



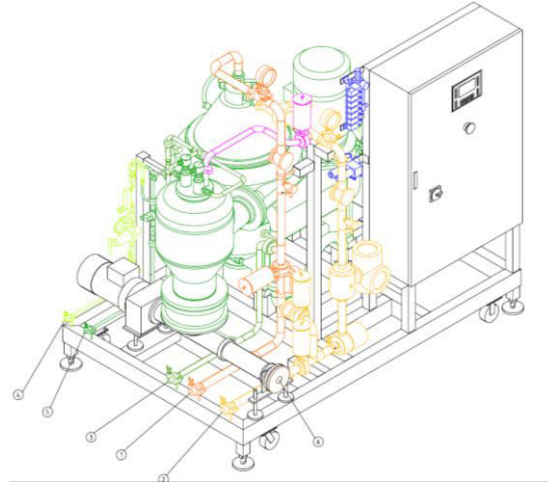
The Implementation of a **Centrifuge** into a Craft Brewing Operation

Jamie Scrimgeour

Predicted **Benefits**

- Increased Yields
- Shorter Run times
- Removes the Need for Traditional Fining Agents
- Decrease in Tank Residency
- No Ongoing Costs of Filter Media
- Better Flavour Retention

Machine Specifications



Capacity

Beer clarification	up to 180 hl/h
Tank bottoms recovery	6 hl/h
Wort clarification	100 hl/h
Dimensions (H/W/D)	1950 mm x 1400 mm x 2450 mm
Motor	30 kW

Considerations Made During **Commissoning**

- Yeast counts post centrifuge
- Residual sugar content of beer
- Haze level
- Market Stability
- Dissolved Oxygen Pick Up
- Consumer Perception

Test Results

Test	Centrifuge Only	Filtered Beer
Yeast Count	~1 million cells/mL	>1 million cells/mL
Haze level	3.55 EBC, 12.2 EBC	4.76 EBC
Forced Haze	21.7 EBC, 24.1 EBC	30.8 EBC
6 month Haze	23.4 EBC	22.6 EBC
DO Pick Up	0.060 ppm*	0.020 ppm

*Later reduced to 0.030 ppm after changes were made to the centrifuging process

Process Adjustments

- ▶ Back pressure & turbidity
- ▶ Buffer tank
- ▶ Dosing in-line with Polyclar
- ▶ DO pickup



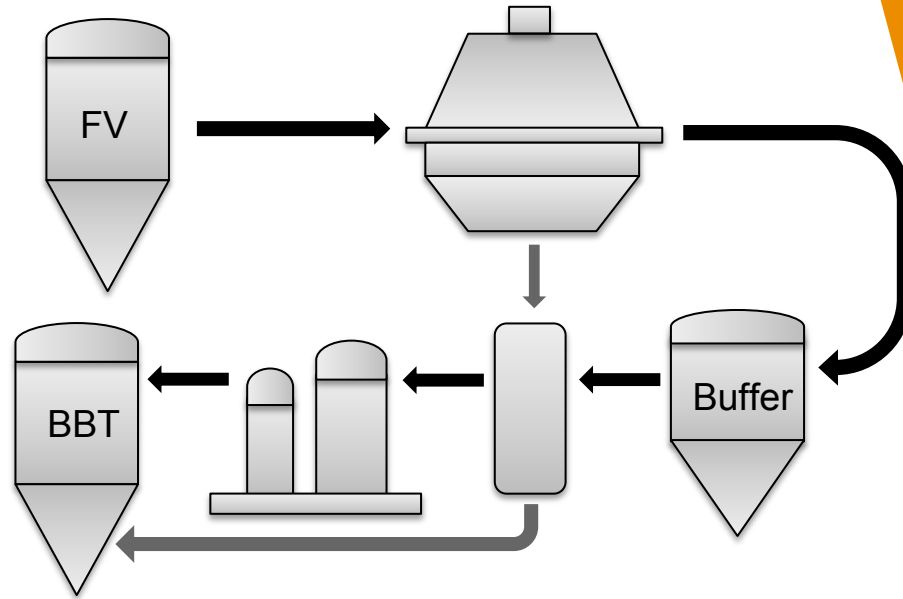
Back Pressure and Turbidity

- ▶ Centrifuge can be set automatically ramp up throughput speed
- ▶ As the speed increases the centrifuge automatically adjusts the back pressure
- ▶ If the turbidity levels rise too high the centrifuge reduces flow and begins a solids desludge



Buffer Tank

- ▶ Allows for sequential use of centrifuge and filter despite sudden changes in pressure from the separator
- ▶ Loss of one fermenting vessel was compensated for by the overall decreased residency time



Fermenter → Separator → Buffer (optional) →
Heat Exchanger → Filter (optional) → Bright Beer

Dosing in-line with **Polyclar (PVPP)**

- ▶ Suggestion: inline dosing could cut down tank residency
- ▶ There was found to be insufficient contact time due to the lack of a hold tank between the dosing point and centrifuge



Dissolved Oxygen Pickup

- ▶ Shortly after commissioning the centrifuge we noticed an increase in DO pick up
- ▶ Increasing CO₂ injection frequency into the hydro hermetic seal helped reduce DO levels
- ▶ Remaining DO pick ups was removed by checking seals of pipe work feeding into the centrifuge

Results of Centrifuging

- 6-8% yield increase for Core Range beers
- Transfer time from cellar to Bright Beer halved
- Cost saving from not using finings with the additional benefit that beer produced without Isinglass is seen as more vegan friendly
- Tank residency reduced by an average of 3 days
- Decreased frequency of replacing filter media, savings estimated at approximately \$70K per year
- Brewers pleased with aroma and flavour retention of dry hopped beers

Staff Training

- ▶ GEA software is generally user friendly
- ▶ Training can take awhile
- ▶ Large, expensive equipment can be daunting to new operators

- ▶ Tip: Have anyone who might use the centrifuge involved during commissioning to familiarise staff and make future training easier.

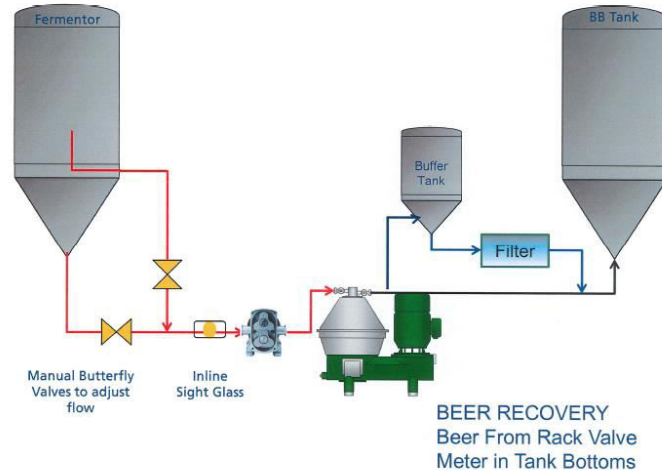
Future Plans

► Our next stage is to add an inwards turbidity meter to our current centrifuge set up

This will allow for:

► Recovery of beer from tanks cones (increased yields)

► Greater control of beer haze in unfiltered beer



Considerations and Conclusion

Benefits

- ▶ Increased Yields
- ▶ Shorter Run times
- ▶ No Finings
- ▶ Shorter Tank

Residency

- ▶ Reduced Costs of Filter Media
- ▶ Better Flavour

Retention

- ▶ Freed labour time

Considerations

- ▶ How will you utilise it?
- ▶ Will you filter?
- ▶ What level of haze is acceptable for your beer?
- ▶ How will you control temperature?
- ▶ Level of automation?
- ▶ Desludge time?
- ▶ Turbidity meter, Cost vs. Quality?



THANKS!

Any questions?

You can contact me at Jamie@emersons.co.nz