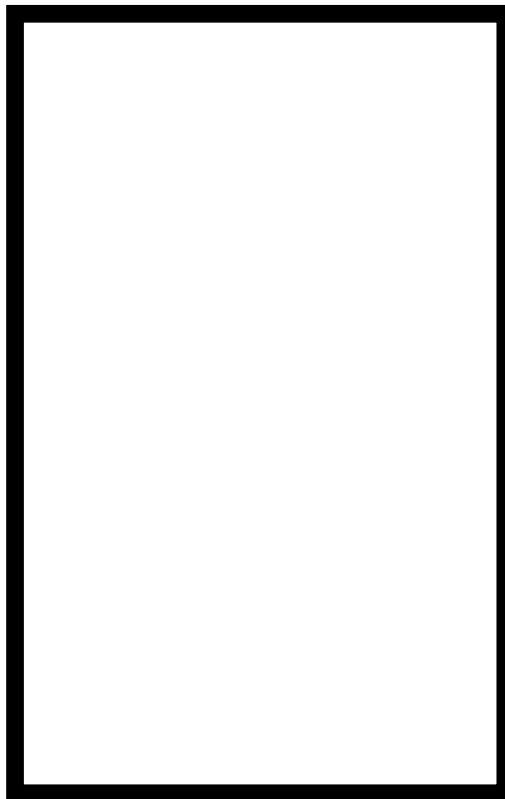


30 Barrel Brewing System

3 Vessel Brewhouse Configuration

(Mash/Lauter Tun, Brewkettle and Whirlpool)



30 Barrel Mash / Lauter Tun

This vessel is constructed from 304 stainless steel. The lauter tun, has an inside diameter of 106", and yields the following bed depths (based on density of wet grain)

12P beer = 11.2"

16P beer = 15.2"

20P beer = 19.3"

The vessel will be insulated and clad in #4 stainless steel on the sidewall. The top cone is unclad and finished in #4 stainless steel.

Specifications:

- Dimensions :
 - 106" inside diameter, 109" outside diameter
 - 42" straight sidewall
- Volume :
 - 1604 US gallons to top of straight sidewall
- Material ;
 - 11 gage top
 - 11 gage shell
 - 10 gage bottom
- Top "glass" manway framed in stainless steel
- Boil over ring around circumference of vessel
- 6" TC mash in port located on head, designed to mate to Steele's Masher (TBD)
- Internal vessel light – flush mounted
- Flat tank bottom
- Six 1.5" wort outlets feeding common 2" runoff line
- 0.75 mm (0.0295 inch) V-wire style multi piece false bottom, designed for easy removal (Pie shaped)
- Under screen flush assembly
- Lauter rakes and spent grain discharge assembly constructed from stainless steel. Variable speed gear drive and motor to be mounted below vessel with sealed bearings and seals. Internal system consists of two arms with knives designed for efficient lautering, spent grain plow to remove spent grains in Lauter Tun. System is variable height via water piston mounted either under or above vessel.
- 12" diameter bottom discharge for spent grain removal
- Internal CIP assembly with rotating sprayers
- Sparge spray ring designed for full grain bed coverage
- Recirculation no-foam inlet with 1.5" fitting
- Future mash inlet port positioned low on straight sidewall to prevent excess air pick-up
- Vacuum indicator (manometer) sight glass with stainless steel guard, fittings, and calibration strip; allows brewer to regulate run-off and helps prevent collapse of grain bed
- Four stainless steel pipe legs with adjustable feet and cross bracing
- Thermowell
- All internal vessel welds are ground smooth to 180 grit finish
- 1.5" Enerwrap insulation on vessel side

Lauter Tun Spent Grain Evacuation

- Manual knife / butterfly valve allowing for future automation via double acting pneumatic actuator.
- (12" diameter outlet with stainless steel boot from the screen height down to the spent grain manway)

30 Barrel Brew Kettle

This vessel is constructed from 304 stainless steel and will contain plumbing provisions for the future addition of an external collandria. Vessel design includes 3 steam jackets for heating via low pressure steam. The total steam jacket area is 96 ft². The vessel will be able to heat wort at 1 degree C/minute and achieve an evaporation rate of 7.5% per hour. The Brewkettle will be insulated and clad in #4 stainless steel on both the side wall and bottom to prevent steam heat loss.

Specifications:

- Dimensions:
 - 75" inside diameter, 78" outside diameter
 - 72" straight sidewall
- Volume :
 - 30 barrels net capacity
 - 1,396 USgallons to top of straight sidewall
- Material :
 - 14 gage cladding # 4 finish
 - 12 gage top
 - 12 gage shell
 - 10 gage bottom
- Top "glass" manway framed in stainless steel
- Boil over ring around circumference of vessel
- Internal vessel light – flush mounted
- 12" diameter steam flue with internal drip ring includes condensate downtube affixed to brewkettle side isolation valve on downtube to prevent loss of CIP
- 1.5" wort inlet located low on side wall
- Internal CIP sprayball
- Overboil protection sensor available
- Thermowell
- 3 low pressure (15 psig) dimple plate steam jackets; 1 located on bottom and 2 on side
- 3" deep bottom cone
- 2" wort outlet
- Sight glass with stainless steel guard, fittings, and calibration strip
- 1.5" Enerwrap insulation on vessel side and bottom
- clad in #4 stainless steel on side and bottom
- Four stainless steel pipe legs with cross bracing and adjustable feet
- All internal vessel welds are ground smooth to 180 grit finish

Vent Stack

- For brewkettle stack (with optional CIP capability)
- 12" diameter
- 16 ga. stainless steel construction

30 Barrel Whirlpool Vessel

This vessel is constructed using 304 stainless steel with a #4 finish. The flat sloping bottom shall have a 2% slope. There will be an additional wort draw-off point located approximately 12" up the straight side to facilitate quicker draw-off times.

Specifications:

- Dimensions:
 - 72" diameter
 - 66" straight sidewall
 - 56" fill height
- Volume ;
 - 30 barrels net capacity
 - 1180 USgallons to top of straight sidewall
- Material ;
 - 12 gage top
 - 12 gage shell
 - 12 gage bottom
- Top "glass" manway framed in stainless steel
- Four stainless steel pipe legs with adjustable feet and cross bracing
- 1.5" tangential whirlpool inlet
- Internal CIP sprayball
- Flat sloping bottom to 2" trub / wort outlet with valve
- Removable trub dam located on pins
- Additional 2" wort outlet with valve located approximately 12" up straight sidewall
- Site tube
- All internal vessel welds are ground smooth to 180 grit finish

$$992 \text{ usl} = 132.6 \text{ ft}^3$$

$$1 \text{ ft}^3 = 7.48 \text{ usl}$$

$$V = \pi r^2 h$$

$$h = \frac{V}{\pi r^2}$$

1.29 : 1	6 = 28.26	4.69' = 56"
3 : 1	8 = 50.24	2.63' = 32"
2 : 1	7 = 38.47	3.44' = 41"

90 Barrel Hot Liquor Vessel

This vessel is designed to recover all water from the heat exchanger (at 170F) and at the same time provide the hot liquor required for two concurrent brews at different stages.

This vessel utilizes an external flat plate heat exchanger vs. steam jackets. The heat exchanger is capable of heating 1 degree C/minute. Vessel design includes provisions for re-circulation to prevent stratification. The vessel is fabricated from #304 stainless steel with a #4 finish.

Specifications:

- Dimensions:
 - 75" inside diameter, 78" outside diameter
 - 144" straight sidewall
 - Overall height 14' 9"
- Volume ;
 - 2829 USgallons total capacity
- Material ;
 - 12 gage top
 - 10 gage shell
 - 10 gage bottom
- Side mounted manway
- 12" deep bottom cone
- 4" top vent; 180 degree return elbow located in top head
- Overflow prevention tube with fitting to route to drain
- Thermowell
- Analog thermometer on 1.5" TC fitting
- 1 ½" recovery inlet from wort cooler
- 1.5" hot liquor outlet
- Internal CIP sprayball
- Sight hose with calibration markings
- Four stainless steel pipe legs with adjustable feet
- 1.5" Enerwrap insulation on vessel side
- Clad in #4 stainless steel (14 gage)
- all interior welds ground smooth

90 Barrel Cold Liquor Vessel

The capacity of this vessel allows for continuous brewing with heat exchanger wort cooling every 4 hours. Through auto level control, the vessel is kept filled; city water enters the vessel as liquor and is pulled off for the heat exchanger.

The complete vessel is fabricated from #304 stainless steel.

Specifications:

- Dimensions:
 - 75" inside diameter, 78" outside diameter
 - 144" straight sidewall
 - Overall height: 14' 9"
- Volume ;
 - 2829 USgallons total capacity
- Material ;
 - 12 gage top
 - 12 gage shell
 - 12 gage bottom
- Side mounted manway
- 12" deep bottom cone
- Overflow prevention tube with fitting to route to drain
- Thermowell
- Analog thermometer on 1.5" TC fitting
- Optional Auto Level Control with inlet water solenoid valve
- 1" Water inlet fitting
- 1.5" outlet with valve
- Internal CIP system with sprayball
- Sight hose with calibration markings
- Four stainless steel pipe legs with adjustable feet
- 1.5" Enerwrap insulation on vessel side
- Clad in #4 stainless steel (14 gage)
- all interior welds ground smooth

Pump Schedule

- Lauter tun Wort transfer pump;
Waukesha C216 stainless centrifugal pump with ³~~4.5~~ Hp. motor and variable frequency drive (VFD)
- Brewkettle Pump;
Waukesha C216 stainless centrifugal pump with 3 Hp. motor and VFD
- Whirlpool pump;
Waukesha C216 stainless centrifugal pump with 3 Hp. motor and VFD
- Portable CIP/Beer Transfer pump;
Waukesha C216 stainless centrifugal pump with 7.5 Hp. washdown motor and VFD
- Hot Liquor pump;
Goulds NPE stainless centrifugal pump with ³~~4.5~~ Hp. motor
- Cold Liquor pump;
Goulds NPE stainless centrifugal pump with ³~~4.5~~ Hp. motor

Brewers' Platform

- Stainless steel construction
- Non-skid stainless steel grating for stairs and decking
- Hand rails
- Platform design will incorporate access to 3 vessel brewhouse with provisions for adding a 4th brewhouse vessel when appropriate.
- Overall height will allow full access to brewhouse plumbing from underneath platform.

Heat Exchanger Wort Cooling

An all stainless steel single stage Thermaline heat exchanger will provide the wort cooling requirements.

Specifications:

- Thermaline Model T13CH-AL with 81 plates
- Designed to cool 30bbbls of wort from 212 deg. F to 55 deg. F in 50 minutes
- Designed to use cold liquor as cooling medium, C/L enters at 38 deg. F and exits at 168 deg. F
- Cold liquor flow rate = 22 GPM
- Total cold liquor volume = 1,100 US gallons
- Stainless steel construction with sanitary fittings
- Multi-pass

Hot Wort Grant

- side mounted on lauter tun @ screen height
- 6" TC end (with clamp and gasket) with 6" clear lexan cap
- 1.5" inlet with interior
- 1.5" outlet ; plumb to pump inlet
- 1" vent tube
- CIP sprayball w/ 1.5" end fitting with clamp, gasket and cap
- sample valve
- 1.5" bypass butterfly valve

Steele's Pre-Masher (TBD)

Allows for controlled metering of malt into Mash/Lauter Tun

- Stainless steel construction
- 6" internal auger
- 6" TC inlet and outlet
- 1" water inlet
- Variable speed motor

Brewhouse Plumbing

- Includes all interconnecting stainless tubing lines, fittings and valves
- For re-assembly on site
- Plumbing diagram details to be provided for customer approval prior to system fabrication

Fermentation / Cellar Equipment

60 Barrel Unitank / Fermenters (Qty: 8) (Manufactured in China)

These vessels are fully constructed from #304 stainless steel. Fermenters to be designed with 25% -30% head space for fermentation. Vessel designed for 15 psig operating pressure.

Common Specifications:

- Cylindroconical vessel
- 60 degree included angle bottom cone
- 6" TC port for dry hopping
- Side manway
- Thermowell
- Analog thermometer on 1.5" TC fitting
- Internal CIP assembly with removable top fitting and downtube
- Removable CIP spool piece with pressure gauge and port for CO2 inlet
- Pressure relief downtube with 2" pressure relief/vacuum break
- Sample valve on 1.5" TC fitting
- 1.5" outlet on bottom cone with butterfly valve for yeast cropping
- Side racking assembly; internal rotating arm, 1.5" butterfly valve
- Four stainless steel pipe legs with adjustable feet
- Lifting lugs located on top of vessel

Glycol Jackets:

2 dimple plate glycol cooling jackets (rated @ 15 psig) located on side and one on bottom cone, top of each side jacket to be located at 30 and 60 bbl. fill heights.

Dimensions:

To be confirmed

Zahm & Nagel Carbonating Stone (3)

- Zahm & Nagel stone with SMS fixture with 2.5" TC fitting to mate to vessel with 1/4" NPT (half nipple) gas connection
- integral back flow preventer

Glycol Chilling System

The glycol system is designed for remote mounting on the condensing units. Designed with 120 deg. F ambient temperature and cooling the glycol to 28 deg. F (with a 20 deg. F suction temp.).

Specifications:

- 2 x 12 HP condensing units (24HP) (185,668 BTU's/hr.)
- Packaged chiller supplied by Pro Refrigeration
- 2HP process pump
- Includes 200 US Gallon stainless steel glycol reservoir
- Dimensions: 119" x 51" x 77"
- Electrical information: MCA = 208-230V/3PH/60HZ (143amps)
- Supply and return connections are 2"
- Ship weight: 2,700lbs