

# Pressurized Fermentation

Ed Carlson  
February 10, 2021



# Pros and Cons

- Pros

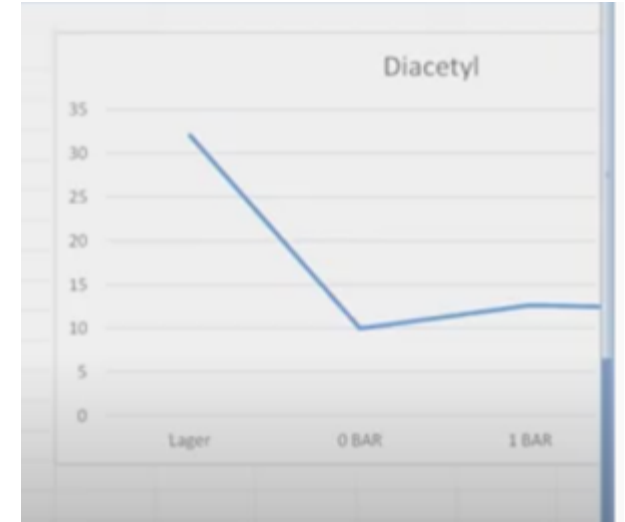
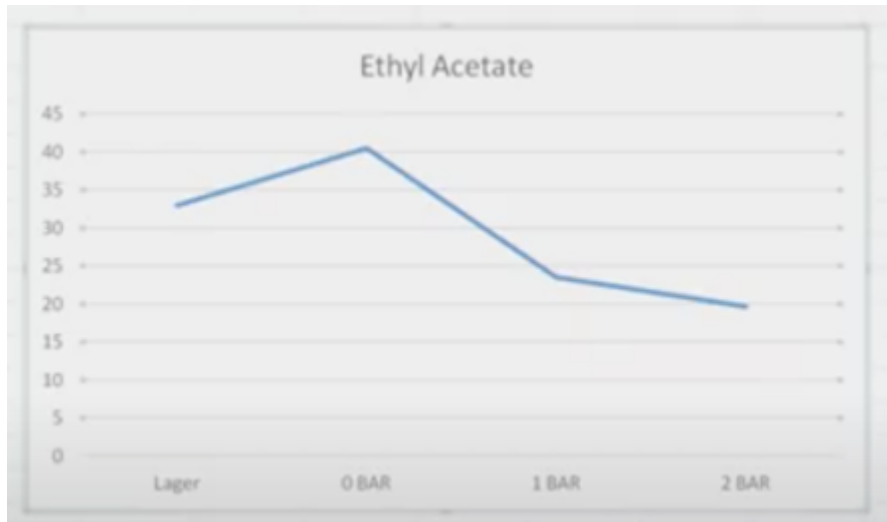
- Quicker & more efficient fermentation, especially for lagers (2 weeks vs. 8)
- Less sensitivity to temperature (potential to produce lager-like beers at room temperature)
- Fewer esters & fusel alcohol flavors
- Minimizes/eliminates oxygen exposure after initial transfer to fermenter
- Smaller krausen; need less head space
- Dry hopping & fruit infusion without exposure to oxygen
- Closed pressurized system reduces risk of possible contamination
- Natural mild carbonation; saves on CO<sub>2</sub>
- Especially good for:
  - Lagers (clean taste and made quickly)
  - IPAs - more hop flavors retained, (e.g., for British style IPAs)
  - German-style beers - natural carbonation

- Cons

- Too much pressure can stress yeast (10 - 15psi seems to be sweet spot, over 30 they go dormant)
- More difficult to bottle as it is already mildly carbonated (but kegging sure is a snap 😊)
- Not good for beer styles that depend on esters for fruity compounds (e.g., hefeweizens, witbier, some IPAs)
- Extra equipment = additional cost (although w/ plastic unibodies you could get a setup for ~\$100)

# Chris White & John Blichmann 2018 Experiment

- Compared the results of traditional lager process vs. room temperature @ various pressures (0, 1, & 2 bars)
- Resulting ABV, attenuation, final SG, & IBUs same across all 4 batches (0 bar batch had lower IBU value)
- Analytical results (below) showed pressurized fermentation produced a lager-like result at 1 & 2 bars in two weeks vs. 8 weeks for lager
- Judges did detect some differences and usually could pick the true lager (probably not the way to go for competition)
- [https://www.youtube.com/watch?v=R9V5MzB7auM&feature=emb\\_logo](https://www.youtube.com/watch?v=R9V5MzB7auM&feature=emb_logo)



# Equipment

- Pressure Vessel
  - 2.5 gal to ½ barrel
  - Conical Unitank w/ collection container
    - Stainless Steel (\$280 - \$1600)
    - Plastic (\$120 - \$160) (e.g., 7.1 & 13.2 gal Fermzilla Conicals)
  - Non-Conical
    - No collection container
    - Cheaper and simpler
    - Plastic (\$50 - \$60) (e.g., 7.1 & 13.2 gal Fermzilla All Rounders)
  - Keg (\$40 - \$100)
    - Limited to smaller batches to allow for head space
    - Might still want to transfer between primary & Secondary
- Pressure kit w/ floating dip tube
  - Included in some systems
  - Add-on (e.g., Fermzilla (\$30))
- Spunding valve w/ gauge (\$20 - \$75)



• PLEASE, DON'T DO PRESSURIZED FERMENTATION IN A GLASS CARBOY!!!

# My Process (w/ 7.1 gal Fermzilla)

1. Brew and cool your wort as usual
2. Pressure test fermenter for leaks (I do this right after cleaning it and just leave it pressurized w/ sanitizer, then verify it held pressure when I'm ready to use it)
3. Transfer wort to fermenter, aerate and pitch yeast (and Tilt if you have one)
4. Put on pressure lid with floating dip tube (use lots of lube!)
5. Pressurize fermenter to 15psi
6. Attach spunding valve and adjust to 15psi
7. After primary fermentation, close collection container valve and relieve its pressure (or it will leak out over time!)
8. Optional – dry hop, fruit infusion at desired point(s) in the process
9. After secondary fermentation, transfer beer to keg using counter pressure setup
10. Cool and finish carbonation using CO2
11. Clean fermenter using keg washer
12. Drink!







# Collection Container Uses

- Dry hopping or fruit infusion
  - How to purge hops/fruit
    - Close valve
    - Remove and clean collection jar
    - Add ingredients to clean jar
    - Use CO<sub>2</sub> to purge air out of jar
    - Open valve
    - Done!
- Collect yeast and sediment
- Attach carbonation stone and force carbonate
- Oxygenate from bottom of fermenter

# Lessons Learned



1. Check for leaks before transferring beer or you won't get the natural carbonation at end of secondary
2. Use lots of lube on collection jar and lid (see #1)
3. Don't take off spunding valve and go to bed disappointed when you think the primary has failed or you will get the privilege of sucking 5 gallons of wort out of the carpet on the other side of your brew room wall the next day 😞
4. Relieve pressure on collection jar after closing valve (or it leaks out and makes getting the jar off very difficult)
5. Be prepared to spend more time cleaning the fermenter
6. I really enjoy brewing this way as it simplifies temperature control, reduces transfers between containers, minimizes lifting of said containers (only move full fermenter once during the whole process), no bottling, and reduced off flavors!



# Links

- Fermzilla introduction from Kegland
  - [https://www.youtube.com/watch?v=U8dWlcoOglA&feature=emb\\_logo](https://www.youtube.com/watch?v=U8dWlcoOglA&feature=emb_logo)
- Various tips and tricks on Youtube including a bunch from PATREON (or on Home Brew Network if you belong), this is link to first of series
  - [https://www.youtube.com/watch?v=3Krqc\\_DDOsU](https://www.youtube.com/watch?v=3Krqc_DDOsU)
- White & Blichmann
  - [https://www.youtube.com/watch?v=R9V5MzB7auM&feature=emb\\_logo](https://www.youtube.com/watch?v=R9V5MzB7auM&feature=emb_logo)

Backup Slides

# English Mild Brown

English-Style Dark Mild Ale

Brewer: **Sped Brew**



Batch Information

[Raw Data](#)

## Stats

ABV	3.54%
Temperature	69 °F
Specific Gravity	1.006
Start Date	Sep 8, 2020 4:14 PM
Duration	16 Days 23 Hours
Attenuation	81.82%

## Temperature

High	74 °F
Low	67 °F
Average	69.84 °F

## Specific Gravity

Original	1.033
Final	1.006

## Yeast

Brand	White Labs
Style	British Ale
Strain	WLP005

## Specific Gravity



## ABV



## Temperature



## Attenuation



## Comments

# FermZilla Conical Fermenter – 7.1 & 13.2 gal.

- **New and Improved:**
  - 1. Larger Dump Valve - 3" butterfly dump valve is more resistant to clogging from large amounts of trub
  - 2. Larger Opening - 4.75" top port opening allows for easier cleaning
  - 3. Less Headspace - more appropriately sized for 5 & 10-gallon batches. Purging the headspace of oxygen is easier and more effective.
- **What's Included:**
  - FermZilla 27L & 55L Tank with Butterfly Dump Valve
  - Reinforced Stainless Steel Stand
  - Top Lid with PRV (35 psi)
  - 1000 ml Collection Container & Lid
  - 3-Piece Airlock
- Graduation Sticker
- Adhesive Thermometer
- Strap Wrench
- Spare Seals
- **Specs:**
  - 27 L (7.1 gal) & 55L (13.2 gal) Total Volume
  - Pressure Rated to 2.4 Bar (34.8 psi)
  - Temperature Rated to 122°F
  - Height in Stand - 28.3" / 40.1"
  - Height w/ Airlock - 32.7" / 43.5"
  - Tank Diameter - 13.9"
  - Diameter in Stand - 15.7"
  - Lid & Collection Container Ports - 28 mm PCO 1881 threads

# Stainless Steel Pressure Kit for FermZilla

- **Fermenting Under Pressure:**
- The pressure kit allows for fermenting under pressure, which will reduce esters and fusel alcohol production. This means you can ferment at warmer temperatures than you normally would, even making lagers at room temperature. Most commercial beer is fermented under pressure simply due to the size of commercial tanks and the pressure that is created by the column of beer. It is one of the distinct differences between homebrewing and brewing on a commercial scale. The FermZilla's lid already comes with a built-in pressure relief valve that will blow at 35 psi; the pressure kit simply allows you to add CO2 through the ball lock fitting. We strongly recommend that you also purchase an adjustable pressure relief valve, or spunding valve, which allows you to set a lower pressure. It's always a good idea to have two relief valves on the FermZilla anytime the unit is under pressure.
- **Carbonating, Transferring, and Serving:**
- When you are fermenting under pressure the beer is already carbonated when you are done fermenting. You can control the level of carbonation by using a spunding valve. This means you can eliminate kegging and serve directly from the fermenter. We love this idea but there will probably still be times that you want to keg. Attach a beer line from the FermZilla's bev out to your keg and enjoy the easiest kegging experience ever. You can also choose to send carbonated beer through a beer filter on the way to your keg. When applying pressure with a CO2 tank also make sure that you have a functional relief valve on your CO2 regulator.
- **Eliminate Oxidation:**
- Since the beer always has a CO2 blanket through fermentation and during any transfers out, oxidation is eliminated. When you cold crash you won't be sucking air back in through an airlock.
- **Key Features:**
- Ferment beer under pressure to reduce ester and fusel alcohol production
- Always draw clear beer with the floating dip tube
- Keg beer that has already been carbonated
- Use CO2 to push beer into a keg or through a filter into a keg
- Eliminate kegging altogether by carbonating and serving directly from the FermZilla

