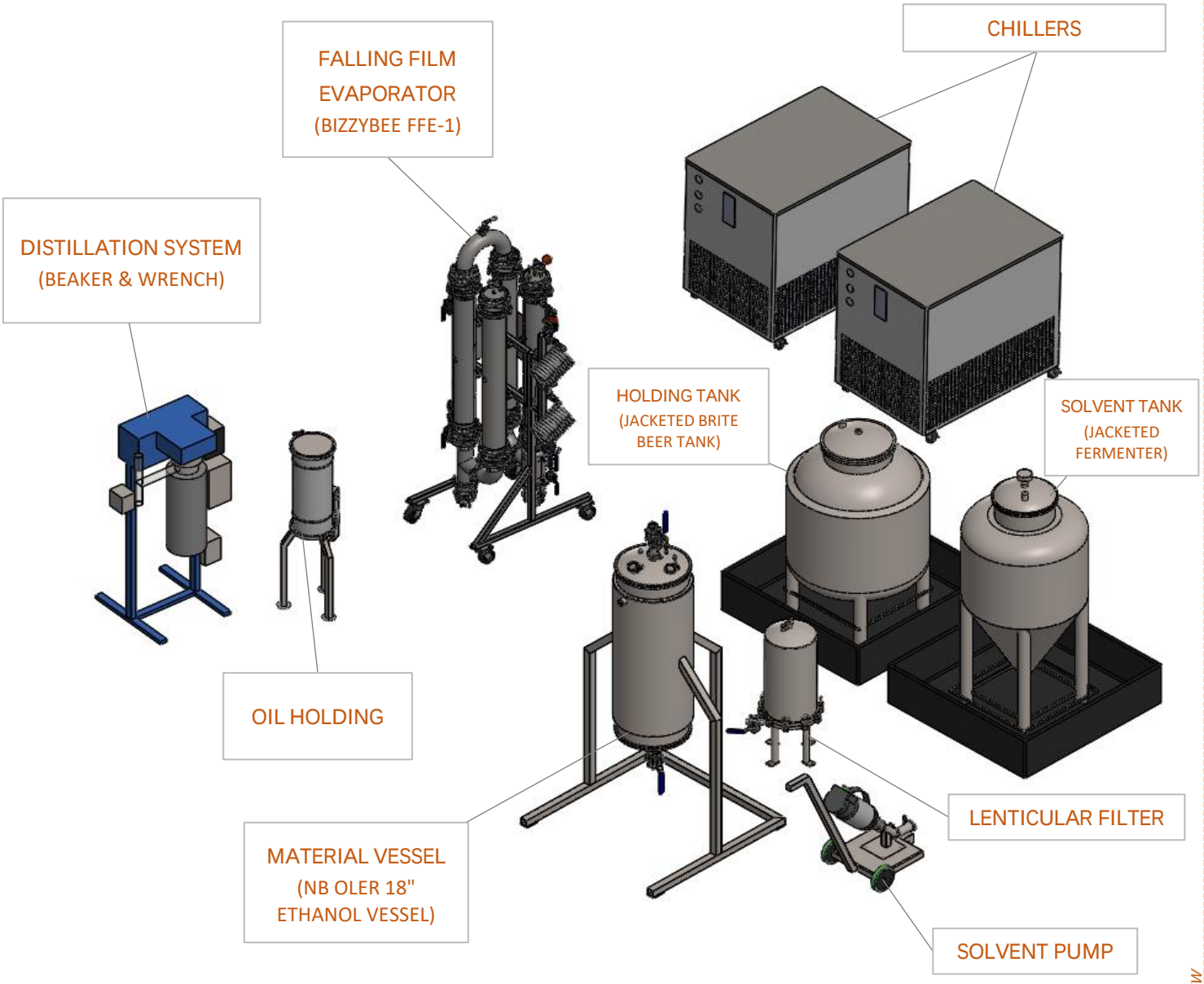
A gas detection system shall be provided that complies with the requirements of IFC 2018, Section 3905.1. The gas detection system shall be set to activate when the gas level exceeds 25% of the Lower Flammability Limit (LFL) of ethanol. Upon activation, the gas detection system shall automatically initiate audible and visual alarm signals, deactivate all heating systems, and activate the mechanical exhaust ventilation system in the extraction room. All gas detection system components and sensors must be UL listed and labeled for the

> *"The flammable gas detection system shall be listed or approved and shall be calibrated to the types of fuels or gases used for the extraction process. The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the LFL."*
>
> *- IFC 2018, Section 3905.1.1*

SYSTEM OVERVIEW

PILOT SCALE SYSTEM

The Cura Pilot Scale extraction system is composed of a 93 gallon solvent tank, a solvent transfer pump, a 50 pound material vessel, a lenticular filter, a 93 gallon holding tank, a falling film evaporator, an oil holding vessel, a distillation system, and two chillers. Vessel and component specifications are identified later in this report.



---------- ***FIGURE 5.1*** - Extraction System, ISO View ----------

SOLVENT TANK

The solvent tank used in this system is a Glacier Tanks 3 BBL Jacketed Fermenter with a working volume of 93 gallons. The tank body is made from SS304 stainless steel and is pressure rated for 14.7 psi. The opening on top is an 18" manway that uses silicone seals. A 15 psi GW Kent pressure relief valve has been installed on the vessel lid.

3 bbl Fermenter | Jacketed - Stainless Steel

SKU	JFM-03-BBL
Brand	Glacier Tanks
Stainless Steel	SS304
Volume	3 Barrels (BBL)
Total Volume	116.25 Gallons
Working Volume	93 Gallons
Warranty	1 Year

Additional information can be found at:
https://www.glaciertanks.com/tanks-jacketed-fermenters-jfm-3-bbl.html

*Representation only

---------- ***FIGURE 5.2*** - 3 BBL Solvent Tank ----------

HOLDING TANK

The holding tank used in this system is a Glacier Tanks 3 BBL Brite tank with a working volume of 93 gallons. The tank body is made from SS304 stainless steel and is pressure rated for 14.7 psi. The opening on top is an 18" manway that uses silicone seals. A 15 psi GW Kent pressure relief valve has been installed on the vessel lid.

3 bbl Brite Tank | Jacketed - Stainless Steel

SKU	JBBT-03-BBL
Brand	Glacier Tanks
Stainless Steel	SS304
Volume	3 Barrels (BBL)
Total Volume	116.25 Gallons
Working Volume	93 Gallons
Warranty	1 Year

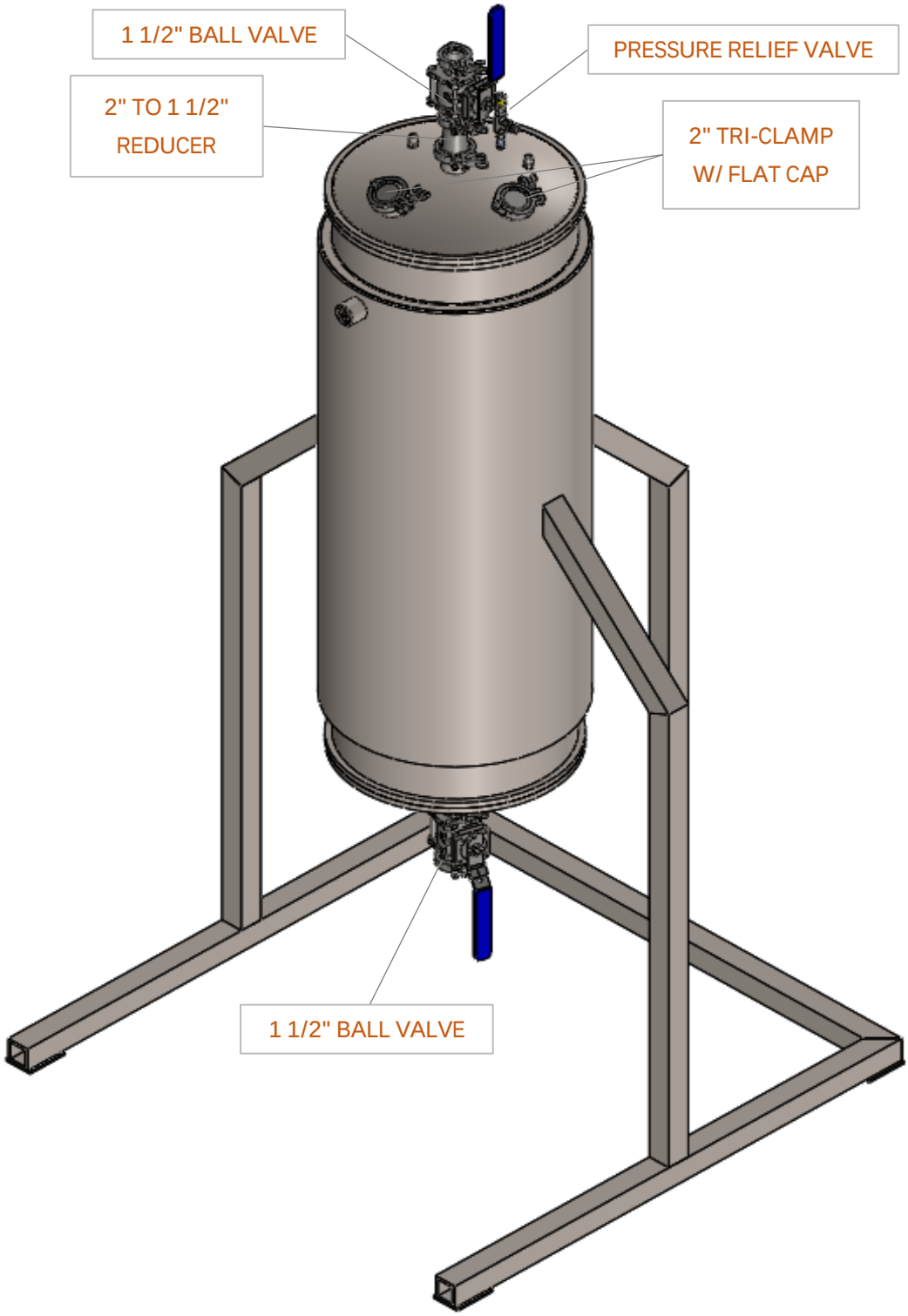
Additional information can be found at:
https://www.glaciertanks.com/tanks-jacketed-bright-beer-tanks-jbbt-03-bbl.html

*Representation only

---------- ***FIGURE 5.3*** - 3 BBL Holding Tank ----------

MATERIAL VESSEL

The material vessel used in this system is an 18" diameter NB Oler Ethanol Vessel with a 50 lb material capacity.



---------- ***FIGURE 5.4*** - Material Vessel, ISO View ----------

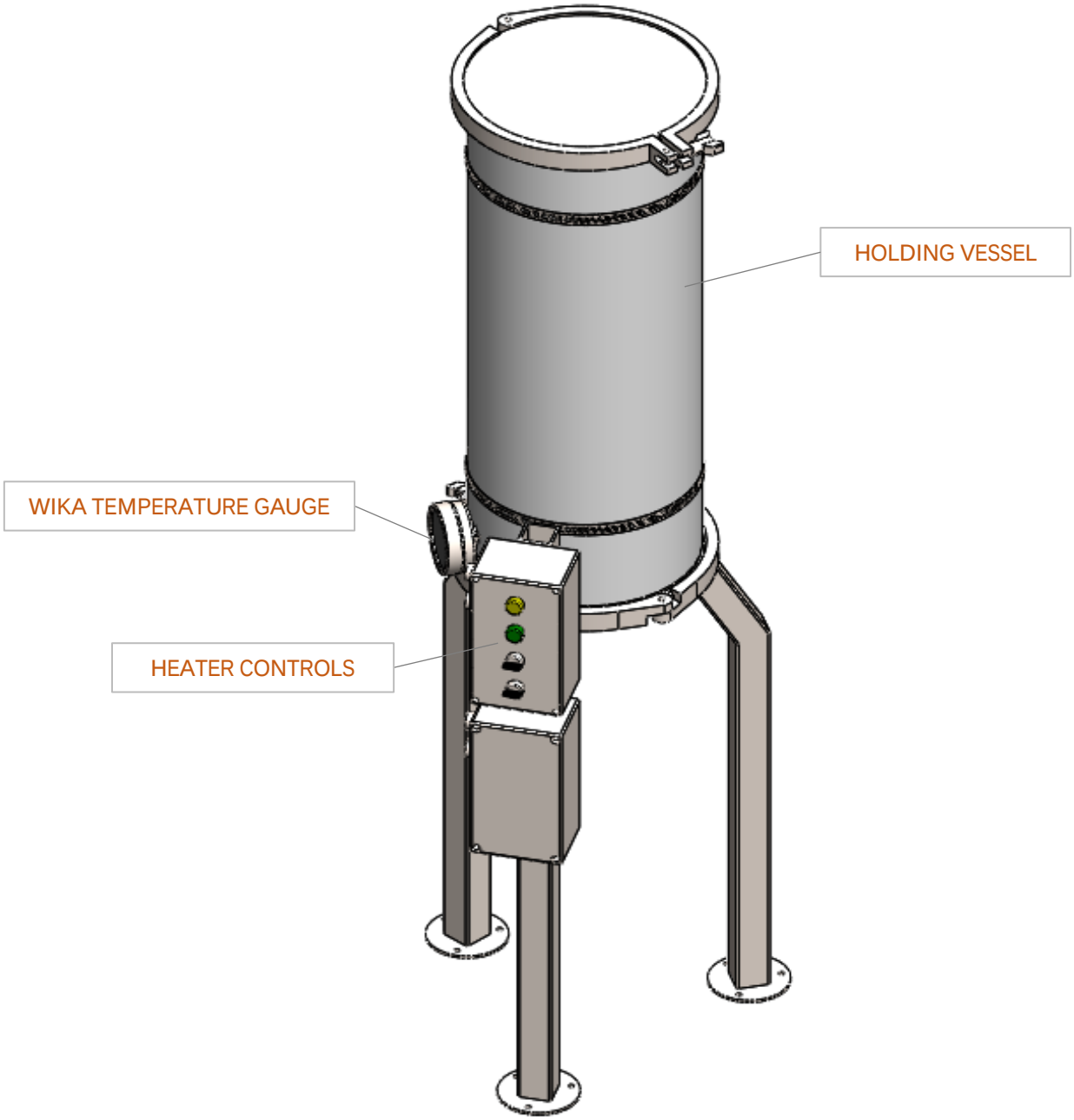
LENTICULAR FILTER

This system uses a GW Kent 12" Lenticular Filter, similar to shown below. A GW Kent 15 psi pressure relief valve has been installed on top of the lenticular filter housing.

---------- ***FIGURE 5.5*** - Lenticular Filter Overview ----------

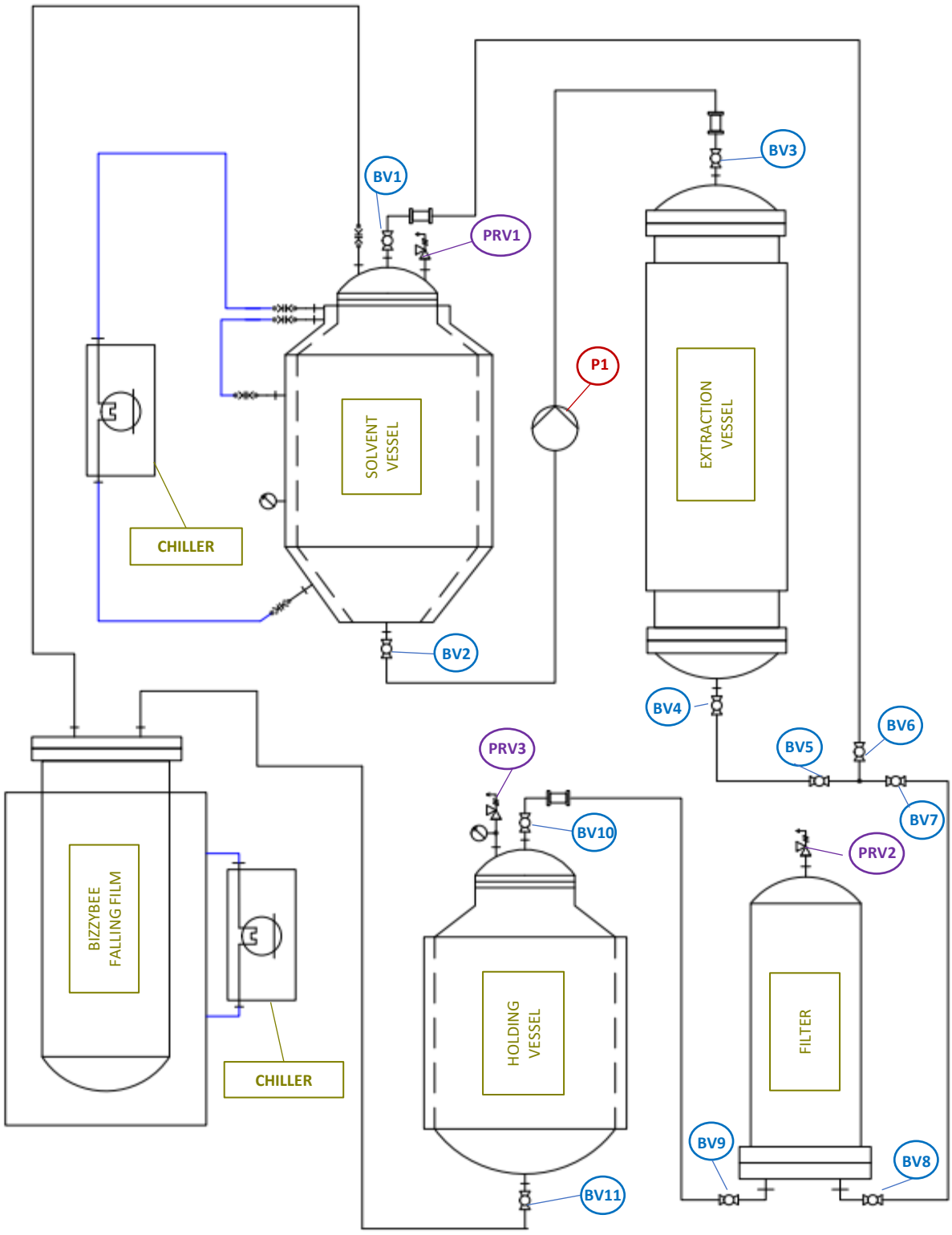
OIL HOLDING VESSEL

A simple oil holding vessel is used next to the Beaker and Wrench distillation system to temporarily hold oil prior to distillation.



---------- ***FIGURE 5.6*** - Oil Holding Vessel ----------

EXTRACTION SYSTEM PIPING AND INSTRUMENTATION DIAGRAM (PID)



---------- ***FIGURE 6.1*** - Cura Ethanol System, PID ----------

PROCESS DESCRIPTION

The following describes the high level steps of the extraction process and indicates the system properties and potential safety hazards of each process task. See manufacturer's Operations Manual for more specific instructions. Definitions for the symbols used throught this process analysis are provided below.

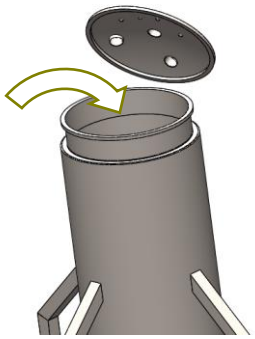
DEFINITIONS:

T = Temperature	A = Ambient (Room Temperature)	*Reference PID on previous page for vessel and component identification.
P = Pressure	L = Liquid	
SS = Solvent State		

1) LOAD TRIM INTO EXTRACTION VESSEL

SYSTEM PROPERTIES			
V *ESSELS*	***T*** *(˚F)*	***P*** *(psi)*	***SS***
Solvent	-40	< 15	L
Extraction	A	0	---
Holding	A	0	---

*Do not exceed rated material vessel capacity.

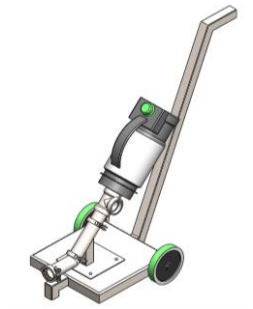


SAFETY: Ensure all ball valves in the system are closed and the solvent transfer pump is deactivated.

2) TRANSFER SOLVENT TO EXTRACTION VESSEL

SYSTEM PROPERTIES			
V *ESSELS*	***T*** *(˚F)*	***P*** *(psig)*	***SS***
Solvent	-40	< 15	L
Extraction	-40	< 15	L
Holding	A	0	---

- Open ***BV1*** though ***BV3*** .
- Use solvent pump to transfer ethanol from solvent vessel to extraction vessel.



*Representation of CPE Centrifugal Pump

SAFETY: Once vacuum is drawn, make sure pressure remains constant in Material and Collection vessel to ensure there are no leaks present in the system.

3) WAIT DESIRED SOAK TIME

- Close ***BV1*** through ***BV3*** and ***BV6.***
- System Properties same as Step 2.

Soak times may vary ...

4) REPEAT RINSE CYCLE

SYSTEM PROPERTIES			
VESSELS	T (˚F)	P (psig)	SS
Solvent	-40	< 15	L
Extraction	-40	< 15	L
Holding	A	0	---

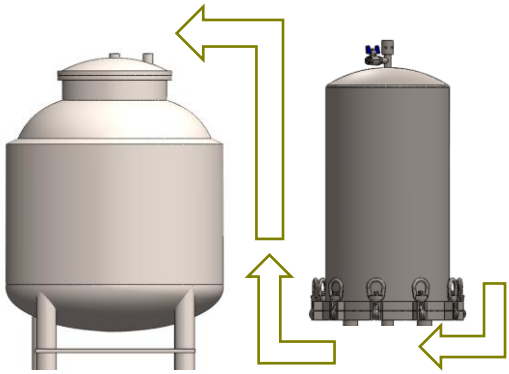
- Open ***BV4, BV5, BV6*** .
- Use solvent pump to recycle ethanol between vessels.

SAFETY: If the smell of ethanol is noticed, immediately close all ball valves and check for loose fittings and other potential leak sources.

5) TRANSFER SOLVENT AND OIL EXTRACT TO HOLDING VESSEL

SYSTEM PROPERTIES			
VESSELS	T (˚F)	P (psig)	SS
Solvent	A	0	---
Extraction	-40	< 15	L
Holding	-40	< 15	L

- Open ***BV7*** through ***BV10*** .

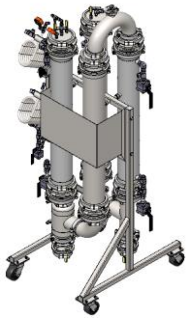


SAFETY: If the smell of ethanol is noticed, immediately close all ball valves and check for loose fittings and other potential leak sources.

6) SEPARATE SOLVENT FROM OIL

SYSTEM PROPERTIES			
VESSELS	T (˚F)	P (psig)	SS
Solvent	A	0	---
Extraction	A	0	---
Holding	-40	< 15	L

- Close **BV7** through **BV10.**
- Open **BV11** .
- Transfer ethanol and oil mixture to Bizzybee Falling Film Evaporator.



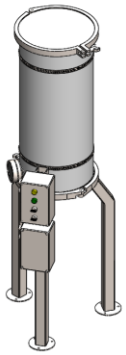
*Representation of Bizzybee FFE-1

SAFETY: Continue recovery process until all solvent is recovered.

7) TRANSFER SEPARATED ELEMENTS

SYSTEM PROPERTIES			
VESSELS	T (˚F)	P (psig)	SS
Solvent	A	< 15	L
Extraction	A	0	---
Holding	A	0	---

- Open **BV1** .
- Transfer ethanol back to solvent vessel.
- Transfer extracted oil to oil holding tank.

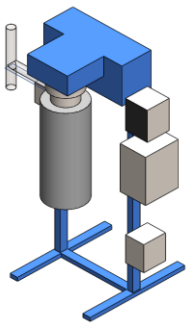


SAFETY: Close all ball valves throughout the system.

8) DISTILL THE OIL

SYSTEM PROPERTIES			
VESSELS	T (˚F)	P (psig)	SS
Solvent	A	< 15	L
Extraction	A	0	---
Holding	A	0	---

- Transfer the oil from the oil holding tank into the Beaker & Wrench distillation system.
- Once oil is distilled, process is complete.



*Representation of Beaker & Wrench

HAZARD ANALYSIS

The system under review is designed for use with Ethanol. Ethanol is a clear, flammable liquid and presents several potential safety hazards with the use/operation of this extraction system. The following hazard analysis identifies the potential safety hazards associated with this system, and describes the precautions taken to avoid them.

FIRE/EXPLOSION

DEFINITION: Ignition of flammable solvent causing a sudden and violent expansion of fire in and around the ignition area.

CAUSE: Ethanol liquid or vapors coming into contact with an ignition source such as a flame or spark.

PREVENTION:

1). Eliminate Ignition Sources

- No open flames or other ignition sources shall be present in or around this product at anytime. This product shall not be used or stored outside of a Class I, Division 1 or 2 control area. Any electronics located in the vicinity of this product must meet the requirements for use in a Class 1, Division 2 hazardous environment per *NFPA 70, Article 500.7.*

2). Proper Facility Design

- This product must only be used in a properly designed and ventilated control area, meeting the requirements of *IFC 2018, 5003.8.3.*

OVERPRESSURIZATION

DEFINITION: Overpressurization occurs when the pressure within a vessel, pipe, hose, fitting, or component exceeds the rated pressure and causes a mechanical failure or rupture.

CAUSE: Vessels or components exposed to pressures exceeding the design operating pressure due to operator error and/or improper selection of hoses, fittings, or components used within the system.

PREVENTION:

1). Pressure Relief Valves

- A pressure relief valve (PRV) is properly installed on each vessel of this product. The PRVs are set to the cracking pressure which corresponds to the maximum design operation pressure of the system (15 psi). This will prevent overpressurization of the vessel or attached components by venting off any gas or vapor causing excess pressure. See the **GENERAL COMPONENTS** sections of this report for additional PRV specifications.

OVERPRESSURIZATION CONTINUED

2). Engineering Review of all Vessel and Component Ratings

- The vessels and components used on this system have been reviewed within this report and found to meet the requirements for the operational temperatures and pressures to which they are subject to under normal operation of this system. The specifications for all PRVs, gauges, fittings, and valves have been reviewed and found to be in compliance with their intended operational conditions, as shown in the **GENERAL COMPONENTS** section of this report.

3). Operator Training

- Operators shall be trained in the correct operation of this product and the implementation of emergency procedures in the event of overpressurization.

EYE OR SKIN CONTACT

DEFINITION: If ethanol or CO_2 comes into contact with the eyes or skin of the operator or other personnel in the area, it may cause irritation or frostbite.

CAUSE: Ethanol may be splashed or spilled while filling or draining the product. Additionally, the CO_2 used in this system is under high pressure and may be rapidly expelled from the jacket in the event of a leak or rupture. Rapid release of solvent or CO_2 can cause exposure to freezing temperatures.

PREVENTION:

1). Use of Personal Protective Equipment (PPE)

- In addition to the preventions described for asphyxiation and overpressurization, personnel in the vicinity of the product during use shall wear the proper PPE, such as safety glasses and gloves, to prevent released ethanol or CO_2 from coming into contact with the eyes or skin.

FIRST AID: In the event that ethanol or CO_2 does come into contact with the eyes or skin, the following first aid should be performed:

RINSE: Immediately rinse the eyes or contaminated skin with plenty of water. If rinsing eyes, be sure to flush upper and lower eyelids. Rinse for at least 10 minutes. Seek medical attention if irritation continues.

WARM: If frostbite has occurred, immediately warm the frostbite area with warm water, not exceeding 106 °F (41 °C). Seek medical attention for large or sensitive exposure areas.

GENERAL COMPONENTS

The system reviewed in this report uses the following components. The specifications of each component have been reviewed and determined to meet the material compatibility, pressure, and temperature requirements associated with the normal operation of this system. Components not shown on this list have NOT been approved for use on this system. See Appendix A for the manufacturer specification sheets associated with these components.

CATEGORY		PRODUCT	MATERIALS	RATINGS
Pressure Relief Valves		Manufacturer: **GW Kent** Part #: **96-15** 1 1/2" Tri-Clamp Connection	304 SS - Body	Set Pressure: **15** psi Flow Rate: --- SCFM
		Manufacturer: **Swagelok** Part #: **RL3** 1/4" Tube Connection	304 SS - Body	Set Pressure: **15** psi Flow Rate: --- SCFM
Sight Glass		Supplier: **GW Kent** Part #: **923-15** 1 1/2" Tri-Clamp Connection	Pyrex Glass 304 SS - Body	Max Pressure: **N/A** Max Temp: 200 ˚F Min Temp: -40 ˚F
Pressure Gauge		Supplier: **GW Kent** Part #: **2725-8** Description: 0-30 psi, 1/4" NPT Back Mount	Stainless Steel Housing Glycerin Filled	Max Pressure: **30** psi Max Temp: 140 ˚F Min Temp: -4 ˚F
Tank Thermometer		Supplier: **GW Kent** Part #: **2823-1** Description: 0-150 F, 1/2" NPT Back Mount	Stainless Steel Housing	Max Temp: 150 ˚F Min Temp: 0 ˚F
Tank Manway		Supplier: **Glacier Tanks** Description: **Round 18" x 4"** Part #: MW-RND-G18x4-SIL	304 SS - Housing Silicone Seals	Working Pressure: **58** psi Max Temp: 400 ˚F Min Temp: -65 ˚F
Ball Valves		Supplier: **GW Kent** Part #: **982-10-1** 1 1/2" Ball Valve	316 SS - Housing PTFE (Teflon) - Seals	Max Pressure: **1000** psi Max Temp: 300 ˚F Min Temp: -65 ˚F
Fittings		Manufacturer: **GW Kent** Part #: **7MP-15** Tee, 1 1/2" Tri-Clamp Con.	304 SS - Housing	Max Pressure: **N/A**

CATEGORY		PRODUCT	MATERIALS	RATINGS
Fittings		Manufacturer: **GW Kent** Part #: **2CMP-15** 90º Elbow, 1 1/2" Tri-Clamp Con.	304 SS - Housing	Max Pressure: **N/A**
		Manufacturer: **GW Kent** Part #: **82-15** 1 1/2" Hose Adapter	304 SS - Housing	Max Pressure: **N/A**
		Manufacturer: **Swagelok** Part #: **SS-600-1-6WBT** Weld Fitting, 3/8" Tube	316 SS - Housing	Max Pressure: **5300** psi
		Manufacturer: **Swagelok** Part #: **SS-400-1-4WBT** Weld Fitting, 1/4" Tube	316 SS - Housing	Max Pressure: **6600** psi
Hose		Manufacturer: **NovaFlex** Part #: **6507NB** 1 1/2" Tube	White Chlorobutyl	Max Temp: 240 ˚F Min Temp: -40 ˚F
Tri-Clamps		Supplier: **Glacier Tanks** Part #: **13MHP-G200** 2" Tri-Clamp	304 SS	Max Pressure: **950** psi @ 110 ˚F
		Supplier: **Glacier Tanks** Part #: **13MHM-G400** 4" Tri-Clamp	304 SS	Max Pressure: **180** psi @ 110 ˚F
		Supplier: **Glacier Tanks** Part #: **13MHM-G200** 2" Tri-Clamp	304 SS	Max Pressure: **405** psi @ 110 ˚F
		Supplier: **Glacier Tanks** Part #: **13MHM-G150** 1.5" Tri-Clamp	304 SS	Max Pressure: **445** psi @ 110 ˚F
Tri-Clamp Gaskets		Supplier: **Glacier Tanks** Description: 1.5", 2" & 4" Tri-Clamp Gaskets	Silicone	Max Temp: 400 ˚F Min Temp: -65 ˚F

COMPONENT MAINTENANCE

The owner of the equipment is responsible for inspecting and maintaining the components used in this system, prior to each use. The tri-clamps must be snuggly tightened with a torque tool set to no more than 30 in-lbs. The threads on these tri-clamps must be regularly inspected and the clamp must be replaced if there are signs of excessive wear or stripping. The silicone gaskets used in this product are shown to have "good" material compatibility with Ethanol, however slight deterioration may occur over time. Therefore, these gaskets must be inspected periodically and replaced if they begin to show any signs of cracking, splitting, or leaking.

TRI-CLAMP TORQUE SETTINGS

13MHP Tri-Clamp fasteners shall be torqued to a maximum of 30 in-lbs per manufacturer specifications. Fasteners must be torqued using a preset torque tool prior to each use of the equipment to prevent over torquing the clamp fasteners. A preset torque tool similar to the one shown below shall be provided with this extraction system.

-------- ***FIGURE 8.1*** - 13MHP Tri-Clamp --------

-------- ***FIGURE 8.2*** - Preset Torque Tool --------

ELECTRICAL COMPONENTS

The electrical components/equipment used in this extraction system have been reviewed for compliance with the NFPA 70, Article 500.7 Protection Techniques for a Class 1, Division 2 location, as listed below. Each electrical component or piece of equipment has been categorized as either meeting the requirements of a hazardous environment, or as not being authorized to be used within the classified zone around the extraction equipment. See the **FACILITY/INSTALLATION REQUIREMENTS** section of this report for additional requirements for the control area. Manufacturer specification sheets for each component are provided in Appendix B.

Acceptable NFPA 70, Article 500.7 Protection Techniques for Class 1, Divison 2 locations:

Explosionproof Equipment	*- able to withstand any explosion originating within its housing and prevent ignition of outside vapors.*
Purged and Pressurized	*- filled with a protective gas and pressurized to prevent entrance of a flammable gas or vapor.*
Intrinsically Safe	*- UL Listed as Instrinsically Safe - contains circuits in which any spark or thermal effects are incapable of igniting a flammable gas or vapor.*
Nonincendive Equipment	*- contains electronic circuitry that is incapable, under normal operating conditions, of causing ignition of specified gas or vapor due to arcing or thermal means.*
Hermetically Sealed	*- sealed against entrance of external atmosphere where seal is made by fusion, such as solder, brazing, or welding.*

*See NFPA 70, Article 500.7(A) - (J) for complete list of acceptable protection techniques.

The following electrical components used in this extraction system have been found to meet the requirements of NPFA 70, Article 500.7 for operation in a hazardous environment:

CATEGORY		PRODUCT INFO - ELECTRICAL RATINGS - TEMPERATURE REQUIREMENTS	
Solvent Pump		Centrifugal Pump Manufacturer: **CPE Systems** Model: **KBDA-27D**	Includes variable speed control unit.
		Electrical Requirements Voltage: 220 Hz: 50/60 Amps: 6.8	Approvals/Certifications Explosion-proof for use in Class I, Division 1 or 2 Locations. Certified per ATEX-Directive 94/9/EC

The following electrical components used in this extraction system have NOT been found to meet the requirements of NPFA 70, Article 500.7(A) - (J) for operation in a hazardous environment and therefore shall not be operated within the classified zone around the extraction equipment:

CATEGORY		PRODUCT INFO - ELECTRICAL RATINGS - TEMPERATURE REQUIREMENTS	
Recirculating Chillers		Recirculating Chiller Manufacturer: **TouchScience** Model #: **DLSB-30/120**	Ambient Temperature Range 5˚ to 35˚ C Min Coolant Temp: -120 ˚ C
		Electrical Requirements Voltage: 380 Hz:: 60 Overall Power: 9100W	Refrigerant: R404/R13/R14 Flow Rate: 25 L/min
Falling Film Evaporator		Falling Film Evaporator Manufacturer: **Bizzybee, LLC** Model #: **FFE-1**	Separates ethanol solvent from extracted oil. Oil is passed on to distillation system while solvent is returned to solvent tank.
		Electrical Requirements Voltage: 230/460/575 Phase: 3 Hz: 60	Temp Range: -40° to 110° C Flow Rate: 50-200 L/hr Gear Pump Max Discharge Pressure: 100 psi
Distillation System		Distillation System Manufacturer: **Beaker & Wrench** Model #: **CUSTOM**	The distillation system is used to purify the oil extract and refine it into the desired product.
		Electrical Requirements Voltage: 115/208 Phase: 3 Hz: 50/60	Operates under vacuum. Flow Rate: 6 L/min

Continuation of electrical equipment not approved for use in the classified zone around the extraction equipment:

CATEGORY		PRODUCT INFO - ELECTRICAL RATINGS - TEMPERATURE REQUIREMENTS	
Distillation System	 *Optional	VTA Distillation System Manufacturer: **Root Sciences** Model #: **VKL 70-5**	This distillation system may be used in place of, or in addition to the Myers Pilot-15 distillation system.
		Electrical Requirements Voltage: 240 Amps: 60 Phase: 1 Hz: 60	

All electrical equipment, plugs, and outlets not rated for a Class 1, Division 1 or 2 environment must be located outside of the classified zone. See *NFPA 70, Article 500* for a full review of the electrical equipment and facility requirements for a hazardous environment. An approved Gas Detection system meeting the requirements of *NFPA 70, Article 500.7(K)* and *IFC 2018, 3905.1* must be installed in the extraction control area.

> "The type of detection equipment, its listing, installation location(s), alarm and shutdown criteria, and calibration frequency shall be documented when combustible gas detectors are used as a protection technique."
>
> *- 2017 NFPA 70, Article 500.7(K)*

STAND/MOUNT ANALYSIS

SOLVENT VESSEL STABILITY

In order for tipping to begin, it is assumed that $F_{C1} = W$. The following calculations are used to determine the side load (V) required to begin the tip, and the minimum design spectral response acceleration parameter (S_{DS}) for the Glacier Tanks solvent vessel. This calculation neglects the reaction forces of anchor bolts. The anchor reaction forces will be calculated in the certificate of conformance document, based on the maximum S_{DS} value for the specific install location.

Frame Length, L =	23.0	in
Frame Depth, D =	23.0	in
CG_L Reference, L_{CG} =	0.5	in
CG_D Reference, D_{CG} =	15.6	in
CG_H Reference, H_{CG} =	32.8	in

$\Sigma M_O = 0 \quad \therefore \quad D \times F_{C1} = (D - D_{CG})W + H_{CG} \times V$

Assume $F_{C1} = W$

$$V = C_s W \qquad \text{(ASCE/SEI 7-10, EQ. 12.8-1)}$$

$$C_s = \frac{S_{DS}}{(R/I_e)} \qquad \text{(ASCE/SEI 7-10, EQ. 12.8-2)}$$

Response Modification Factor, R = 1

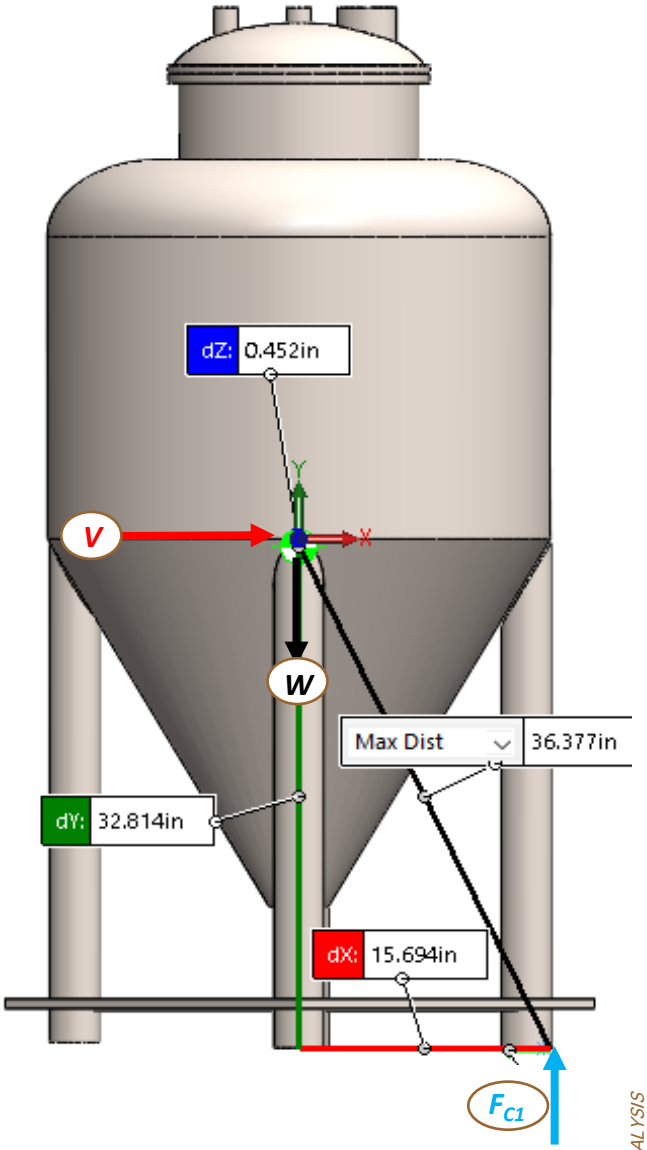
(Assumes no strength reduction necessary for this frame)

Importance Factor, I_e = 1.00

(Risk Category II from ASCE/SEI 7-10, Table 1.5-2)

Design Spectral Response, $S_{DS} = \frac{(D_{CG} \times I_e)}{(H_{CG} \times R)}$ = **0.476**

The design spectral response acceleration parameter (S_{DS}) is relatively low for this support system. Additional mounting requirements may be necessary depending on the install location. Additional mounting requirements are specified on the Certificate of Conformance for the actual install location.



---------- ***FIGURE 10.1*** - Tipping Diagram ----------

In order for tipping to begin, it is assumed that $F_{C1} = W$. The following calculations are used to determine the side load (V) required to begin the tip, and the minimum design spectral response acceleration parameter (S_{DS}) for the material vessel. This calculation neglects the reaction forces of anchor bolts. The anchor reaction forces will be calculated in the certificate of conformance document, based on the maximum S_{DS} value for the specific install location.

Frame Length, L = 46.0 in
Frame Depth, D = 46.0 in
CG_L Reference, L_{CG} = 5.5 in
CG_D Reference, D_{CG} = 30.6 in
CG_H Reference, H_{CG} = 57.8 in

$$\Sigma M_O = 0 \quad \therefore \quad D \times F_{C1} = (D - D_{CG})W + H_{CG} \times V$$

Assume $F_{C1} = W$

$$V = C_s W \qquad \text{(ASCE/SEI 7-10, EQ. 12.8-1)}$$

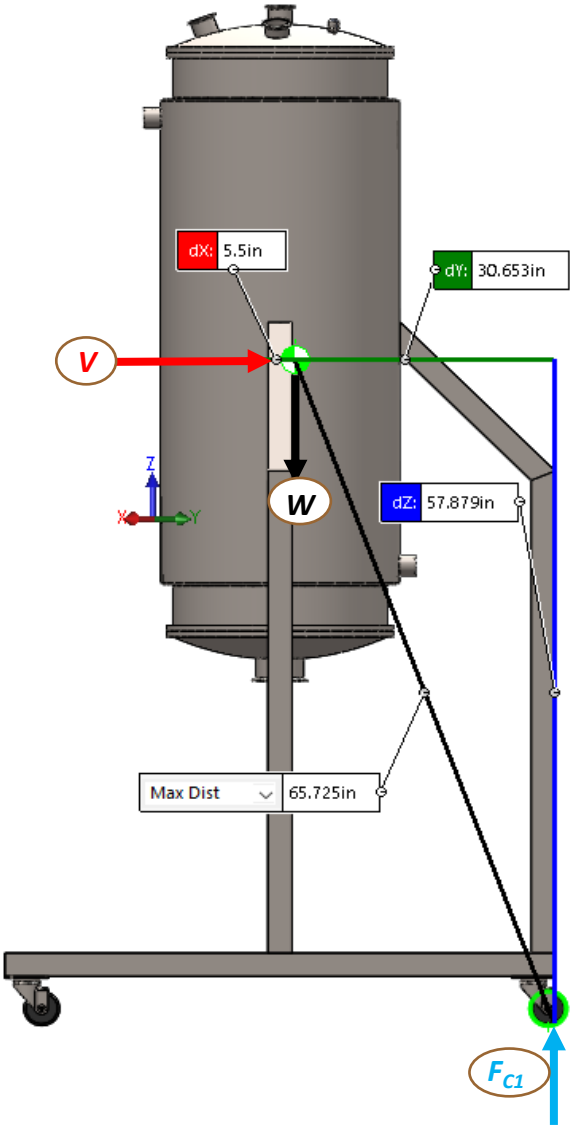
$$C_s = \frac{S_{DS}}{(R/I_e)} \qquad \text{(ASCE/SEI 7-10, EQ. 12.8-2)}$$

Response Modification Factor, R = 1
(Assumes no strength reduction necessary for this frame)

Importance Factor, I_e = 1.00
(Risk Category II from ASCE/SEI 7-10, Table 1.5-2)

Design Spectral Response, $S_{DS} = \frac{(D_{CG} \times I_e)}{(H_{CG} \times R)} = 0.529$

The design spectral response acceleration parameter (S_{DS}) is relatively low for this support system. Additional mounting requirements may be necessary depending on the install location. Additional mounting requirements are specified on the Certificate of Conformance for the actual install location.



---------- **FIGURE 10.2** - Tipping Diagram ----------

LENTICULAR FILTER STABILITY

In order for tipping to begin, it is assumed that $F_{C1} = W$. The following calculations are used to determine the side load (V) required to begin the tip, and the minimum design spectral response acceleration parameter (S_{DS}) for the lenticular filter housing. This calculation neglects the reaction forces of anchor bolts. The anchor reaction forces will be calculated in the certificate of conformance document, based on the maximum S_{DS} value for the specific install location.

Frame Length, L = 15.5 in
Frame Depth, D = 15.5 in
CG_L Reference, L_{CG} = 0.8 in
CG_D Reference, D_{CG} = 7.8 in
CG_H Reference, H_{CG} = 22.0 in

$\Sigma M_O = 0 \quad \therefore \quad D \times F_{C1} = (D - D_{CG})W + H_{CG} \times V$

Assume $F_{C1} = W$

$$V = C_s W \qquad \text{(ASCE/SEI 7-10, EQ. 12.8-1)}$$

$$C_s = \frac{S_{DS}}{(R/I_e)} \qquad \text{(ASCE/SEI 7-10, EQ. 12.8-2)}$$

Response Modification Factor, R = 1

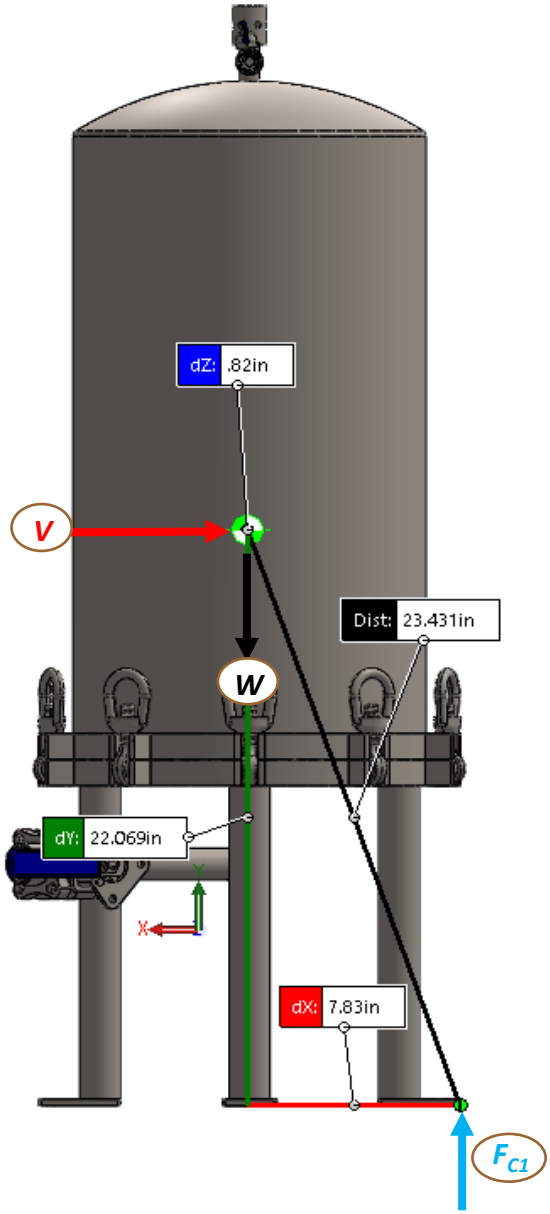
(Assumes no strength reduction necessary for this frame)

Importance Factor, I_e = 1.00

(Risk Category II from ASCE/SEI 7-10, Table 1.5-2)

Design Spectral Response, $S_{DS} = \frac{(D_{CG} \times I_e)}{(H_{CG} \times R)} = 0.355$

The design spectral response acceleration parameter (S_{DS}) is relatively low for this support system. Additional mounting requirements may be necessary depending on the install location. Additional mounting requirements are specified on the Certificate of Conformance for the actual install location.



---------- **FIGURE 10.3** - Tipping Diagram ----------

HOLDING VESSEL STABILITY

In order for tipping to begin, it is assumed that $F_{C1} = W$. The following calculations are used to determine the side load (V) required to begin the tip, and the minimum design spectral response acceleration parameter (S_{DS}) for the Glacier Tanks holding vessel. This calculation neglects the reaction forces of anchor bolts. The anchor reaction forces will be calculated in the certificate of conformance document, based on the maximum S_{DS} value for the specific install location.

Frame Length, L = 35.3 in
Frame Depth, D = 35.3 in
CG_L Reference, L_{CG} = 12.5 in
CG_D Reference, D_{CG} = 12.4 in
CG_H Reference, H_{CG} = 28.9 in

$\Sigma M_O = 0 \quad \therefore \quad D \times F_{C1} = (D - D_{CG})W + H_{CG} \times V$

Assume $F_{C1} = W$

$$V = C_s W \qquad \text{(ASCE/SEI 7-10, EQ. 12.8-1)}$$

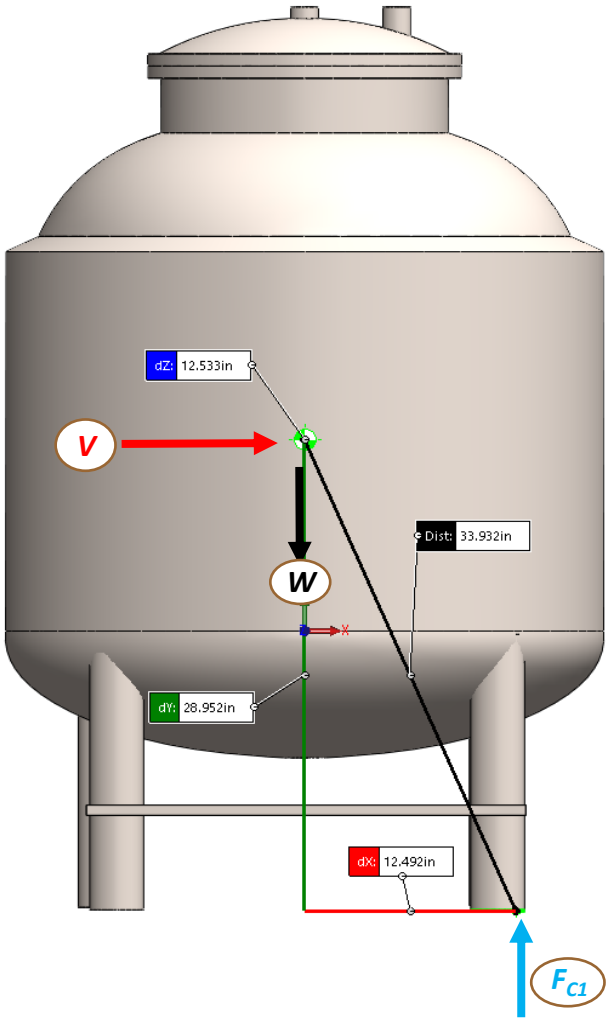
$$C_s = \frac{S_{DS}}{(R/I_e)} \qquad \text{(ASCE/SEI 7-10, EQ. 12.8-2)}$$

Response Modification Factor, R = 1
(Assumes no strength reduction necessary for this frame)

Importance Factor, I_e = 1.00
(Risk Category II from ASCE/SEI 7-10, Table 1.5-2)

Design Spectral Response, $S_{DS} = \frac{(D_{CG} \times I_e)}{(H_{CG} \times R)} = 0.429$

The design spectral response acceleration parameter (S_{DS}) is relatively low for this support system. Additional mounting requirements may be necessary depending on the install location. Additional mounting requirements are specified on the Certificate of Conformance for the actual install location.



---------- **FIGURE 10.4** - Tipping Diagram ----------

In order for tipping to begin, it is assumed that $F_{C1} = W$. The following calculations are used to determine the side load (V) required to begin the tip, and the minimum design spectral response acceleration parameter (S_{DS}) for the Bizzybee FFE-1 Falling Film Evaporator. This calculation neglects the reaction forces of anchor bolts. The anchor reaction forces will be calculated in the certificate of conformance document, based on the maximum S_{DS} value for the specific install location.

Frame Length,	L =	36.0 in
Frame Depth,	D =	27.0 in
CG_L Reference,	L_{CG} =	17.2 in
CG_D Reference,	D_{CG} =	13.3 in
CG_H Reference,	H_{CG} =	46.6 in

$\Sigma M_O = 0 \quad \therefore \quad D \times F_{C1} = (D - D_{CG})W + H_{CG} \times V$

Assume $F_{C1} = W$

$$V = C_s W \qquad \text{(ASCE/SEI 7-10, EQ. 12.8-1)}$$

$$C_s = \frac{S_{DS}}{(R/I_e)} \qquad \text{(ASCE/SEI 7-10, EQ. 12.8-2)}$$

Response Modification Factor, R = 1

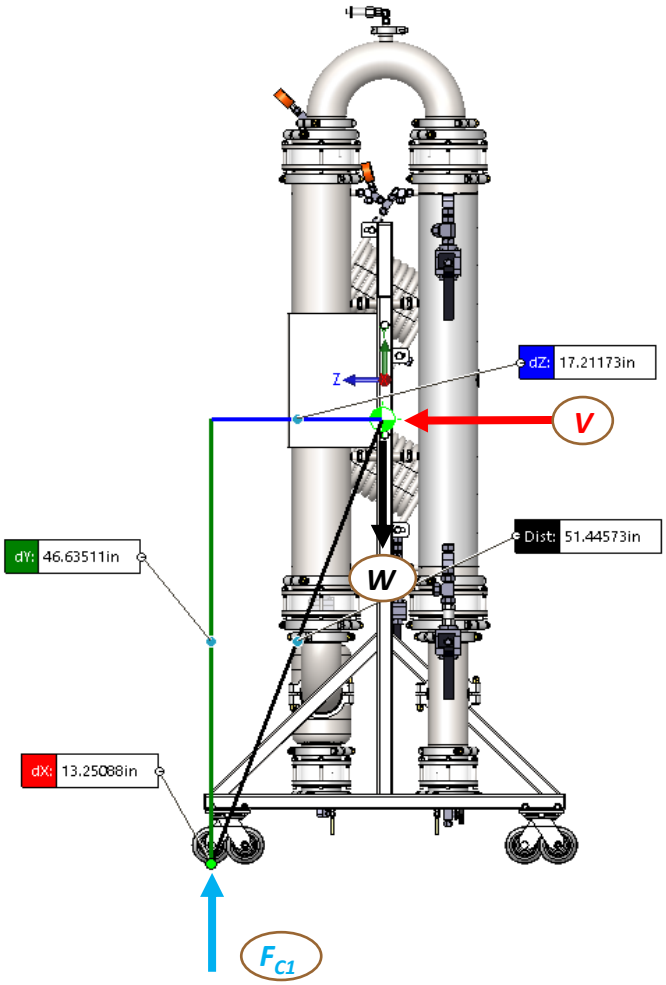
(Assumes no strength reduction necessary for this frame)

Importance Factor, I_e = 1.00

(Risk Category II from ASCE/SEI 7-10, Table 1.5-2)

Design Spectral Response, $S_{DS} = \frac{(D_{CG} \times I_e)}{(H_{CG} \times R)} = 0.284$

The design spectral response acceleration parameter (S_{DS}) is relatively low for this support system. Additional mounting requirements may be necessary depending on the install location. Additional mounting requirements are specified on the Certificate of Conformance for the actual install location.



---------- **FIGURE 10.5** - Tipping Diagram ----------

In order for tipping to begin, it is assumed that $F_{C1} = W$. The following calculations are used to determine the side load (V) required to begin the tip, and the minimum design spectral response acceleration parameter (S_{DS}) for the grant oil holding vessel. This calculation neglects the reaction forces of anchor bolts. The anchor reaction forces will be calculated in the certificate of conformance document, based on the maximum S_{DS} value for the specific install location.

Frame Length, L = 17.7 in
Frame Depth, D = 17.7 in
CG_L Reference, L_{CG} = 4.2 in
CG_D Reference, D_{CG} = 7.2 in
CG_H Reference, H_{CG} = 35.3 in

$\Sigma M_O = 0 \quad \therefore \quad D \times F_{C1} = (D - D_{CG})W + H_{CG} \times V$

Assume $F_{C1} = W$

$$V = C_s W \qquad \text{(ASCE/SEI 7-10, EQ. 12.8-1)}$$

$$C_s = \frac{S_{DS}}{(R/I_e)} \qquad \text{(ASCE/SEI 7-10, EQ. 12.8-2)}$$

Response Modification Factor, R = 1

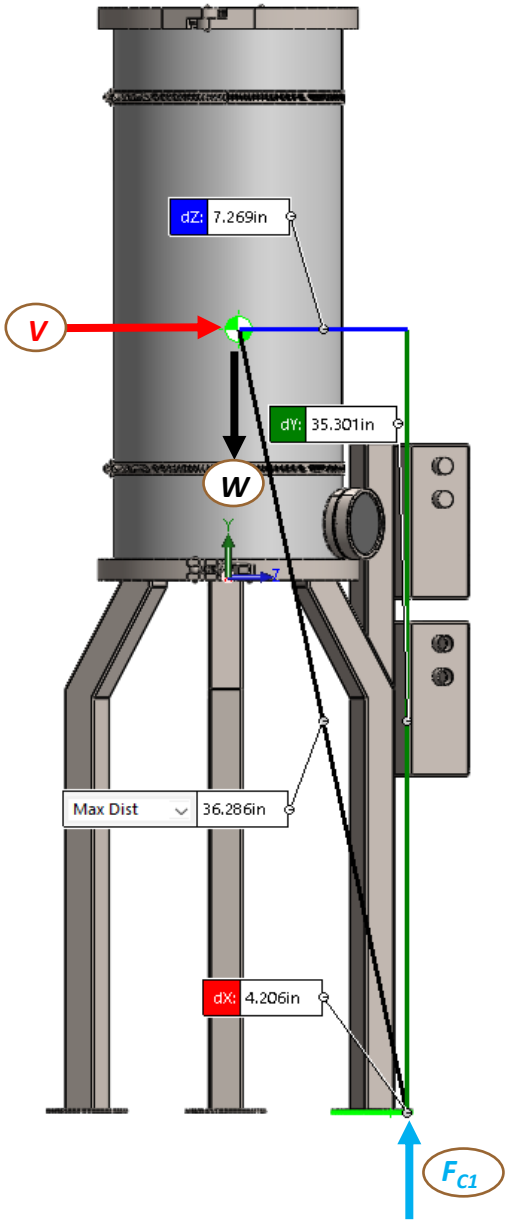
(Assumes no strength reduction necessary for this frame)

Importance Factor, I_e = 1.00

(Risk Category II from ASCE/SEI 7-10, Table 1.5-2)

Design Spectral Response, $S_{DS} = \frac{(D_{CG} \times I_e)}{(H_{CG} \times R)} = 0.204$

The design spectral response acceleration parameter (S_{DS}) is relatively low for this support system. Additional mounting requirements may be necessary depending on the install location. Additional mounting requirements are specified on the Certificate of Conformance for the actual install location.



---------- **FIGURE 10.6** - Tipping Diagram ----------

BEAKER & WRENCH STABILITY

In order for tipping to begin, it is assumed that $F_{C1} = W$. The following calculations are used to determine the side load (V) required to begin the tip, and the minimum design spectral response acceleration parameter (S_{DS}) for the Beaker & Wrench distillation system. This calculation neglects the reaction forces of anchor bolts. The anchor reaction forces will be calculated in the certificate of conformance document, based on the maximum S_{DS} value for the specific install location.

Frame Length, L = 27.0 in
Frame Depth, D = 22.0 in
CG_L Reference, L_{CG} = 9.0 in
CG_D Reference, D_{CG} = 8.5 in
CG_H Reference, H_{CG} = 41.7 in

$\Sigma M_O = 0 \quad \therefore \quad D \times F_{C1} = (D - D_{CG})W + H_{CG} \times V$

Assume $F_{C1} = W$

$$V = C_s W \qquad \text{(ASCE/SEI 7-10, EQ. 12.8-1)}$$

$$C_s = \frac{S_{DS}}{(R/I_e)} \qquad \text{(ASCE/SEI 7-10, EQ. 12.8-2)}$$

Response Modification Factor, R = 1

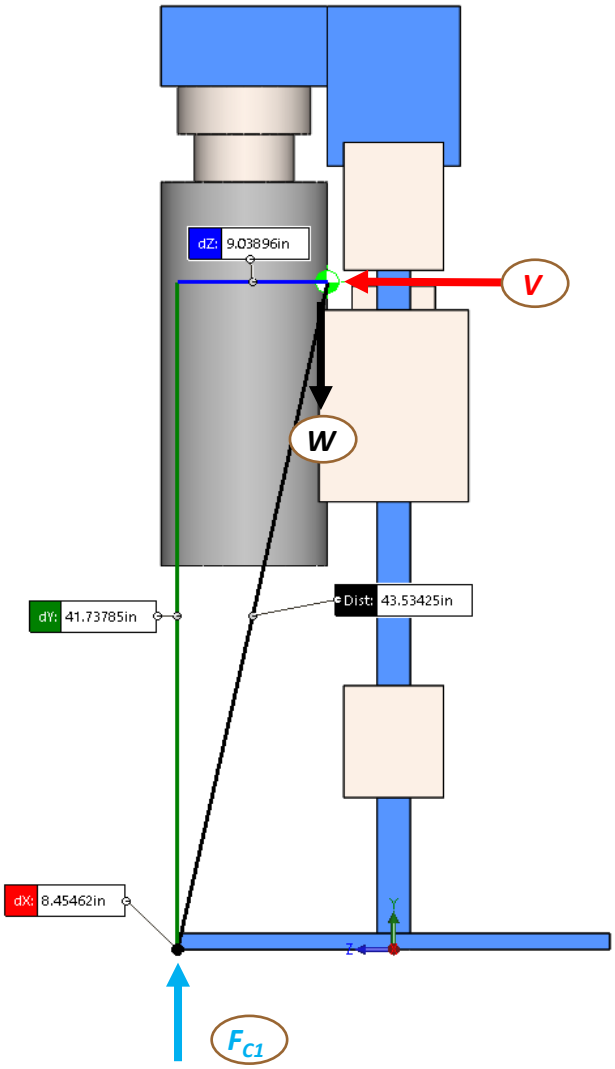
(Assumes no strength reduction necessary for this frame)

Importance Factor, I_e = 1.00

(Risk Category II from ASCE/SEI 7-10, Table 1.5-2)

Design Spectral Response, $S_{DS} = \frac{(D_{CG} \times I_e)}{(H_{CG} \times R)} = 0.202$

The design spectral response acceleration parameter (S_{DS}) is relatively low for this support system. Additional mounting requirements may be necessary depending on the install location. Additional mounting requirements are specified on the Certificate of Conformance for the actual install location.



---------- **FIGURE 10.7** - Tipping Diagram ----------

LEGAL DISCLAIMER

This engineering report certifies the Cura Cannabis Solutions Pilot Ethanol System on a design basis only. Manufacturing quality and enforcement of correct user operation are not covered by this certification. It is the responsibility of the component, equipment, and vessel manufacturers to implement and maintain their own manufacturing quality control procedures. It is the responsibility of Cura Cannabis Solutions to train and educate any persons involved in the use and operation of the equipment.

Only the components listed within this report have been approved for use with this product. Any component changed or replaced with that of a different product number or from another product manufacturer, without the approval of 3P Certz, will nullify this certification. For inclusion of additional or alternate components, the new product specifications must be submitted to 3P Certz for review. If approved, 3P Certz will revise this certification report to include the new component and release a new report with an updated revision number. See the **GENERAL COMPONENTS** section of this report for a complete list of the components currently approved for use with this extraction system.

3P Certz will not be held liable for equipment failures or incidents that occur as a result of components that have not been approved within this report and/or operator error or negligence resulting from failure to adhere to the operational and safety guidlines provided in this report. Product manufacturers will be held liable for failures or incidents resulting from manufacturer defects or due to errant product specifications provided by the manufacturer for components which have been approved in this report. This product shall only be installed and operated in a properly designed control area that has been approved by the *Authority Having Jurisdiction* (AHJ). See the **FACILITY/INSTALLATION REQUIREMENTS** section of this report for an overview of the minimum control area and facility requirements.

This certification report is only applicable to manufactured units that have been issued a 3P Certz serial number, which has been logged and recorded by 3P Certz. Serial numbers are specific to product owners and the sale or transfer of extraction units requires a new 3P Certz serial number be issued to the new product owner. 3P Certz does not take any responsibility for manufactured units without a valid 3P Certz serial number physically attached, which corresponds to a 3P Certz certificate of conformance document. Additionally, certificates of conformance are state specific. Manufactured units that have been issued a certificate of conformance and a serial number shall not be sold or transfered to any other state besides the one for which it has been PE stamped and approved.

REFERENCES

NATIONAL CODES

International Code Council. *2018 International* ***Fire*** *Code.*

International Code Council. *2018 International* ***Building*** *Code.*

International Code Council. *2018 International* ***Mechanical*** *Code.*

National Fire Protection Association. ***NFPA 30*** *, Flammable and Combustible Liquids Code , 2018 Edition.*

National Fire Protection Association. ***NFPA 497*** *, Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas, 2017 Edition.*

American Society of Civil Engineers. ***ASCE/SEI 7-10*** *, Minimum Design Loads for Buildings and Other Structures, Third Printing.*

WEBSITES

"Chemical Compatibility Database." *Cole-Parmer,* 2018, www.coleparmer.com/chemical-resistance.

"Chemical Resistance Chart." *Rubber Fab,* 2018, www.rubberfab.com/sites/default/files/resources/pdfs/Chemical%20Resistance%20List2.pdf

STATE CERTIFICATIONS

CALIFORNIA

The extraction system described within this report has been reviewed by a California Licensed Professional Engineer and found to meet all applicable requirements set forth by the state of California. This report certifies the ***design only***. Each manufactured unit shall be assigned a serial number and certificate of conformance verifying full compliance with this report. The following codes and standards have been reviewed as a basis for certification of this system:

- *2016 California Fire Code*
- *2018 International Fire Code*
- *NFPA 30-2018, Flammable and Combustible Liquids Code*
- *NFPA 70-2017, Electrical Code*

The *2018 International Fire Code* has been compared to the *2016 California Fire Code* to ensure equivalency of the specific codes used to certify this equipment. The following shows the results of this comparison:

2018 IFC → *2016 CFC*	RESULT
Hazardous Materials: Systems, equipment and processes	
5003.2 → 5003.2	Equivalent content and wording
Hazardous Materials: Hazard identification signs	
5003.5 → 5003.5	Equivalent content and wording
Hazardous Materials: Signs	
5003.6 → 5003.6	Equivalent content and wording
Hazardous Materials: Control areas	
5003.8.3 → 5003.8.3	Equivalent content, but references *California Building Code* instead of *International Building Code*
Flammable and Combustible Liquids: Storage	
5704 → 5704	Equivalent content and wording.
Flammable and Combustible Liquids: Dispensing, use, mixing and handling	
5705 → 5705	Equivalent content and wording.

Licensed Engineer: Brian A. Kester
License Number: M 39026

MANUFACTURER
SPEC SHEETS

APPENDIX A

180026

GENERAL COMPONENTS

Vacuum & Pressure Relief Valve

Catalog # 96-15 In stock

Sanitary design and construction spring pressure relief with vacuum break for beer tank.

Pressure *

15 psi

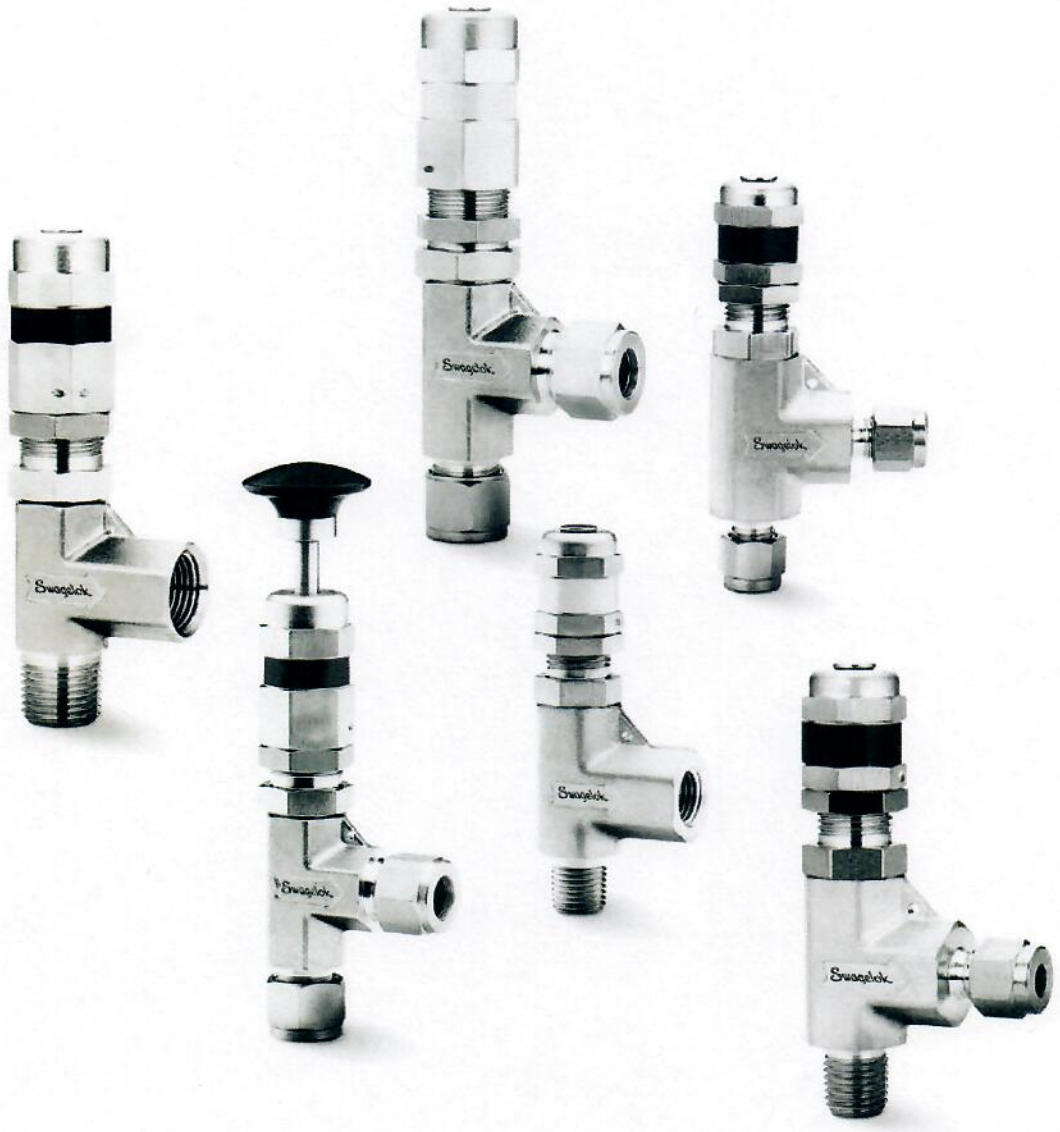
Connection *

1-1/2" TC

$179.00

https://www.gwkent.com/vacuum-pressure-relief-valve.html

Proportional Relief Valves



R Series

- Liquid or gas service
- Set pressures from 10 to 6000 psig (0.7 to 413 bar)
- 1/4 and 1/2 in. and 6 to 12 mm end connections

Technical Data

Pressure-Temperature Ratings

Series	R3A					R4				RL3 and RL4			
Inlet Working Pressure①	6000 psig (413 bar); up to 8000 psig (551 bar) during relief					6000 psig (413 bar)				300 psig (20.6 bar)			
Outlet Working Pressure①	1500 psig (103 bar)					2500 psig (172 bar)				225 psig (15.5 bar)			
Set Pressure	50 to 6000 psig (3.4 to 413 bar)					50 to 1500 psig (3.4 to 103 bar)				10 to 225 psig (0.7 to 15.5 bar)			
Seal Material	Fluoro-carbon FKM	Buna N	Neo-prene	Ethylene pro-pylene	Perfluoro-carbon FFKM	Fluoro-carbon FKM	Buna N	Neo-prene	Ethylene pro-pylene	Fluoro-carbon FKM	Buna N	Neo-prene	Ethylene pro-pylene
Temperature, °F (°C)	Maximum Set Pressure, psig (bar)												
–40 (–40)	—	—	—	—	—	—	—	—	—	—	—	—	225 (15.5)
–30 (–34)													
–10 (–23)			6000 (413)								225 (15.5)	225 (15.5)	
0 (–17)		6000 (413)											
10 (–12)										225 (15.5)			
25 (–4)	6000 (413)			6000 (413)	2500 (172)	1500 (103)	1500 (103)	1500 (103)	1500 (103)				
30 (–1)													
40 (4)					6000 (413)								
50 (10)													
70 (20)													
150 (65)	5580 (384)	5580 (384)	5580 (384)	5580 (384)	3000 (207)								
200 (93)	5160 (355)	5160 (355)	5160 (355)	5160 (355)	1500 (103)								
250 (121)	4910 (338)	4910 (338)	4910 (338)	4910 (338)	—								
275 (135)	—	—	4660 (321)	—				—	—				
300 (148)										—			

① Outlet pressure should not exceed inlet pressure.

Set Pressure and Resealing Pressure

- Set pressure is the upstream pressure at which the first indication of flow occurs. Set pressure of each valve **after initial relief** is repeatable within
  - ± 3.0 psig (0.20 bar) or ± 5 % (whichever is greater) of the initial set pressure at 60 to 80°F (15 to 26°C)
  - ± 6.0 psig (0.40 bar) or ± 20 % (whichever is greater) of the initial set pressure below 60°F (15°C) and above 80°F (26°C).
- Resealing pressure is the upstream pressure at which there is no indication of flow. Resealing pressure is always lower than set pressure.

Testing

Every R series proportional relief valve is tested for set and resealing performance.

Series	Test Set Pressure psig (bar)	Minimum Resealing Pressure as a Percentage of Set Pressure, %
RL3, RL4	10 to 20 (0.7 to 1.3)	50
	175 to 225 (12.0 to 15.5)	91
R3A, R4	100 to 200 (6.8 to 13.7)	50
	850 to 1000 (58.5 to 68.9)	84

Back Pressure

High-Pressure Valves (R3A and R4 Series)

The effect of system back pressure is minimized by the design of these high-pressure valves.

Low-Pressure Valves (RL3 and RL4 Series)

System back pressure increases the set pressure of the valve. To compensate, multiply the back pressure by 0.8 and subtract the result from the desired set pressure. Use the result to pre-set the valve while back pressure is equal to atmospheric pressure.

Example:

Desired set pressure is 120 psig. System back pressure is 40 psig.

Step 1. Multiply back pressure by 0.8.
40 psig × 0.8 = 32 psig.

Step 2. Subtract result from desired set pressure.
120 psig – 32 psig = 88 psig.

Step 3. Pre-set proportional relief valve to 88 psig.

Cleaning and Packaging

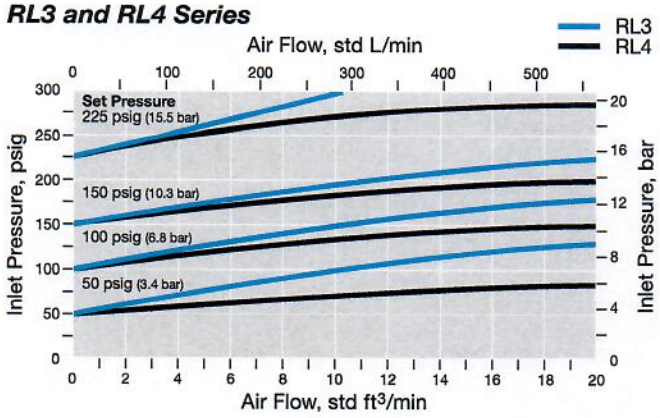
All Swagelok R series relief valves are cleaned and packaged in accordance with Swagelok *Standard Cleaning and Packaging (SC-10)* (MS-06-62) .

Swagelok

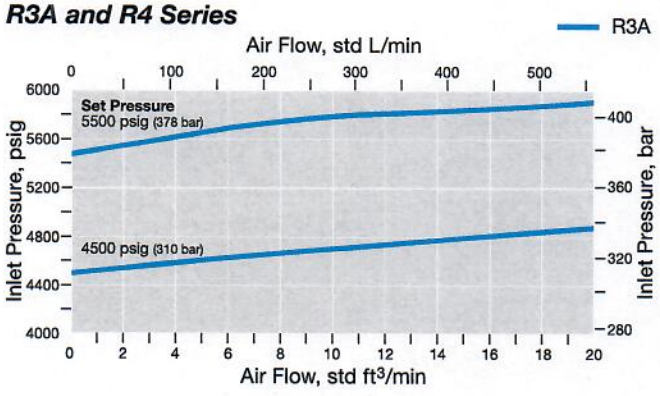
Flow Data at 70°F (20°C)

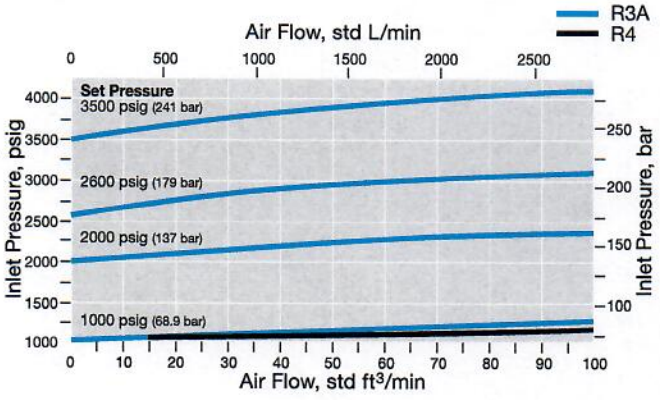
Air

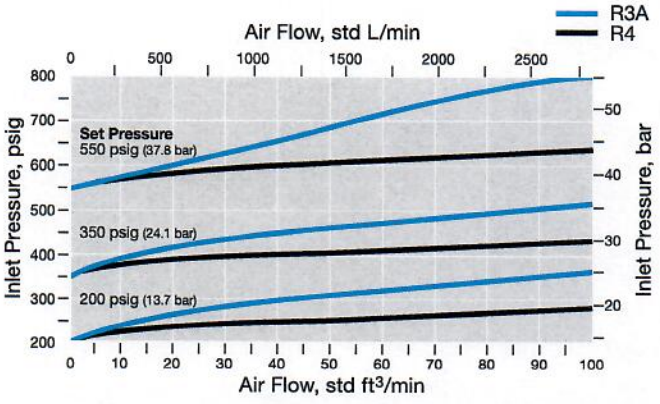
RL3 and RL4 Series



R3A and R4 Series

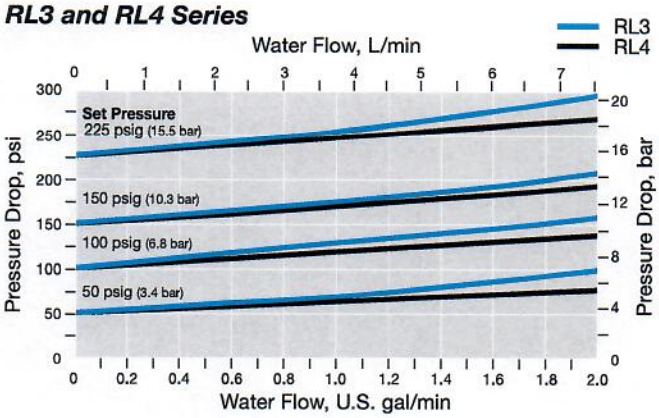




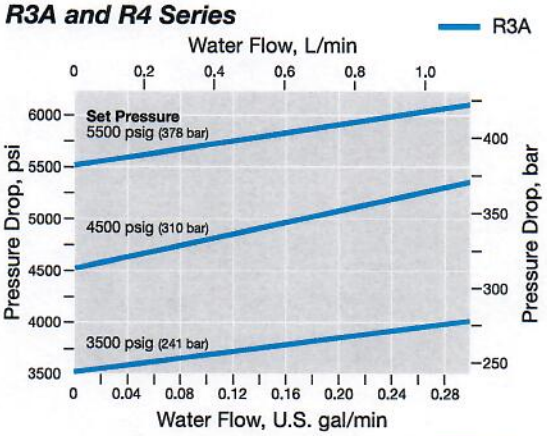


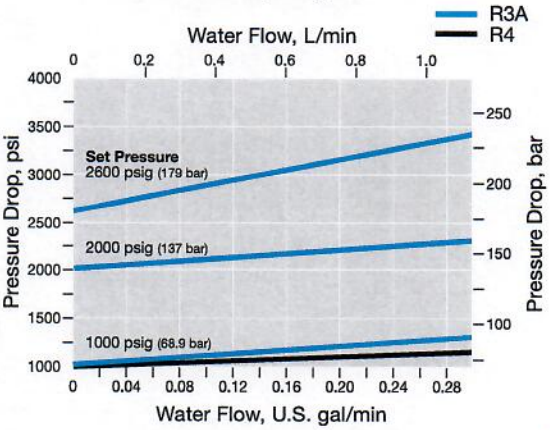
Water

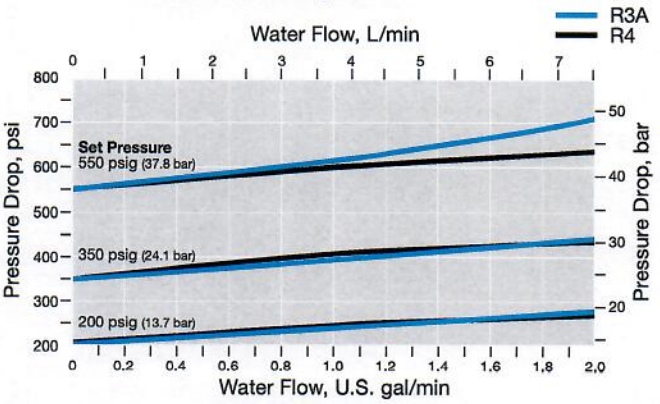
RL3 and RL4 Series



R3A and R4 Series







Ordering Information

Low-Pressure Valves (RL3 and RL4 Series)

Valve contains spring; set pressure must be adjusted. Select a valve ordering number.

Factory-Set Valves

RL3 and RL4 series valves are available with springs factory-set to a specified set pressure. Valves are set, tested, locked, and tagged with the set pressure; certificates of test are included.

To order, add **-SET** to the valve ordering number and specify the desired set pressure.

Example: SS-RL3S4-**SET**

Replacement Spring Kits

Spring kits include spring and installation instructions. Select a spring kit ordering number.

Series	Spring Kit Ordering Number	Set Pressure Range psig (bar)
RL3	177-13K-RL3	10 to 225 (0.7 to 15.5)
RL4	177-13K-RL4	

High-Pressure Valves (R3A and R4 Series)

Valve does not contain spring. Select a valve ordering number and a spring kit ordering number.

Spring Kits

Spring kits include spring, label, 302 SS lock wire with seal, spring support, and installation instructions.

Select a spring kit basic ordering number and add the spring designator for the desired set pressure range.

Examples: **177-R3A-K1-F**
177-13K-R4-C

Set Pressure Range psig (bar)	Spring Designator	Spring Color
R3A series spring kit: basic ordering number 177-R3A-K1-		
50 to 350 (3.4 to 24.1)	A	Blue
350 to 750 (24.1 to 51.7)	B	Yellow
750 to 1500 (51.7 to 103)	C	Purple
1500 to 2250 (103 to 155)	D	Orange
2250 to 3000 (155 to 206)	E	Brown
3000 to 4000 (206 to 275)	F	White
4000 to 5000 (275 to 344)	G	Red
5000 to 6000 (344 to 413)	H	Green
R4 series spring kit: basic ordering number 177-13K-R4-		
50 to 350 (3.4 to 24.1)	A	Blue
350 to 750 (24.1 to 51.7)	B	Yellow
750 to 1500 (51.7 to 103)	C	Purple

Factory-Set Valves

R3A and R4 series valves are available with springs factory-set to a specified set pressure. Valves are set, tested, locked, and tagged with the set pressure; certificates of test are included.

To order, add **-SET** and a spring designator whose range includes the desired set pressure to the valve ordering number; specify the desired set pressure.

Example: SS-4R3A-**SETB**

Options and Accessories

Seal Materials

Fluorocarbon FKM is the standard seal material. Buna N, ethylene propylene, and neoprene and perfluorocarbon FFKM are available. Quad seal elastomers are PTFE-coated.

To order a *valve* with an optional seal material, add a valve seal material designator to the valve ordering number.

Examples: SS-4R3A-**BU**
SS-RL3S4-**BU**

Seal Material	Designator	
	Valves	Seal Kits
Buna N	-BU	BN①
Ethylene propylene	-EP	EP
Neoprene	-NE	NE
Perfluorocarbon FFKM②	-KZ	KZ
Fluorocarbon FKM	—	VI

① Use **BU** for R3A series seal kits.
② Only available for R3A series.

To order a *replacement seal kit,* insert a seal kit material designator as a prefix (R3A series) or suffix (all others) to the seal kit basic ordering number.

Examples: **BU**-R3A-K2
SS-3K-RL3-**BN**

RL3 Series	R3A Series	RL4 Series	R4 Series
Seal kit basic ordering number			
SS-3K-RL3-	-R3A-K2	SS-3K-RL4-	SS-3K-R4-
Seal kit contents			
O-ring, quad seal, bonded disc, retainer, instructions	O-rings (2), quad seal, retainer, instructions	O-ring, quad seal, bonded disc, retainer, instructions	O-ring, quad seal, bonded stem, instructions

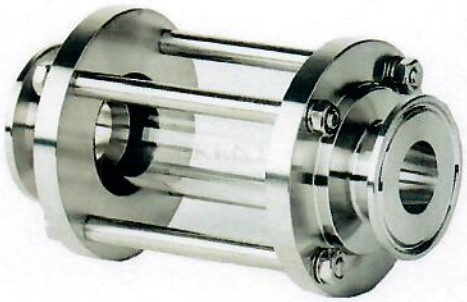
Special Cleaning and Packaging (SC-11)

To order R series relief valves processed in accordance with Swagelok *Special Cleaning and Packaging (SC-11)* (MS-06-63) to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C, add **-SC11** to the valve ordering number.

Example: SS-RL3S4-**SC11**

Oxygen Service Hazards

For more information about hazards and risks of oxygen-enriched systems, see the Swagelok *Oxygen System Safety* technical report (MS-06-13).



Vista Sight Glass TC

Catalog # 923-15 In stock

In-line sight glass with 4 bolts for larger viewing area, with tri-clamp connections. Made of 304 stainless steel with pyrex glass.

Connection *

1-1/2" TC

$78.00

Description | Contact Us | More Information | Documents

- Made of 304 stainless steel with pyrex glass, 3-A..
- Seal material: EPDM
- Glass Length 3.35"
- Temperature: up to 200°

https://www.gwkent.com/vista-sight-glass-tc.html

Pressure Gauges 1/4" NPT

Catalog # 2725-G

In stock

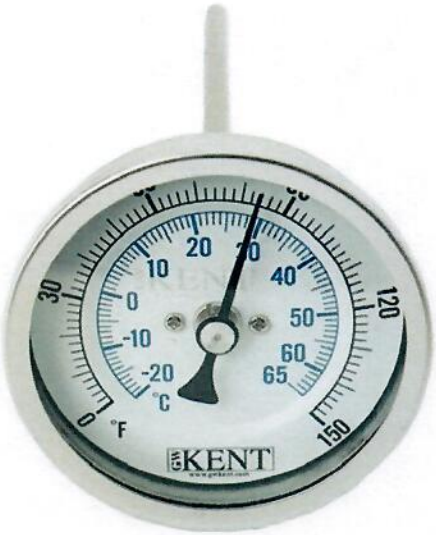
General processing pressure gauge, premium quality at great price.

Product Name	Qty
0-30 psi Pressure Gauge 1/4" NPT Bottom Mount Catalog #2725-6 **$14.00**	0
0-60 psi Pressure Gauge 1/4" NPT Bottom Mount Catalog #2725-7 **$14.00**	0
0-30 psi Pressure Gauge 1/4" Back Mount Catalog #2725-8 **$14.00**	0
0-60 psi Pressure Gauge 1/4" Back Mount Catalog #2725-9 **$14.00**	0

Description | Contact Us

- Stainless steel case and dial face 2.5" and glycerine fill.
- Polycarbonated lens, brass internal
- Connection in 1/4" NPT male.
- Accuracy 1.6%.

https://www.gwkent.com/pressure-gauges-1-4-npt.html



Tank Thermometer

Catalog # 2823-1 In stock

Bimetal thermometer with 3" stainless steel dial face and 1/2" NPT male back mounting connection for thermometer well.

Temperature *

0 - 150 F

Probe *

2.5"

$16.00

Description | Contact Us | More Information

Dual scale F & C in color with calibrate reset screw.

https://www.gwkent.com/tank-thermometer.html

Click the image to zoom

Disclaimer: Images are intended to best approximate actual product

Tank Manway | Round 18 in. x 4 in. Neck - SS304 / Silicone

SKU	MW-RND-G18x4-SIL
Brand	Glacier Tanks
Stainless Steel	SS304
Material	Silicone
Connection Type(s)	Weld
Connection Size(s)	18 in.
Item Length	22 in.
Item Width	22 in.
Item Height	12 in.
Wall Thickness	0.115
Warranty	1 Year
Quantity in stock	34
Store Location:	2-03R-D1

Description | Return Policy | Store Reviews

Product Description

Tank pressure manways are available in stainless steel SS304 or SS316 (some are special order). Depending on the size of your tank, your tank manway will be either top or side mounted. Rectangular manways are commonly side mounted in mash tuns to facilitate the removal of grain. Elliptical manways are often found on brite beer tanks and fermenters, and offer both an inward and outward swinging door. Shadowless manways are designed to be mounted flush with the exterior of the tanks, thus creating no interior protrusions, or a lip inside, where unsanitary conditions can build up; they are recommended instead of their oval counterparts. Round manways are simply designed to be an access port for pressurized brewing systems. The manway has a working pressure of 58 PSI, with a design pressure of 72.5 PSI.

- 4 bar Working Pressure, 5 Bar Design Pressure

https://www.glaciertanks.com/pressure-manways-mw-rnd-g18-4-ss304.html

Ball Valve 316L. Encapsulated

Catalog # 982-15 In stock

Heavy duty sanitary ball valve full port with encapsulated teflon seats and tri-clamp connection. In-line designed for maximum flow capacity. Valves may be installed at any positions.

Connection *

1-1/2" TC

$149.00

https://www.gwkent.com/ball-valve-316l-tri-clamp-encapsulated.html

Tee

Catalog # 7MP-G

In stock

Sanitary tee for food and beverage processing line.

Product Name	Qty
1" Tee TC Catalog #7MP-10 **$38.00**	0
1-1/2" Tee TC Catalog #7MP-15 **$45.00**	0
Reducing Tee 2" TC x 1-1/2" TC Catalog #7MP-97 **$52.00**	0
Instrument Tee 1-1/2" TC Catalog #7MP-99 **$39.00**	0
2" Tee TC Catalog #7MP-20 **$57.00**	0

https://www.gwkent.com/tee.html

Elbow - 90 & 45 degree

Catalog # 2CMP-G

In stock

Product Name	Qty
1" 90° Elbow TC Catalog #2CMP-10 **$25.00**	0
1-1/2" 90° Elbow TC Catalog #2CMP-15 **$25.00**	0
Reducing Elbow 2" x 1-1/2" TC Catalog #2CMP-31MP **$29.00**	0
2" 90° Elbow TC Catalog #2CMP-20 **$34.00**	0
2-1/2" 90° Elbow TC Catalog #2CMP-25 **$59.00**	0
3" 90° Elbow TC Catalog #2CMP-30 **$75.00**	0

https://www.gwkent.com/elbow-90-45-degree.html

Hose Adapter & Hose Barb

Catalog # 82-G

In stock

Heavy wall sanitary hose adapter for food and beverage processing with tri-clamp end. Barb size is based on OD to fit hose size inside diameter.

Product Name	Qty
3/8" Hose Barb x 1-1/2" TC Catalog #82-01 **$19.00**	0
1/2" Hose Barb x 1-1/2" TC Catalog #82-02 **$19.00**	0
1/4" Hose Barb x 1-1/2" TC Catalog #82-03 **$19.00**	0
3/4" Hose Barb x 1-1/2" TC Catalog #82-04 **$19.00**	0
Long Hose Barb 1" x 1-1/2" TC Catalog #82-10 **$20.00**	0
Long Hose Barb 1-1/2" x 1-1/2" TC Catalog #82-15 **$20.00**	0

https://www.gwkent.com/hose-adapter-hose-barb.html

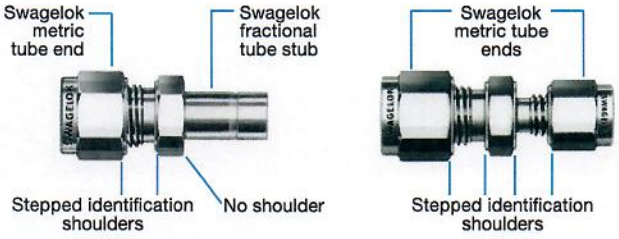
Gaugeable Tube Fittings and Adapter Fittings

- Available in tube sizes from 1/16 to 2 in. and 2 to 50 mm
- Consistent gaugeability upon initial installation
- Easy to disconnect and retighten
- Wide variety of materials and configurations
- Demonstrated reliability and performance

Swagelok

Metric Swagelok Tube Fittings

Metric tube fittings have a stepped shoulder on the body hex. Shaped fittings, such as elbows, crosses, and tees, are stamped MM for metric tubing and have no step on the forging.



Pressure Ratings

Swagelok Tube Fitting Pressure Ratings

Swagelok tube fitting ends are rated to the working pressure of tubing as listed in Swagelok *Tubing Data,* MS-01-107. Careful selection of high-quality tubing is important when installing safe, leak-tight systems.

Pipe End (NPT and ISO 7) Pressure Ratings Basis

Pressure ratings for fittings with both tube fitting and pipe thread ends are determined by the end connection with the lower pressure rating. The table lists pressure ratings for male and female **tapered pipe thread ends.** For female and male pipe threads to have the same pressure rating in the same nominal pipe size, the female thread would require a heavier wall, resulting in a fitting too large and bulky to be practical.

Allowable Stress

Stress values are based on ASME Code for Pressure Piping B31.3, Process Piping, at ambient temperature.

Material	Allowable Stress	
	psi	bar
316 SS	20 000	1378
Brass	10 000	689
Steel	20 000	1378

Pressure Ratings

Ratings are based on ASME Code for Pressure Piping B31.3, Process Piping, at ambient temperature.

NPT/ ISO Pipe Size	316 SS and Carbon Steel				Brass			
	Male		Female		Male		Female	
in.	psig	bar	psig	bar	psig	bar	psig	bar
1/16	11 000	757	6700	461	5500	378	3300	227
1/8	10 000	689	6500	447	5000	344	3200	220
1/4	8 000	551	6600	454	4000	275	3300	227
3/8	7 800	537	5300	365	3900	268	2600	179
1/2	7 700	530	4900	337	3800	261	2400	165
3/4	7 300	502	4600	316	3600	248	2300	158
1	5 300	365	4400	303	2600	179	2200	151
1 1/4	6 000	413	5000	344	3000	206	2500	172
1 1/2	5 000	344	4600	316	2500	172	2300	158
2	3 900	268	3900	268	1900	130	1900	130

- To determine pressure ratings in accordance with ASME B31.1, Power Piping:
  - carbon steel material—multiply by 0.85.

  Stainless steel and brass material ratings remain the same.
- To determine MPa, multiply bar by 0.10.

SAE/MS Fittings Pressure Ratings Basis

Pressure ratings are based on SAE J1926/3 at ambient temperature.

SAE/MS Thread Size	Designator	316 SS and Carbon Steel			
		Nonpositionable		Positionable	
		psig	bar	psig	bar
5/16-24	2ST	4568	314	4568	314
7/16-20	4ST				
1/2-20	5ST				
9/16-18	6ST			3626	249
3/4-16	8ST				
7/8-14	10ST	3626	249	2900	199
1 1/16-12	12ST				
1 3/16-12	14ST	2900	199	2320	159
1 5/16-12	16ST				
1 5/8-12	20ST	2320	159	1813	124
1 7/8-12	24ST				
2 1/2-12	32ST	1813	124	1450	99

Novaflex 6506

Connoisseurs Food & Beverage Hose

Special kink and crush resistant suction & discharge hose, designed for those more demanding applications requiring a product that meets 3-A (cert# 1376), FDA & USDA standards. Designed to meet the temperatures and chemical resistance associated with "cleaning in place" systems. This ultra smooth microbe resistant tube is built for non-oily applications, on special stainless steel mandrels for cleanliness.

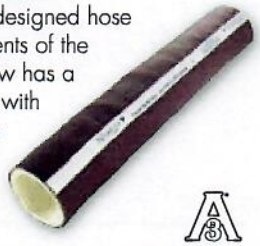
Construction:

Tube: White Chlorobutyl (non oily applications)
Reinforcement: Multiple plies of polyester tire cord & dual monofilament helix
Cover: Gray EPDM abrasion resistant. Length: 100 ft
Temperature Range: -40°F (-40°C) to +240°F (+116°C) (Cleaning In Place to 248°F (+120°C) Not for continuous steam service

Part No.	I.D.	O.D.	MBR (in)	VAC (Hg)	Plies	WP psi	WT LBS/FT
6506WB-00750-00	¾	1.41	3.0	Full	2	250	0.33
6506WB-01000-00	1	1.64	3.5	Full	2	250	0.44
6506WB-01500-00	1½	2.14	4.5	Full	2	250	0.63
6506WB-02000-00	2	2.77	7.0	Full	4	250	1.21
6506WB-02500-00	2½	3.29	13.0	Full	4	250	1.52
6506WB-03000-00	3	3.79	16.0	Full	4	250	1.84

Meets or exceeds the requirement of the Canadian Food Inspection Agency (File:N267)

Novaflex 6507NB NovaBrew



NovaBrew is a state of the art designed hose based on the specific requirements of the modern day brewery. NovaBrew has a rugged but flexible construction with a super smooth white hose tube for non-oily applications, that is microbe resistant along with a dark burgundy red cover that resists dirt scuffs and is easily cleaned. NovaBrew is built on stainless steel mandrels for cleanliness and meets FDA USDA and 3-A (certificate #1376).

Construction:

Tube: White chlorobutyl (non oily applications)
Reinforcement: Multiple plies of polyester tire cord, dual monofilament helix rods
Cover: Dark burgundy EPDM. Length: 100ft
Temperature Range:-40°F (-40°C) to +240°F (+116°C) (Can be open end steam cleaned) CIP to 248°F (+120°C)

Part No.	I.D.	O.D	WP psi	MBR	Vacuum Hg	WT LBS/FT
6507NB-07500-00	¾	1.41	250	4	Full	0.33
6507NB-01000-00	1	1.64	250	4	Full	0.48
6507NB-01500-00	1½	2.14	250	5	Full	0.65
6507NB-02000-00	2	2.77	250	7	Full	1.26
6507NB-02500-00	2½	3.29	250	13	Full	1.54

13MHP Tri-Clamp Pressure Ratings:

Part #	Size	Max Torque (In LBf)	Maximum Pressure @70F	Maximum Pressure @250F
13MHP-150	1.5"	130 In LBf	1500 PSI	1200 PSI
13MHP-200	2"	130 In LBf	1000 PSI 950 psi @ 110°F	800 PSI
13MHP-250	2.5"	130 In LBf	1000 PSI	800 PSI
13MHP-300	3"	130 In LBf	1000 PSI	800 PSI
13MHP-400	4"	200 In LBf	600 PSI	800 PSI
13MHP-600	6"	200 In LBf	300 PSI	200 PSI
13MHP-800	8"	200 In LBf	250 PSI	150 PSI
13MHP-1000	10"	200 In LBf	200 PSI	125 PSI
13MHP-1200	12"	200 In LBf	150 PSI	100 PSI

13MHM Tri-Clamp Pressure Ratings:

Part #	Size	Maximum Pressure @70F		Maximum Pressure @250F
13MHM-075	3/4"	1500		1200
13MHM-150	1.5"	500	445 psi @ 110°F	250
13MHM-200	2"	450	405 psi @ 110°F	250
13MHM-250	2.5"	400		200
13MHM-300	3"	350		150
13MHM-400	4"	200	180 psi @ 110°F	125
13MHM-600	6"	150		75
13MHM-800	8"	100		50
13MHM-1000	10"	40		30
13MHM-1200	12"	30		25

Sanitary Brewing Fittings

Silicone Gaskets

Silicone gaskets offer an economical choice with a wide working temperature (-58°F - 400°F). Silicone is almost an industry default and offers very low extractables (leaching characteristics). **Gaskets and Seals are non-returnable.**

Products | Specifications | Return Policy | Store Reviews

- Temperature Range: -58°F to +450° F
- Acid Resistance: Good
- Alkali Resistance: Poor
- Petroleum Oil Resistance: Good
- Vegetable Oil Resistance: Good
- Abrasion Resistance: Excellent
- Compression Resistance: Excellent
- Ethanol < 10%: Good
- Ethanol 10% to 40%: Poor
- Ethanol > 40%: Not recommended

https://www.glaciertanks.com/tri-clamp-silicone-gaskets.html

Lenticular Filter Housing

Catalog # 3450-G

In stock

Lenticular filter system is as versatile as filter sheet in plate & frame filter but sanitary, easy to use and easy to change out with minimal product loss and air exposure.

Product Name	Qty
Lenticular Filter Housing 1 Module 12" Catalog #3450-1** **$4,195.00**	0
Lenticular Filter Housing 2 Module 12" Catalog #3450-2** **$4,295.00**	Out of stock
Lenticular Filter Housing 3 Module 12" Catalog #3450-3** **$4,695.00**	0
Lenticular Filter Housing 4 Module 12" Catalog #3450-4** **$4,995.00**	0

Description | Contact Us

- Material in 316 L. stainless steel, sanitary construction with electro polish.
- Equipped with sanitary pressure gauge, two butterfly valves and fittings.
- Venting valve and drain included with housing.
- Filter Module is not included.

https://www.gwkent.com/lenticular-filter-housing.html

Example torque tool for 13MHP Tri-Clamps

Seekonk

3/8" DR 5 - 60 IN LBS / .56 - 6.7 NM SEEKONK PRESET SLIP TYPE TORQUE WRENCH - LT-0

$121.51

Model #	LT-0
Condition:	New
Drive Size:	3/8"
English Range:	5-60 In Lbs
Metric Range:	.56-6.7 Nm
Length:	6"
Weight:	13 Oz
Accuracy:	± 4%
Scale:	In Lbs
Scale:	Nm
Type:	Slip

Enter Preset Level Tool Should Be Set At: Required

Quantity: 1

ADD TO CART REQUEST QUOTE

DESCRIPTION

SEEKONK Precision Tools

The Seekonk LT-0 is a 3/8" Drive L Handle Preset Slip Type Torque Wrench that can be preset between 5 - 60 In Lbs English or .56 - 6.7 Nm Metric and torques when turned either left or right.

Lead time for presetting the 3/8" slip torque wrench is 2 days.

Features:

- The Seekonk "L" handle slip type torque tools extend fool proof versatility into a convenient "low profile" configuration.
- As with our other slip type tools, over torquing is impossible even with continued turning.
- The minimum head diameter of the 3/8" slip torque wrench allows access into hard to reach areas.

- The unmatched performance and endurance exhibited by these tools are made possible by internal components produced on Seekonk's state of the art CNC machining centers.
- Both the advanced design and production of these and all other Seekonk products are controlled by our ISO 9001 quality system.
- The preset Seekonk torque wrench is pre-set at the factory to your requirements.
- Under normal use, yearly calibration is sufficient, however; routine calibration checks on a Seekonk Analog or PDTS electronic torque analyzer would be considered prudent.
- The preset Seekonk torque wrench features a standard +/- 4% accuracy.
- Shipped with complementary NIST certificate of calibration.

Made in the USA

WARRANTY INFORMATION

RELATED PRODUCTS

Seekonk
1/4" Dr 2 - 20 In Lbs / .2 - 2.2 Nm Seekonk Preset Slip Type Torque Wrench - LT-M
$86.93
CHOOSE OPTIONS

Seekonk
3/8" Dr 5 - 60 In Lbs / .56 - 6.7 Nm Seekonk Preset Slip Type Torque Wrench Locking - LT-L
$131.48
CHOOSE OPTIONS

Seekonk
1/4" Dr 30 - 100 In Lbs / 3.3 - 11.3 Nm Seekonk Preset Slip Type Torque Wrench Ratcheting - LT-R 1/4
$123.41
CHOOSE OPTIONS

Seekonk
3/8" Dr 30 - 100 In Lbs / 3.3 - 11.3 Nm Seekonk Preset Slip Type Torque Wrench Ratcheting - LT-R 3/8
$123.41
CHOOSE OPTIONS

Seekonk
3/8" Dr 3 - 15 Ft Lbs / 4 - 20.3 Nm Seekonk Preset Slip Type Torque Wrench - MR-1 3/8
$159.55
CHOOSE OPTIONS

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CONTACT

Pro Torque Tools
751 James P. Brawley Dr. NW
Suite # 3
Atlanta, GA 30318
USA

1-800-945-7644

customerservice
@protorquetools.com

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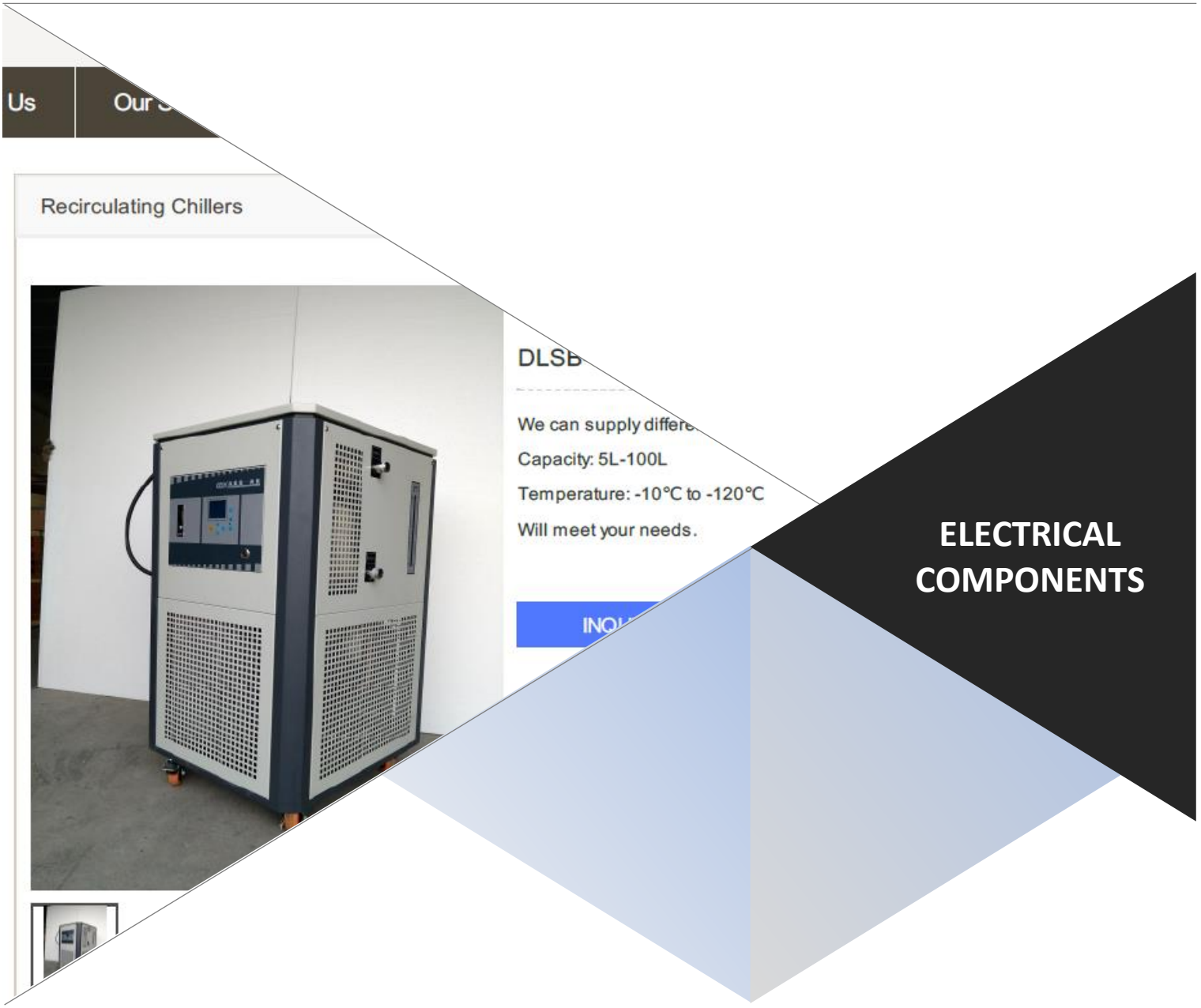
APPENDIX B

180026



ELECTRICAL COMPONENTS

CPE SYSTEMS
INCORPORATED

HIGH PROOF ALCOHOL PORTABLE VARIABLE SPEED PUMP ASSEMBLY

FOR CRAFT FOOD AND BEVERAGE INDUSTRIES

PUMPS
-
HOSES
-
HEAT EXCHANGERS
-
FLOW METERS
-
GASKETS
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VALVES
-
FITTINGS
-
THERMOMETERS
-
PORTABLE SYSTEMS
-
AND MORE

CPE Systems Inc. | www.cpesystems.com | +1 800 668 2268 | sales@cpesystems.com

High Proof Alcohol Pump Assembly

FLUX F 460 EX EL MOTOR

Explosion-proof commutator motor type F 460 Ex EL features a compact design, robust double shell housing in aluminium and very low noise level. Tested and certified according to ATEX-Directive 94/9/EC.

Variable speed control is included in the switch knob for an easy control of the delivery rate. Integral no-volt release provides additional safety to prevent any unintentional re-starting after a voltage discontinuity.

Armature is protected by a Ventilator, washer (deflector), and seal for cooling, fume, and moisture protection. It is also dynamically balanced, has heavy gauge wires, lacquer coated windings, and 36 bars for maximum surafce area for effeciency.

FEATURES

- F420 thermal overload protection with manual reset
- 6.8 amp rating on nameplate – operates at less amps
- Cable disengagement protection
- Power cord can be replaced without motor disassembly
- Switch & cover are designed to keep out fumes and moisture
- Stator has wrapped coils for protection; also keeps out carbon dust
- Carbon brushes are easily accessible for inspection or replacement
- Insulating disc assures that no carbon dust from brush wear gets into the upper bearing
- Fumes are blocked in 2 areas when housing flange and bearing bracket engages the motor housing – provides fume protection when motor is not operating
- Lower housing two wall construction creates high velocity air flow in the open space for cooling efficiency and quiet operation
- Ergonomically designed heavy-duty handle (aluminum construction / corrosion proof coating)
- Steel drive couping/ coated for corrosion resistance
- Large bearings are sealed:
- 24 mm OD, 7 mm w, 9 mm opening
- 32 mm OD, 10 mm w, 12 mm opening
- Circlip, ball bearing compensation disc, and o-ring assures top-end alignment of the armature

Motor, Electrical:

- Single Phase - 220 volts - 9,500 rpm

Horsepower:

- 1/4 HP

1Ø Input

- 230 VAC, 50/60 Hz

Motor Housings:

- TEFC (Totally Enclosed Fan Cooled)
- Alluminun double shell

Approx Dimensions:

- 12" x 7 1/2"

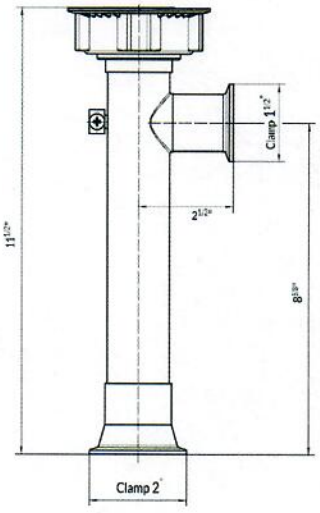
FLUX ATTATCHMENT PUMP FP 424 EX

Pump Connections:

- Clamp 2" x 1 1/2"

Pump Construction Materials:

- All wetted parts - 316 SS
- Seals - Carbon (other seals available)
- FKM, EPDM, and PTFE are available
- PTFE Impeller



Capacity Curves

Materials

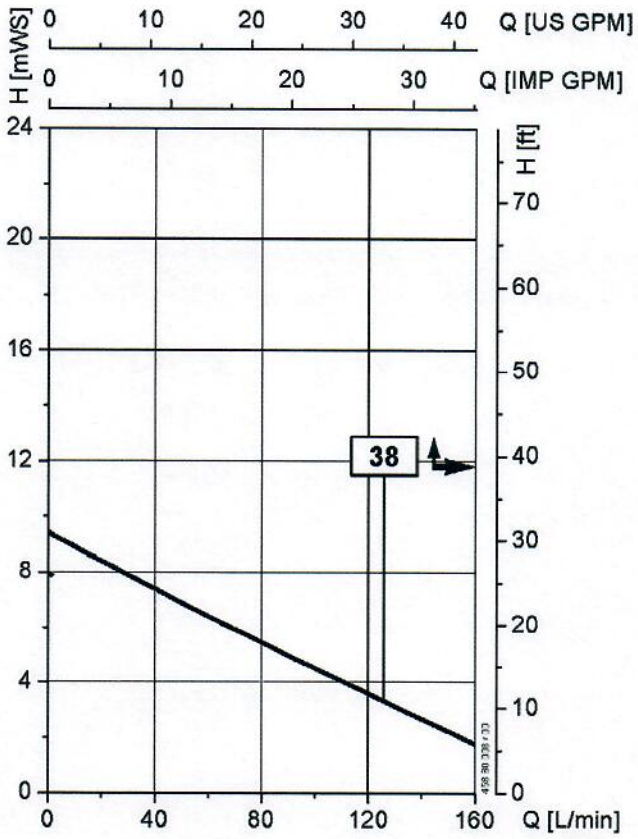
Parts in contact with product:	Stainless steel AISI 316L
Other steel parts:	Stainless steel AISI 304
Gaskets in contact with product:	EPDM

Mechanical seal

Rotary Seal:	Carbon
Stationary Seal:	Ceramic
	Gaskets EPDM
Surface finish:	Bright polish

Operating limits

Nominal pressure:	25 ft
Temperature range:	14 °F
Maximum flow:	30 US GPM
Maximum speed:	9500 rpm



Pump Cart

Made in Canada

Custom designed for the craft food and beverage industry, this is our smallest pump cart built for up to 2HP p umps. This cart is arodynamic, tilt draining, has a small footprint and has easy manuverability. All parts hand whelded in Canada for quality assurance and durability.

MATERIAL

Frame	16 ga stainless steel square tube
Handle	16 ga stainless steel square tube
Platform	14 ga Stainless steel AISI 304
Axle	1/2 ga Stainless steel rod axle
Wheels	5" non marking neoprene wheels with slidding pin clips

Henan Touch Science Instruments Co., Ltd.

Add: Room 2109, 56 Zijingshan Road, Jinshui District, Zhengzhou City, Henan Province, China

Mobile phone: (086) 18538121127; Tel: 86 371 8605 1511

QUOTATION SHEET

Date: 26 October, 2017

From: Ben	**To: Ken**
Email: admin@touch-science.com	**Email:** Ken@curacan.com
Tel/M: +8618538121127	**Tel/M:**

Item 1

Picture	Technical Data	Model	DLSB-30/120	Unit price	Cost
	Flow: 25L/min Lift: 8m Refrigerant: R404/R13/R14 Coolant temperature: -120℃ Cooling capacity: 8760-950W Overall power: 9100W Power supply: 380V/60Hz Environment temperature: 5~35℃	**Commodity**	Low-temperature Coolant Circulation Pump	US$7,800.00	US$7,800.00
		Package	Plywood box		
		Packing size(mm)	1125*905*1315		
		Weight(kg)	NW: 300; GW: 330		
		Quantity(set)	1		
				Total	US$7,800.00

Remarks:

Validity:	26 November, 2017
Delivery time	About 1-3 work days after your payment
Transport mode	By Express or Air
Payment method	T/T, Western Union
Quality Gurantee	One year from delivery date

Beaker & Wrench Equipment List and Specifications

Pope Scientific Wiper Drive
Specifications
Motor: DC, 1725rpm, 0.75hp
Variable speed drive: 7a fused, AC110V, 50/60Hz

High temp circulator: (CE, ISO-9001)
Specifications
Model: LBC-H15O
Temperature Range: room-200℃
Temperature Control: digital PID, 7 inch touch screen
Pump Speed: 6 L/min
Work Area: 30x25x20 cm, 15L
Open Area: 24x16 cm
Heating Watts: 1800 watts
Voltage: AC110/220V, 50/60Hz

Low temp circulator: (CE, ISO-9001)
Specifications
Model: LBC-H15W
Temperature Range: room-100℃
Temperature Control: Digital PID, 7 inch touch screen
Pump Speed: 6 L/min
Work Area: 30x25x20 cm, 15L
Open Area: 24x16 cm
Heating Watts: 1000 watts
Voltage: AC110/220V, 50/60Hz

Dosing Pump:
Model: BWDP2.0-06
Power: <0.6A 110vAC
(the only AC component is a CE labeled 3a 24vDC power supply)

Outlet Pump(2x):
Model: BW-GP-4.5-PPB
Power: <0.6A 110vAC
(the only AC component is a CE labeled 3a 24vDC power supply)

8 Channel PID Temperature Controller:
Custom built 8ch PID Control box
power:15a 110vAC

15a breaker
5a per channel fused

Feed Flask Heater: Keenovo 165w(10w/sqin) 110vAC silicone heater
Feed hose: Custom 6ft, 117w 110vAC
Heat Tape(2x): Briskheat BIH051040L 210w 110vAC
Heated Outlet hoses(2x): Custom 8in, 60w 110vAC
Outlet Pump Heater(2x): Keenovo 25w 110vAC silicone heater

Immersion chiller: (CE, ISO-9001)
Polyscience P60N2A101B
Power 110VAC 5a

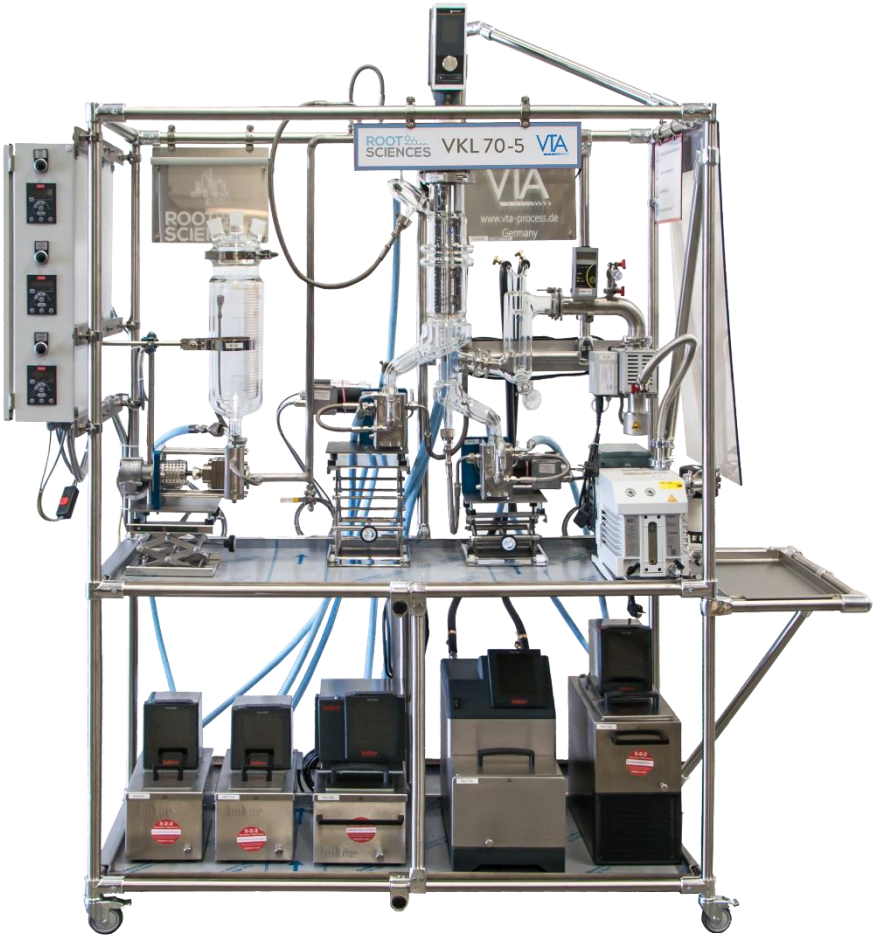
Diffusion Pump:
Varian HSA-150 (rebuilt)
Heater: 3a 110v
Fan: 0.1a 110v

ROOT SCIENCES

SHORT PATH DISTILLATION PLANT
VKL 70-5 RS

KEY FEATURES

- **Throughput Capability**
  1,000-1,500 ml per hour
- **True Continuous Feed**
  Patented design allows for uninterrupted operation by continuously feeding cannabis oil into the feed tank and pumping finished product out without breaking vacuum
- **Fully Jacketed System**
  The VKL 70-5 RS is heated from start to finish, negating the use of heating tape or heat guns to keep product moving through the system
- **Fully Pump-Driven Operation**
  Integrated pumps provide full operator control over feed and discharge rates instead of relying on gravity type drip feed systems
- **Expert On-Site Training**
  Instruction on operation of equipment and proprietary parameters for producing distillate are included with purchase
- **Optimal Yields and Potency**
  Analytic results up to 99.85% total cannabinoids



ROOT SCIENCES

VKL 70-5 RS SPECIFICATIONS

Item 1	**Feed** 1. Feed Tank in jacketed design with flanged lid with spare nozzles. 2. Gear pump in jacketed design (design temperature 300°C), the speed of the pump is adjustable by frequency inverter. 3. Feed line to evaporator is jacketed.
Item 2	**Short-Path Evaporator** 1. Max evaporator temperature: 300 °C 2. Borosilicate glass 3. Internal condenser (coil) 4. 3 wiper strands 5. Digital display of wiper speed at motor drive 6. Operating pressure (depending on product): 0.001 mbar 7. Feed nozzle in jacketed design 8. Residue nozzle in jacketed design 9. Distillate nozzle in jacketed design
Item 3	**Distillate & Residue discharge pumps (2 pumps)** 1. Gear pump in jacketed design (design temperature 300°C), the speed of the pump is adjustable by frequency inverter 2. Discharge siphon after gear pump is jacketed, which is used as a pressure lock against the atmosphere
Item 4	**Vacuum System** 1. Vacuum pump equipped with vacuum pump oil. Leybold D16B Vacuum pump 2. Diffusion vacuum pump for achieving stable vacuum conditions at low pressures (oil included) 3. Flanged cold trap & collection vessel for cold trap condensate 4. Dosing valve for pressure adjustment & for venting 5. Digital gauge display measuring vacuum pressure 6. All necessary connection pipes & hoses for vacuum system
Item 5	**Heating & Cooling by Huber** 1. 1 independent heating unit for the evaporator 2. 1 independent heating unit for the residue & distillate line 3. 1 independent heating unit for the feed tank 4. 1 independent cooling unit for the cold trap 5. 1 independent chilling unit for the internal condenser
Item 6	**Rack/Frame** 1. Frame made of stainless steel with connection clamps for variable use and equipped with 4 wheels
Item 7	**Power supply & power distribution system** 1. Voltage: 240V 2. Frequency: 60 Hz 3. Number of Phases: 1 (two hot wires) 4. Power distribution panel. 5. Control panel for pumps.
Item 8	**Included spare parts** 1. 1 set of tools 2. 1 set of wiper blades 3. 1 set of static gaskets 4. 1 set of shaft sealing for rotary transmission 5. 1 set of bearings for rotary transmission 6. 1 set of O-rings
Item 9	**Documentation** 1. Operating instructions

VKL 70-5 RS PRE-INSTALLATION CHECKLIST

Heat Transfer Fluid (Marlotherm SH or equivalent) For Marlotherm SH contact Kristi Collins at Chem-Group (812) 759-8226 or (800) 489-2306	25 Liters (included with new units)
Chiller Fluid (Isopropyl Alcohol 97%-99% or non-diluted anti-freeze fluids rated to at least -50˚C)	1.5 gal
Cannabis Oil (Crude) Fully winterized & decarboxylated as described below.	500 ml
Electrical Supply Requires a single feed whip to be hard-wired to the equipment's power distribution panel by a licensed electrician during installation. Backup fuses or circuit breakers should also be available.	Single Phase 240V / 60A / 60 Hz 2 Hot Wires / 1 Ground Wire
Equipment Dimensions (L x W x H in inches)	70.1" x 38.6" x 84.7"
Equipment Weight	580 Kg (Gross) / 320 Kg (Net)

Cannabis Oil Preparation

The following processes are for use with cannabis oil (crude) derived from extraction methods using CO2 (Carbon Dioxide), Light Hydrocarbon (Butane, Propane, etc.) or Cold Ethanol (processed between -40˚C to -60˚C or lower).

Winterization:

1.) Dilute crude oil with ethanol to a ratio of 1-part crude oil to 4-parts ethanol.
2.) Transfer the diluted oil solution to a griffin beaker equipped with a stir bar and place on a magnetic hot plate stirrer.
3.) Adjust stir bar speed based on viscosity to create a small concave pattern of product in the beaker.
4.) Homogenize and warm the solution to a probe temperature of 50˚C and let cool to room temperature.
5.) Place the solution into a freezer for at least 24hrs to allow lipids to fully separate.
6.) Remove the separated lipids by filtering via vacuum-assisted Büchner funnel using cold ethanol to wash the oil through until clear.
7.) Recover the ethanol via rotary evaporation.

Decarboxylation:

(Hot Plate Method)

1.) After recording the tare weight, transfer the oil from the rotary evaporator to a griffin beaker equipped with a stir bar and place on a magnetic hot plate stirrer.
2.) Adjust stir bar speed based on viscosity to create a small concave pattern of product in the beaker.
3.) Heat oil to a probe temperature of 80˚C, making sure not let it foam over.
4.) After all bubbles have disappeared, continue decarboxylation at a probe temperature of 150˚C until the sweet terpene smell has dissipated.

(Reactor Method)

1.) Transfer the oil from the rotary evaporator to a jacketed glass reactor, not exceeding 80% of reactor capacity.
2.) Heat reactor to 150˚C and begin stirring oil under vacuum.
3.) Continue decarboxylation for 2 ½ hours, or until there is no visible condensate on the condenser.
4.) Discontinue stirring, release vacuum and transfer oil to an appropriate receiving vessel.

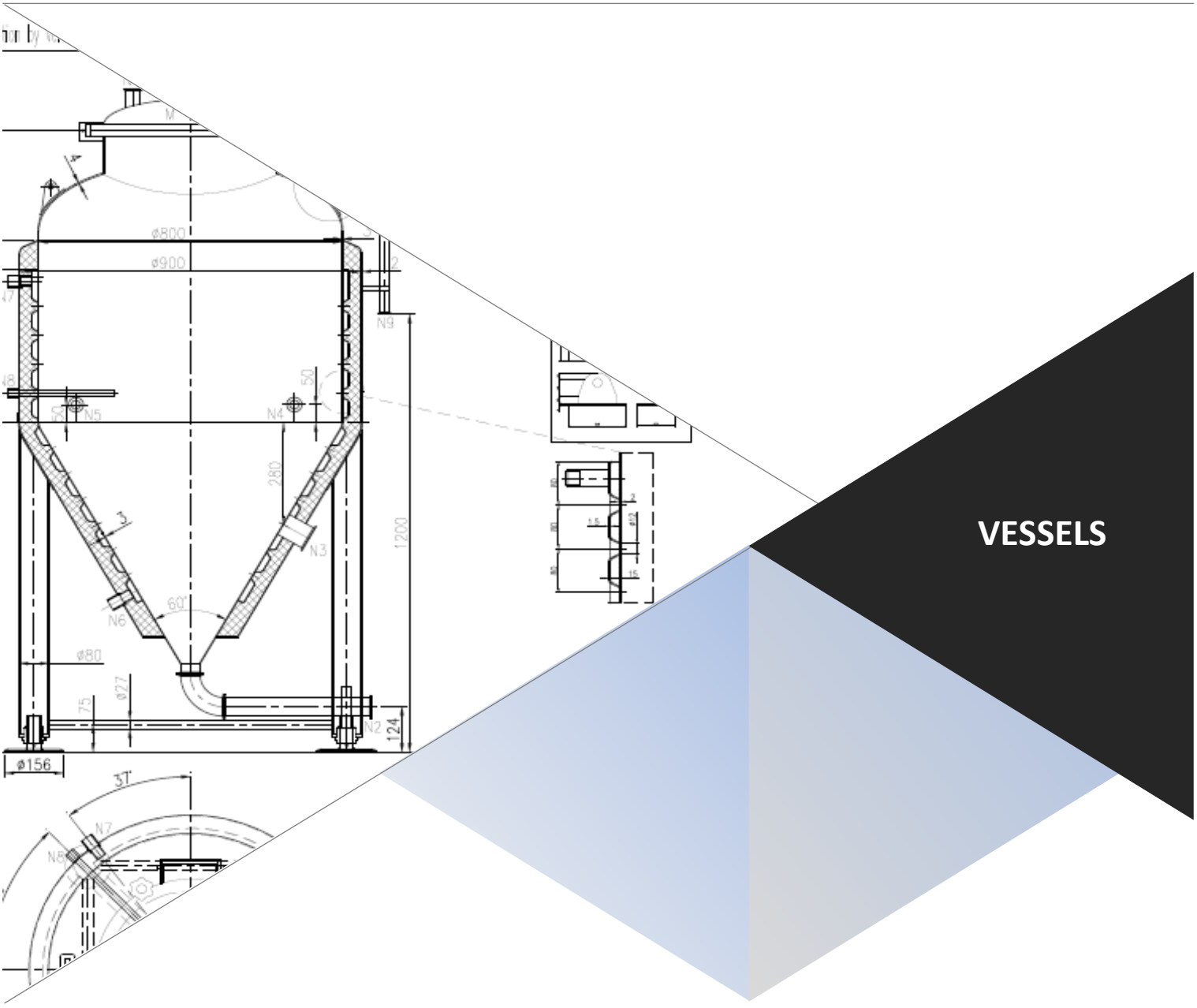
IMPORTANT:

- **Full winterization and decarboxylation of crude oil prior to distillation is critical to prevent off-gassing during distillation that will impede vacuum and significantly reduce throughput, product quality and potency.**
- **208V power must be boosted to 240V with a 2kVA Buck Boost Transformer**
- **If a licensed electrician, appropriate power supply or any of the required fluids or crude oil are not available at the time of installation and/or training, rescheduling based on technician availability will be required. Costs for rescheduling (U.S. locations only) are $1,500 per additional day plus travel expenses if extending the current trip or $5,000 plus travel expenses if a return trip is required.**

TECHNICAL DRAWINGS

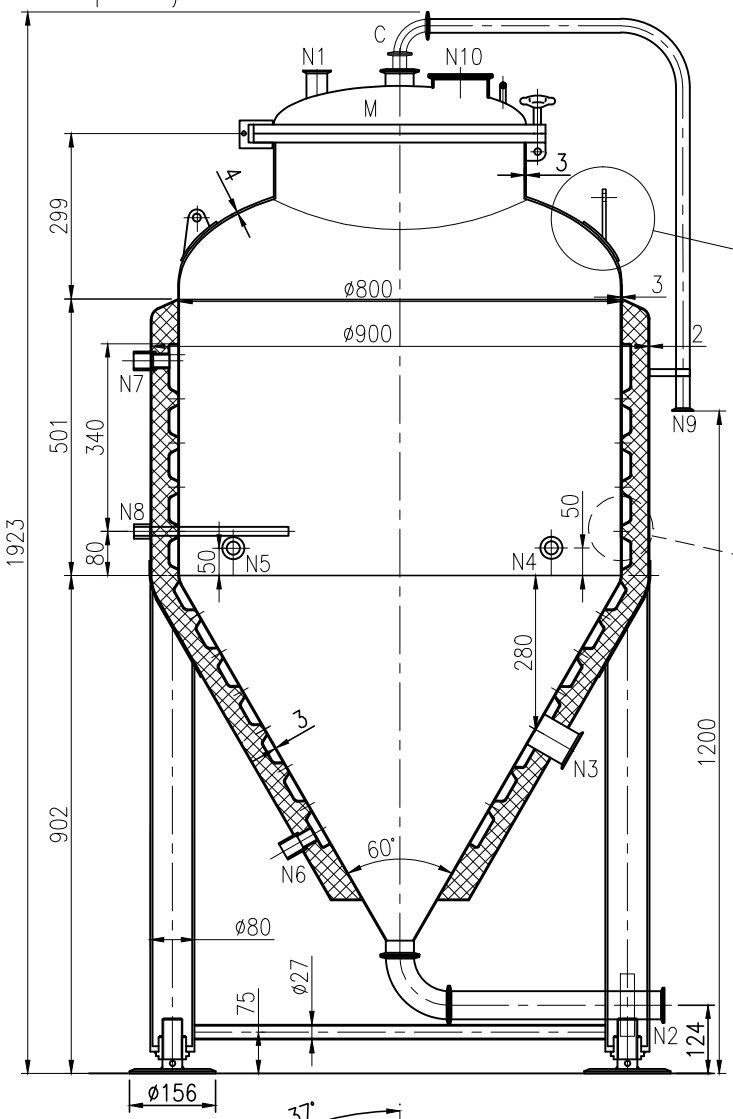
APPENDIX C

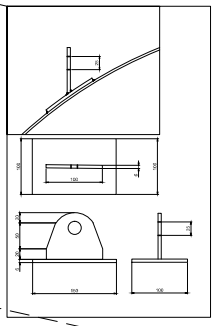
180026

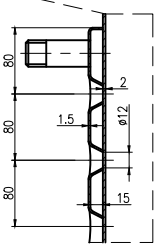


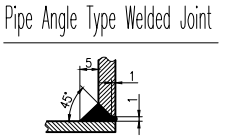
VESSELS

1.Nozzle position by vertical view.



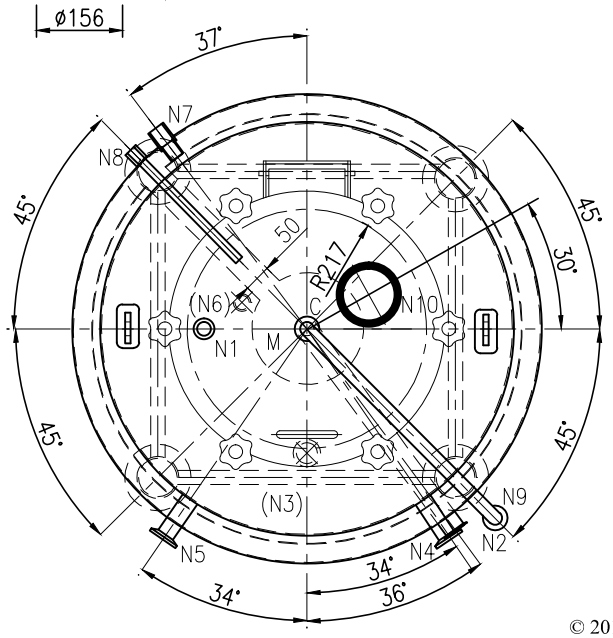






Technical Parameters

Tank Material	304
Insulation	Perlite
Total Volume	462.11L/122.08G
Working Volume 25%HS	369.69L/97.66G



Port Specifications

Sym.	Spec.	Style	Name
N1	1.5”	Tri-Clamp	PRV Port
N2	2.0”	Tri-Clamp	Drain
N3	2.5”	Tri-Clamp	Racking Arm
N4	1.5”	Tri-Clamp	Sample Valve
N5	1.0”	Tri-Clamp	Thermowell (A)
N6	1.0”	MNPT	Glycol Inlet
N7	1.0”	MNPT	Glycol Outet
N8	0.5”	FNPT	Thermowell (D)
N9	1.0”	Tri-Clamp	CIP Pipe
N10	4.0”	Tri-Clamp	Hops Port
C	2.0”	Tri-Clamp	Cleaning Port
M	ø18”/450mm	Round	Man Way

☐ APPROVED AS IS
☐ NOT APPROVED; SEE NOTES
☐ OTHER; SEE NOTES

Customer Copy

Be aware that by approving the drawing and authorizing Glacier Tanks to begin production, you take responsibility if there are any errors in the final job that were within this drawing. Our undertaking is to ensure the tank matches the signed off drawing. The signatory accepts responsibility for proofing all the designs accurately. Glacier Tanks cannot accept responsibility for corrections not implemented and/or requested at the design stage. Any modification requested after client approval of the tanks design may result in production delays and/or additional expenses for which client will be invoiced accordingly.

X_____ Date: _____

Glacier Tanks LLC (360) 953-8453

STEP	SIGN	DATE	3 Barrel Jacketed Fermenter
DESIGN	LAB	4-May-15	
DRAFT	NAH	4-Aug-16	
CHECK	AL	29-Dec-16	–
AUDIT			–

Glacier Tanks LLC Oregon Est. 2006

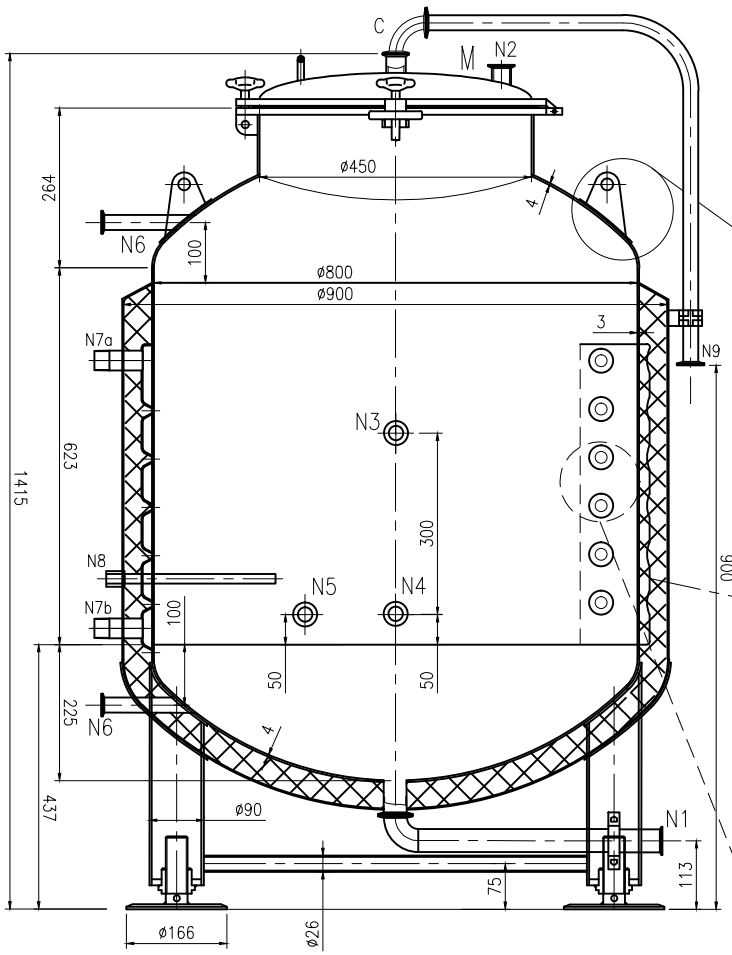
PO#2982

QUANTITY	–
MATERIAL	ss304

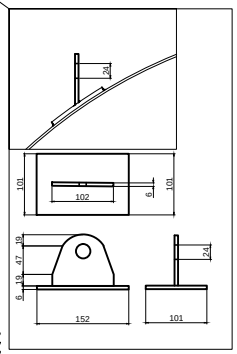
Technical Parameters

Tank Material	304
Insulation	Perlite
Total Volume	456.15L/120.50G
Working Volume 25%HS	364.92L/96.40G

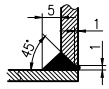
1.Nozzle position by vertical view.



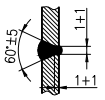
Picking Hook Detail

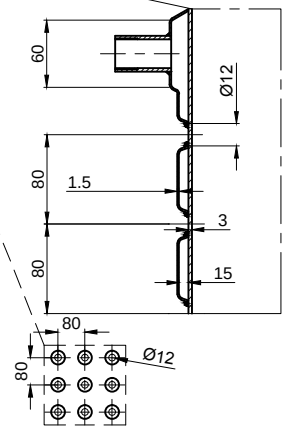


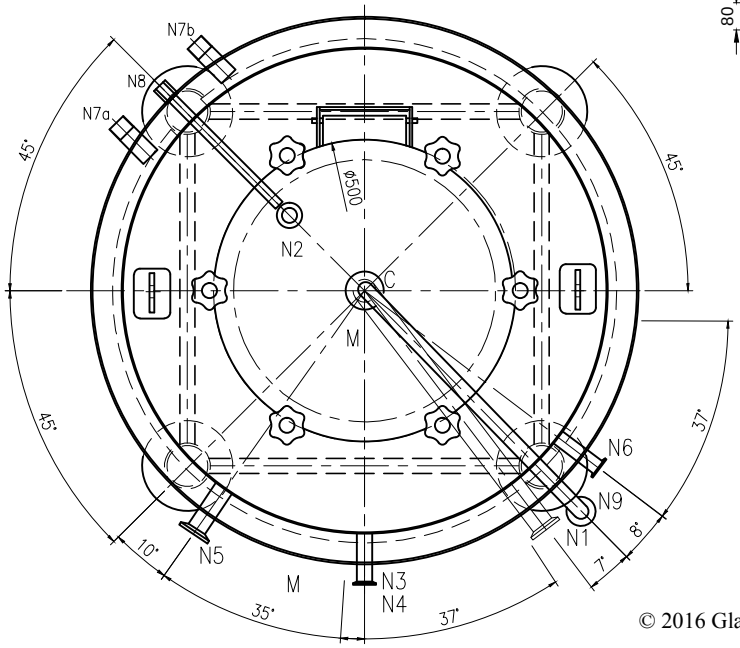
Pipe Angle Type Welded Joint



A.B Type Welded Joint







Port Specifications

Sym.	Spec.	Style	Name
N1	1.5"	Tri-Clamp	Drain
N2	1.5"	Tri-Clamp	PRV Port
N3	1.0"	Tri-Clamp	Thermowell (A)
N4	1.5"	Tri-Clamp	Sample Port
N5	1.5"	Tri-Clamp	Carb Stone
N6	1.0"	Tri-Clamp	Sight Level
N7	1.0"	MNPT	Glycol
N8	0.5"	FNPT	Thermowell (D)
N9	1.0"	Tri-Clamp	CIP Pipe
C	2.0"	Tri-Clamp	Cleaning Port
M	ø18"	Round	Man Way

☐ APPROVED AS IS
☐ NOT APPROVED; SEE NOTES
☐ OTHER; SEE NOTES

Customer Copy

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X_____ Date: _____

Glacier Tanks LLC (360) 953-8453

STEP	SIGN	DATE	3 Barrel Jacketed Bright Beer Tank
DESIGN	LAB	1-Apr-15	
DRAFT	NAH	15-Jun-16	
CHECK	AL	29-Dec-17	–
AUDIT			–

Glacier Tanks LLC Oregon Est. 2016

PO#2982

QUANTITY	–
MATERIAL	ss304

3P
CERTz