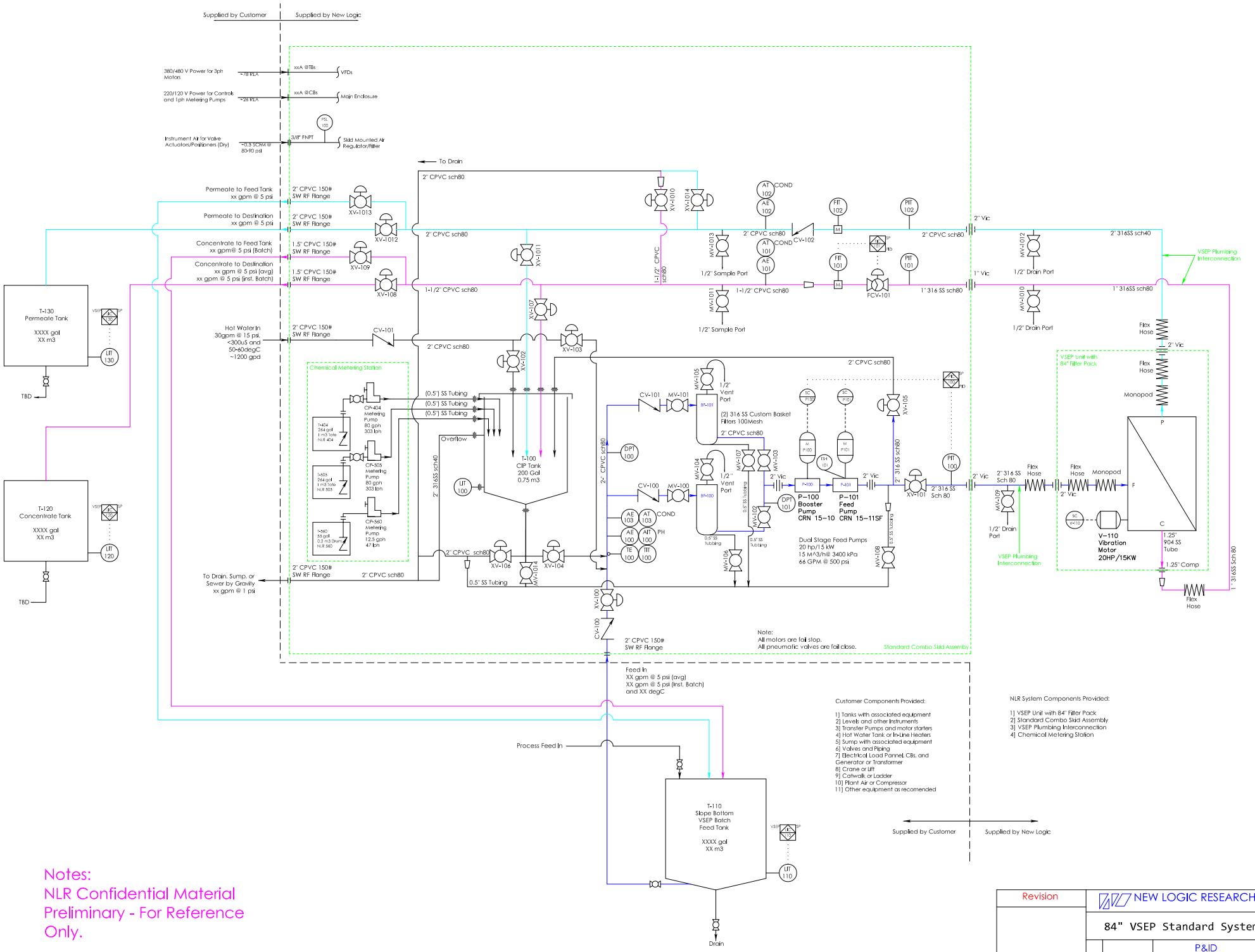
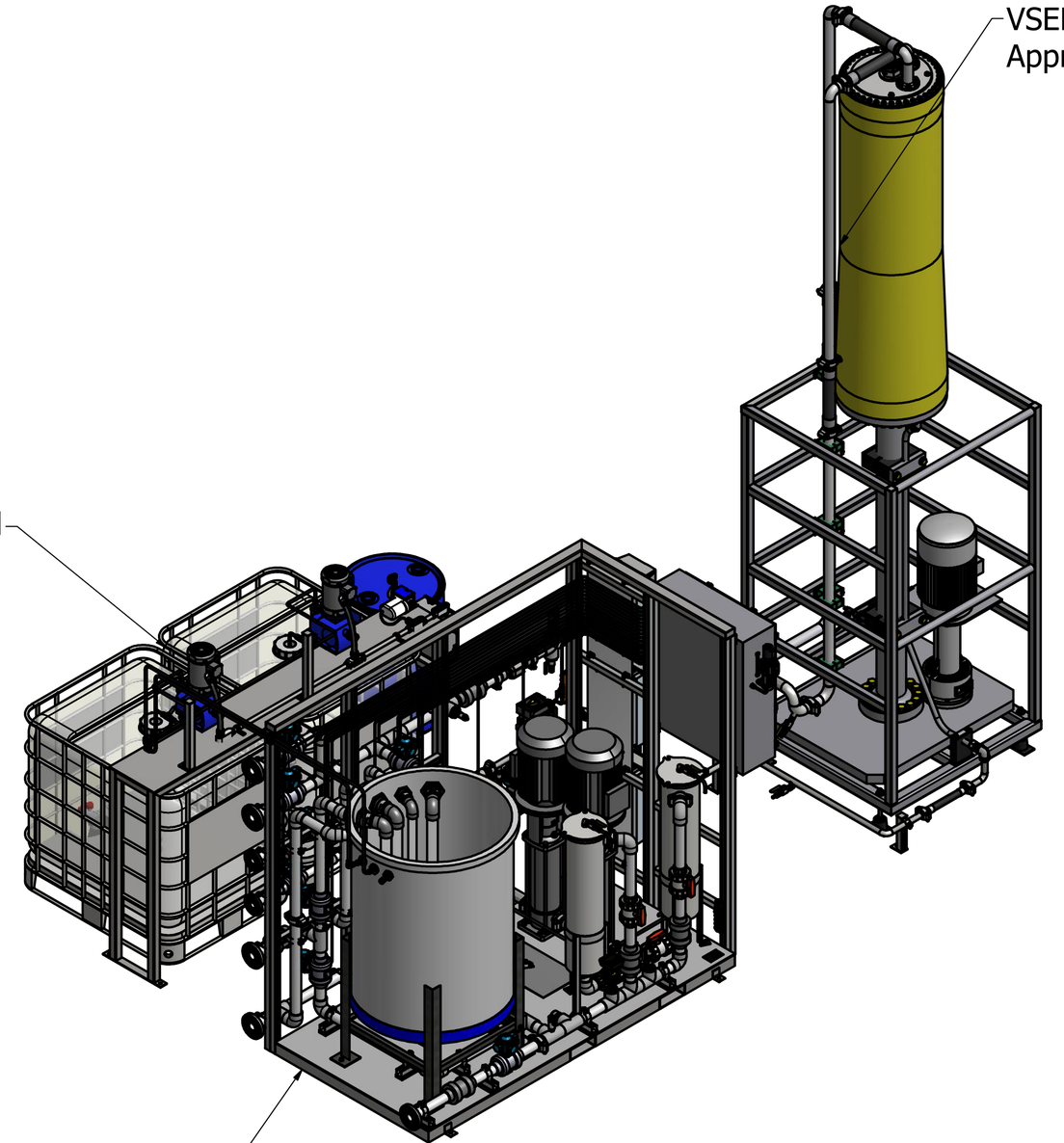


Notes:
NLR Confidential Material
Preliminary - For Reference Only.

Revision	NEW LOGIC RESEARCH
	84" VSEP Standard System
	P&ID
	August 2020 — A. DeSchutter

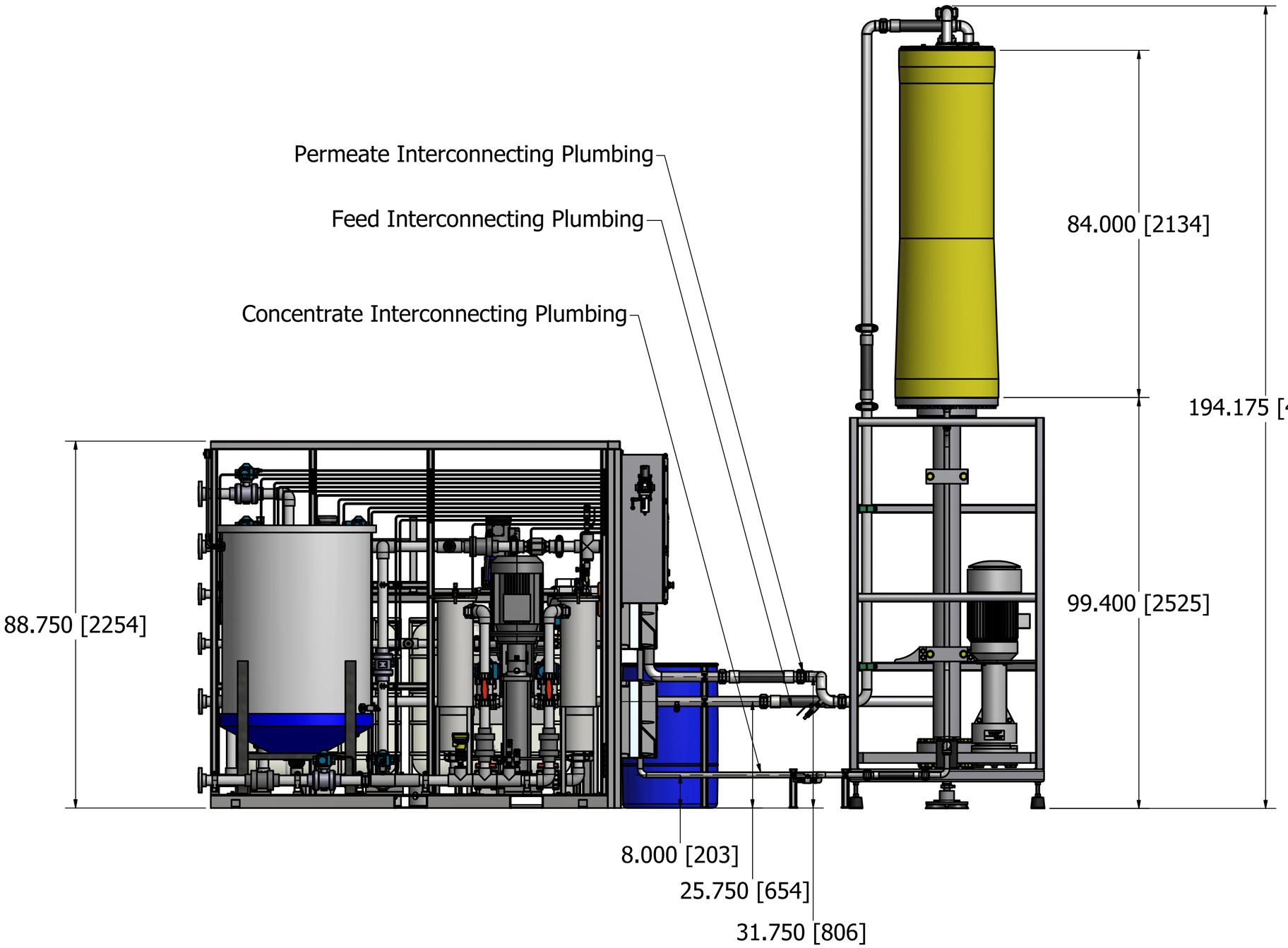
FRONT ISO VIEW



NOTES:
1. New Logic Research confidential material.
2. Slight differences between drawings and actual system may be attributed to New Logic Research Continuously evolving and improving its technology.
3. All dimensions are shown in inches [mm] and for reference only.

84" Standard System

FRONT VIEW



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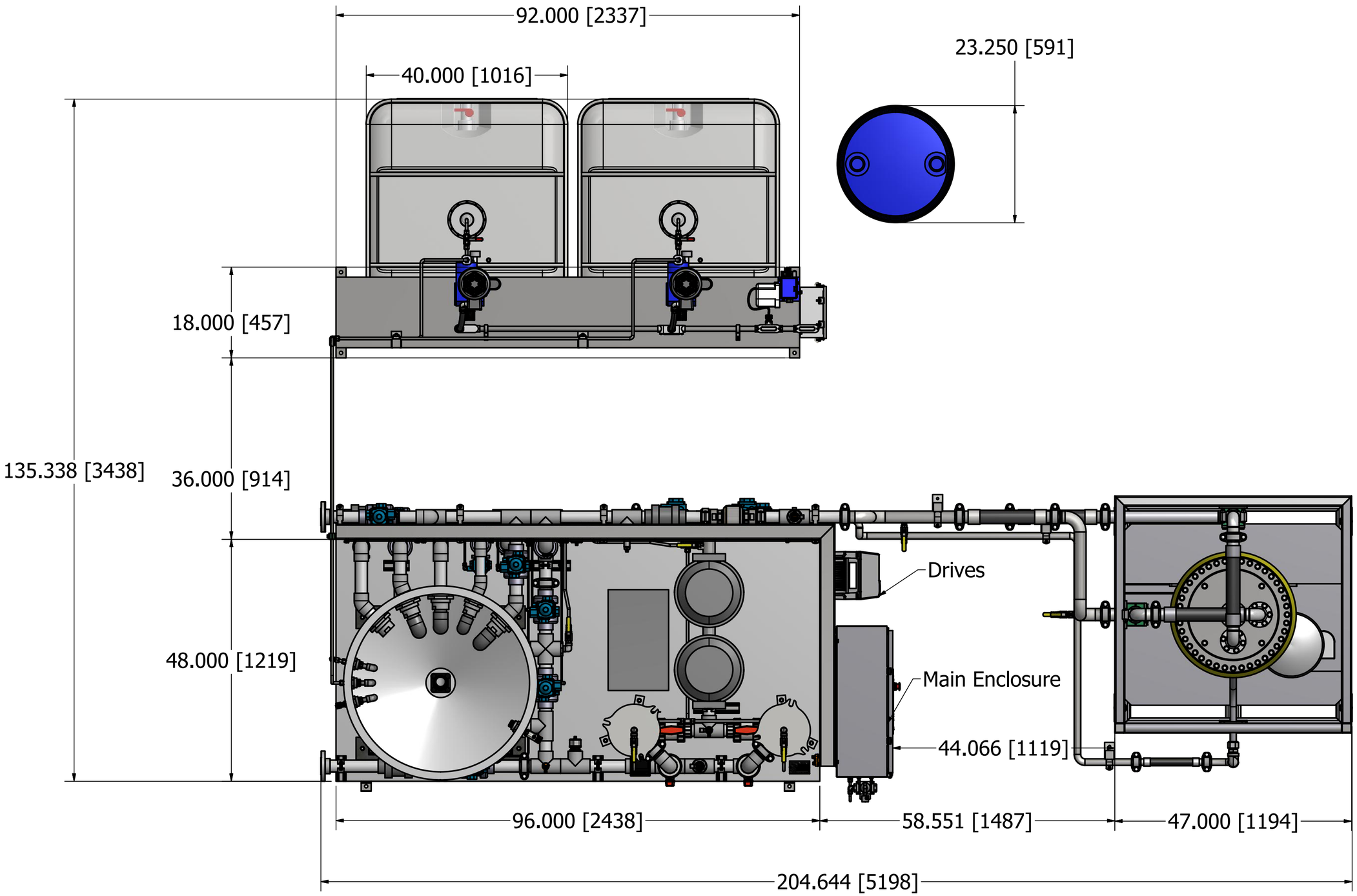
TOP VIEW



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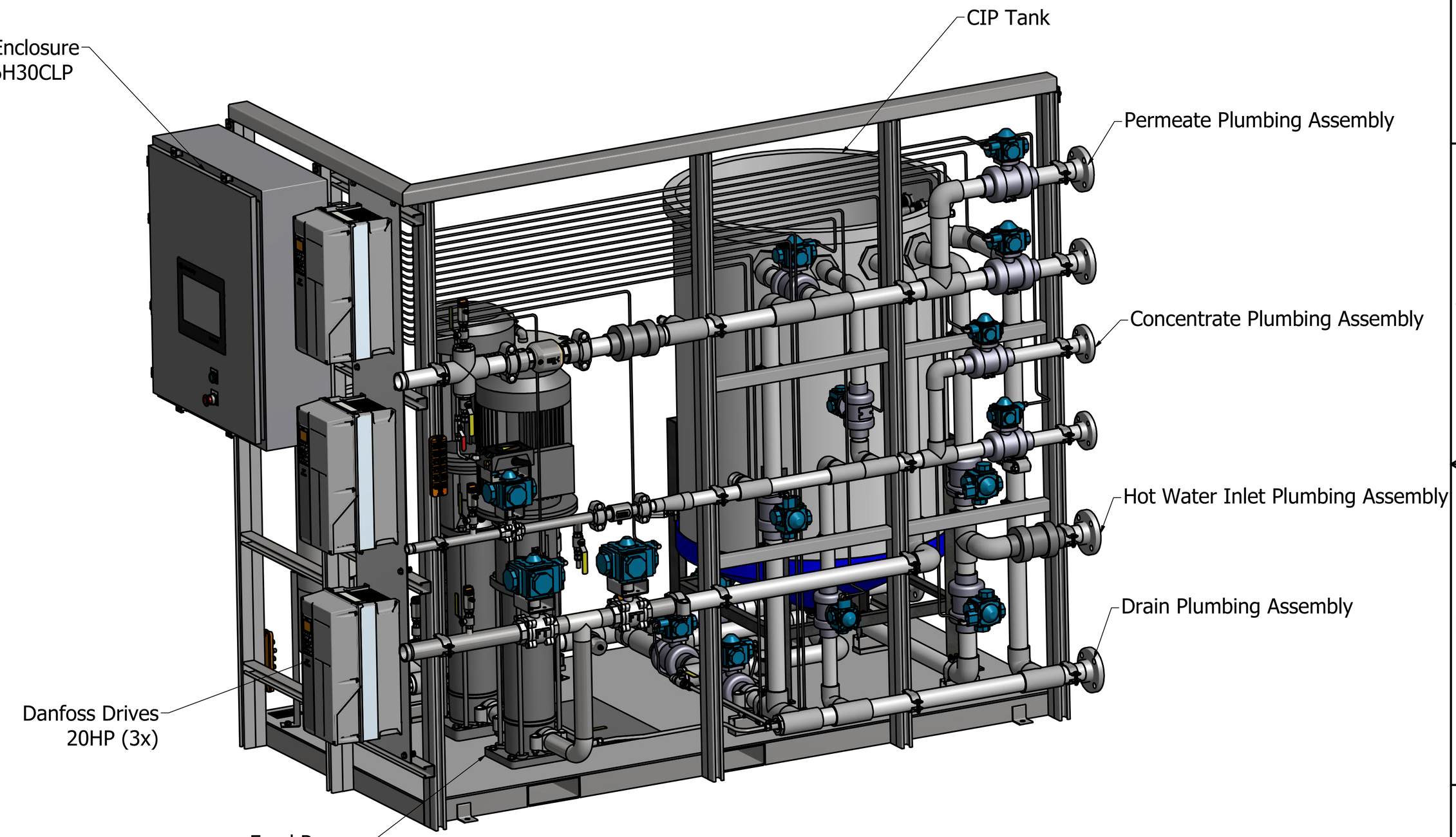
BACK ISO VIEW



Standard Combo Skid Assembly

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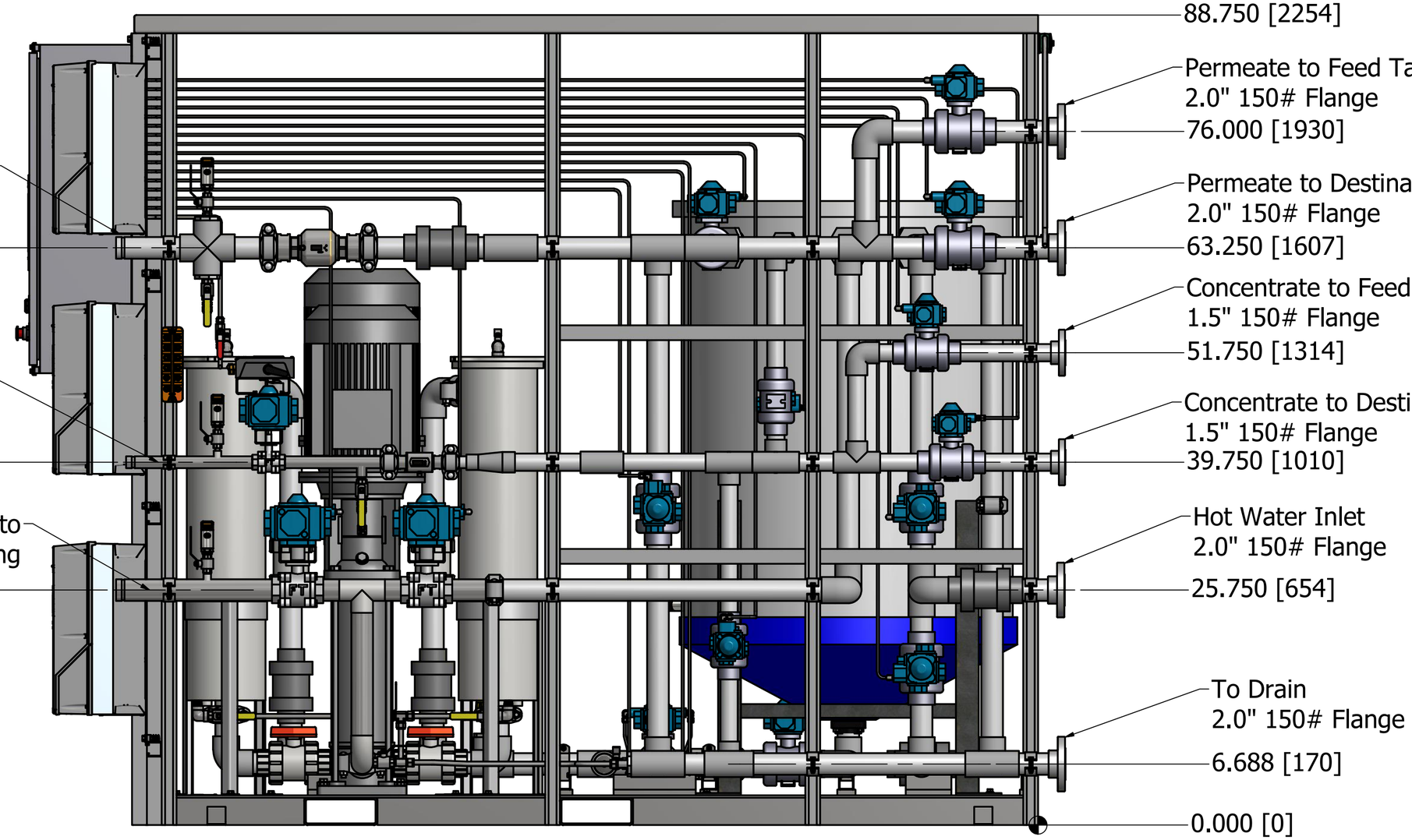
FRONT VIEW



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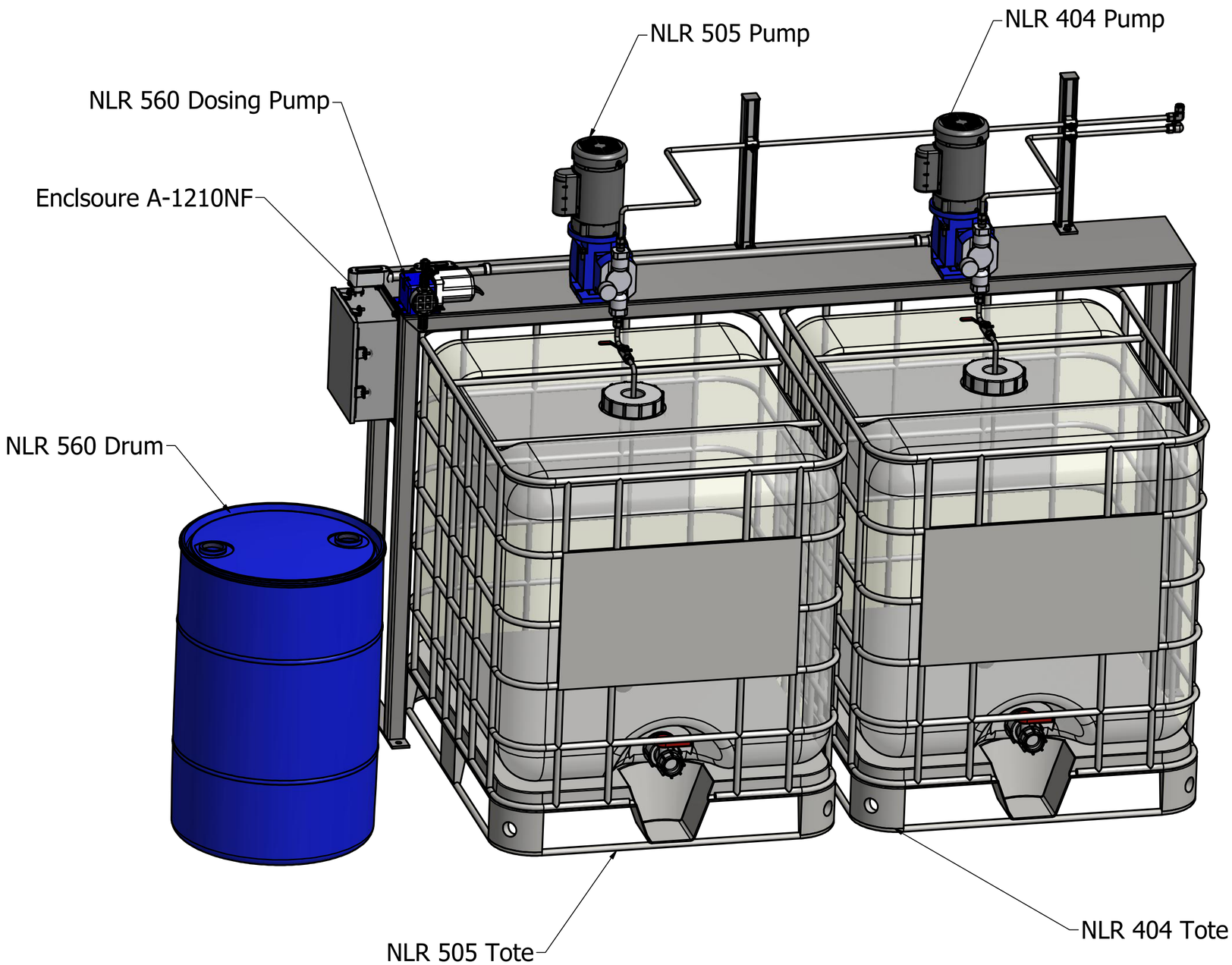
ISO FRONT VIEW



Standard Chemical Metering Station (Combo)

NOTES:
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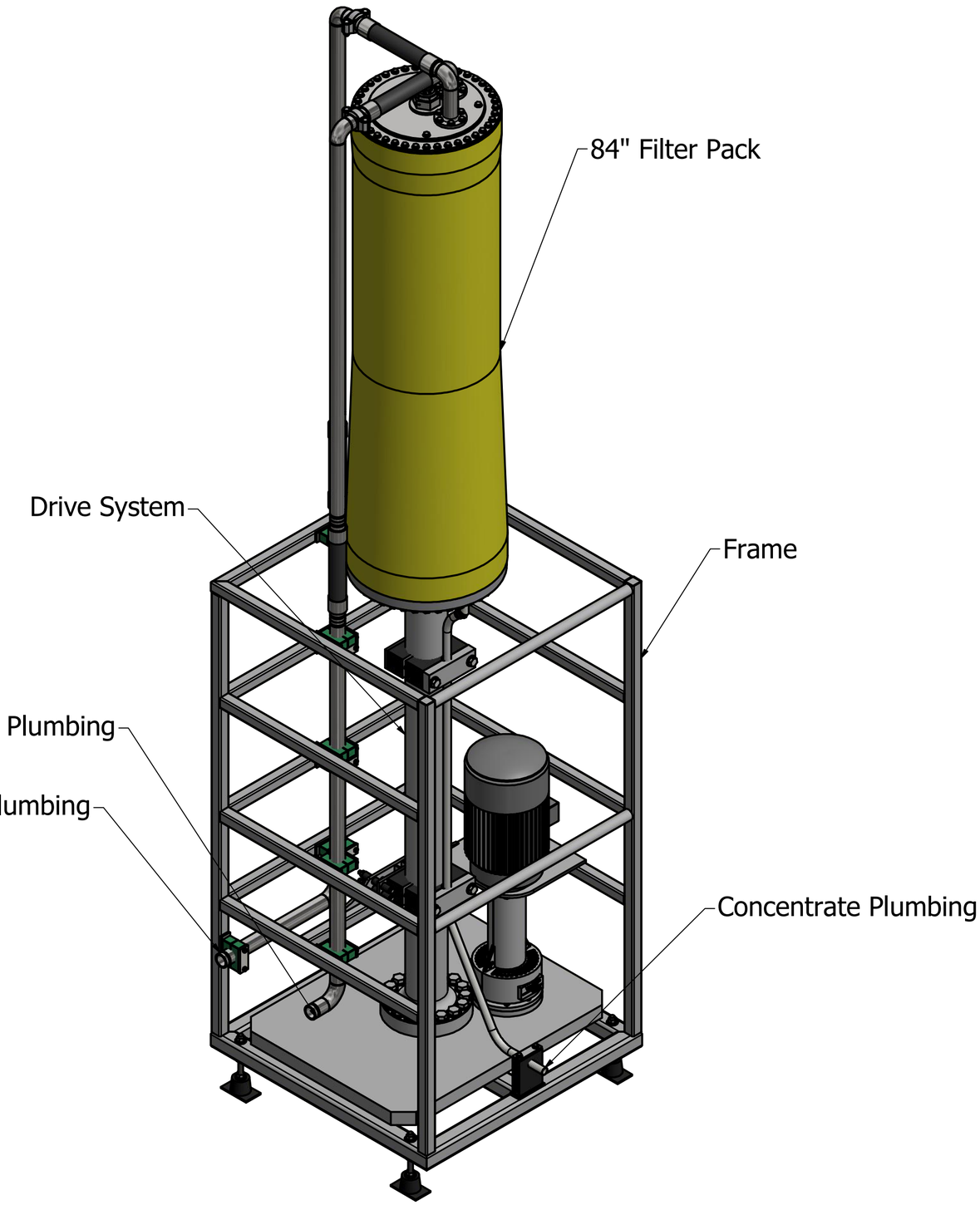
TOP VIEW



Standard 84" VSEP Unit

NOTES:
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3. All dimensions are shown in inches [mm] and for reference only.

V✧SEP SYSTEM COMPONENT SPECIFICATIONS

84” VSEP Standard System

1] Filter Pack:

Membrane:	MF, UF, NF, RO (depends on application and pilot testing)
Allowable Process Temperature:	5º-60ºC (some membranes have higher limits up to 120ºC)
Max Process Pressure:	550 psi (3,800 kPa)
Allowable Feed Slurry pH Range:	2-12 (some membranes have different limits 1-13)
O-ring and Seal Material:	EPDM (option for Viton)
Filter Pack Housing:	Glass impregnated epoxy resin (FRP)
Wetted Steel Trays:	304 Stainless Steel (option for 316)
Wetted Plastic End Plates:	Polypropylene

2] Vibration System:

Vibration Drive Motor:	Baldor 460VAC, 3phase, 20HP, 3525 RPM
Motor Speed Controller:	Danfoss 20HP 380-480VAC, NEMA 4 (or Equal)
Max. Vibration Amplitude:	3/4 inch (peak to peak measured at the Filter Pack)
Frequency Range:	43.0 Hz to 55.0 Hz (Approximate)
Maximum Decibels:	<85
Bearing RPM:	2800 to 3100
Bearing Oil:	Sullube ~750 ml Compressor Oil
Bearing O-rings:	2-263 & 2-270 Buna

3] Pump Specifications:

Feed Pump Type:	Grundfos 316SS Vertical Multi-stage Centrifugal
Feed Pump Motor:	Grundfos ML 3500 rpm TEFC 460VAC, 3phase
Motor Speed Controller:	Danfoss 380-480VAC, NEMA 4 (or Equal)
Chemical Metering Pump:	Bran+Luebbe Diaphragm pump with manual stroke adjust
Metering Pump Motor:	Baldor 3/4HP TEFC 120/220V, 1phase, 15A, 60/50Hz
Dosing Solenoid Pump:	Chemtech Series 100

4] Pre-Screen Basket Strainer:

Filter Housing Type:	NLR Custom Made 316 SS
Basket Strainer:	100 Mesh 316 SS (Optional Felt Bag Filters)
Capacity:	120 GPM, 4.6 sqft
Elastomers (Seals):	EPDM (option for Viton)

5] Operating Site Conditions:

Equipment Rating:	NEMA 4, Indoor/Outdoor protect from sunlight & rain.
Ambient Temperature:	5º - 37°C
Storage Temperature:	2º - 70°C (Protect Filter Pack from Freezing)
Max Relative Humidity:	<95%, non-condensing
Elevation:	3300 ft maximum without derating VFD/Motor

V✧SEP SYSTEM COMPONENT SPECIFICATIONS (continued)

6] Piping:

High Pressure Piping:	Schedule 80 316 SS
Low Pressure Piping:	Schedule 80 CPVC
Special VSEP Concentrate Pipe:	1-1/4” OD 904L Stainless Steel Tubing .065 wall
Flexible Hoses:	SBR/NBR Lined Reinforced Flex Hose
Pipe Clamps:	Zero-Flex Victaulic Style 07 EPDM
Pneumatic Air Supply:	90lb Instrument Grade Air (3/8" connection)
Tubing Fittings:	Hylok 316 SS
Clean in Place Tank:	200 Gallon Sloped Cross Linked Polypropylene (36” ø x 54”)
On/Off Valves:	316 SS and CPVC 3-piece ball valve
Manual Valves:	CPVC 3-piece ball valve
Flow Control Valves:	316 SS V-port ball valve
Check Valves:	CPVC Ball check valve
Pneumatic Actuators:	Compact 4, Spring Return
Positioners:	BLX Linear Quarter Turn I/P
Skid Pipe Terminations:	150 lb CPVC Raised Face Flange
Flange Gaskets:	150 lb Garlock Blue Guard

4] Electrical:

Controls Voltage:	120/220VAC, 1phase, 15A, 50/60Hz
Enclosures:	Hoffman NEMA 4 Powdercoat Finish 48x30x10, 24x30x8
Switches, Relays, & Contactors:	Allen Bradley 120/220 Volt
Remote Access:	Ewon Cosy 131
Programmable Controller:	AB CompactLogix 1769
Operator Display:	AB Versa View 5400
IO Link Masters and Hubs:	IFM Efector AL1122
Pressure Sensors:	IFM Efector PN-2292
Mag Flow Tube and Transmitter:	IFM Efector SM2000, SM8000
Bag Filter DP Sensors:	IFM Efector PN-2294
Temperature Sensor:	IFM Efector TN-2511, UT0028
Level Sensors:	IFM Efector PN-2298
Conductivity Meters:	IFM Efector LDL-100, LDL-210
pH Meter:	GF Signet 3-2726-00, 3-2751-1, 3-9900-1
Solenoid Valves:	Festo Manifold Gang Mounted Dual 3/2 24 VDC, IO Link

Utility Summary						New Logic Research
VSEP System						
AIR COMPRESSOR SIZING INFORMATION						
	# of Valves		In^3 Air/stroke	Strokes/day	CFM	M3/hr
VSEP						
1.5" Pneumatic Valves	4		35	20	0.0011	0.0019
2" Pneumatic Valves	11		60	20	0.0053	0.009
1" Flow Control Valves	1		35	20	0.5003	0.8505
System Air Totals				**System Totals**	**0.51**	**0.8614**
Supply instument grade dry air at 80-90 psi (560-630kPa)						
Supply air to enclosure mounted regulator/filter 3/8" NPT connection						
Totals do not include air for tools or other sources.						
HOT WATER SIZING INFORMATION						
	# /Day		Temp degC	Gallons/Day	GPM	M3/hr
VSEP						
Cleanings	1		50-60	1000	0.69	0.1576
Rinse filter pack at 60gpm for 5mins	1		50-60	150	0.10	0.0236
Intermittent need of additional cleaning or flush of filter pack	0.14		50-60	21	0.01	0.0033
System Water Totals				**System Totals**	**0.81**	**0.1846**
Supply chlorine free water at >300 uS/cm						
Supply water at 50-60degC and 30gpm (6.8m3/hr)						
Supply water at 15 psi to 2" Hot Water flange connection on Combo Skid						
ELECTRICAL LOAD PANEL SIZING INFORMATION						
Circuit Breaker Sizing 1.25-2x Nameplate Current						
3-Phase Power Voltage VAC	400-460	50/60 Hz				
1-Phase Power Voltage VAC	220-120	50/60 Hz				
	# Motors	Rated Motor HP	Nameplate Current	Nameplate Current	Recommended CB Sizing	
			400V	460V		
VSEP Drive Motor	1	20	26.3	24.0	40	
VSEP Feed Pump	1	20	26.3	24.0	40	
VSEP Feed Pump Booster	1	20	26.3	24.0	40	
Totals	**3**					
Supply 3-Phase power from customer supplied load panel (with circuit breakers, disconnects, line filters, etc.) to the inlet of each VFD provided by New Logic.						
	# Connections	Rated Motor	Nameplate	Nameplate	Recommended	
			220V	120V		
Main Control Enclosures	1	NA	10	8.0	20	
Metering Pumps	3	0.75	9.2	4.6	15	
Supply 1-phase power from customer supplied load panel (with circuit breakers, ups, etc.) to New Logic provided circuit breakers inside the Main VSEP control enclosure (PLC/HMI/24VDC Power Supply).						
Supply 1-phase power from customer supplied load panel (with circuit breakers) to New Logic provided circuit breakers inside the Main VSEP control enclosure (Contactors). Only one circuit breaker is required for all three metering pumps as only one will run at a time.						
Note: These are estimates only based on very preliminary data. These calculations are subject to change and do not include equipment offskid of VSEP system (ie: Transfer Pumps, Generators, Heaters, Lighting, Cranes, etc). For power consumption estimates refer to the operating cost spreadsheet.						