CODI
CRAFT CANNING SYSTEM

DO Troubleshooting

This is an in depth look of how to mitigate DO pickup on the CCL-45. This guide may not solve your issue entirely, but will definitely highlight the areas of focus where DO pickup occurs.

Tools Needed

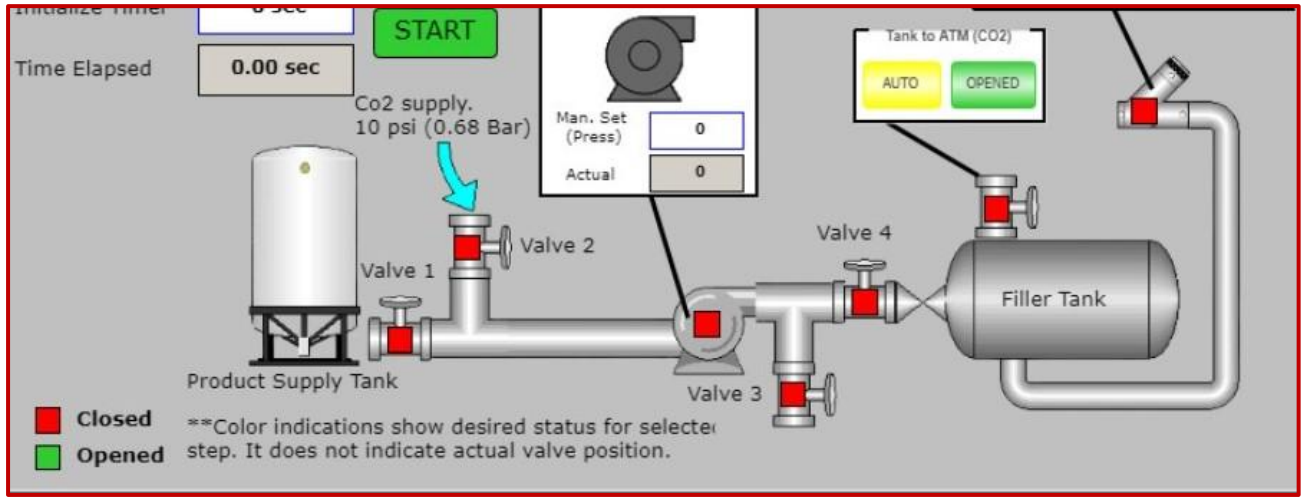
An open mind

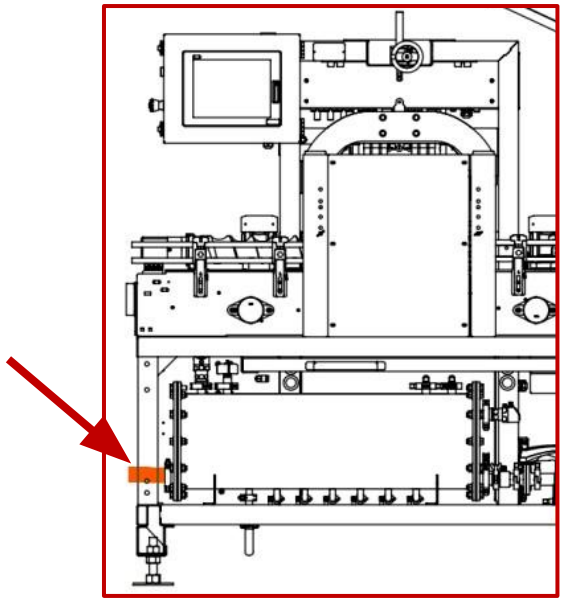
Where to start

Keeping TPO low is a very important step in preserving the quality of your product in the can. Many factors contribute to the level of Dissolved Oxygen in cans. When troubleshooting DO pickup, we first want to have a base set of numbers to troubleshooting off of.

We want to take a reading on the following points and log what we see.

1. The base of the brite tank on the block and bleed setup. (Valve 2)
2. The valve post pump to drain. (Valve 3)
3. In the tank using the capped port located on the infeed side of the tank.
4. Pierce the finished can.



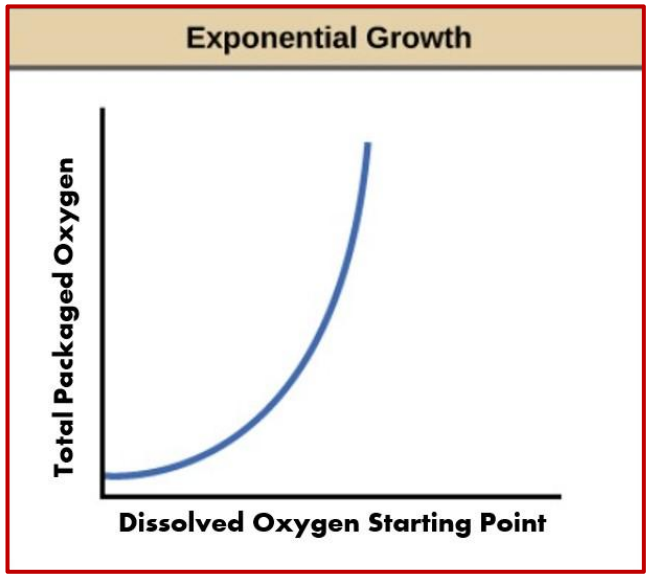


DO numbers and expectations

The most important variable in getting the lowest possible TPO is starting at the lowest possible DO in the brite. DO pickup is not linear, starting at 20ppb opposed to 10ppb is not a difference of 10ppb in the can.

The higher your starting point, the aggressively higher your finished product will be. We can't use autotune on the fill heads, meaning we can't "fix it" in post. If we put oxygenated beer into the filler, we are going to get very oxygenated beer in cans.

The goal for a starting DO in brite should always be single digits, and anything higher than 15ppb should warrant a QC hold before packaging that product.



Water or Ionized Air Rinse

One of the single biggest differences you can make is switching from a water/sanitizer rinse to an ionized air rinse.

When rinsing with water or sanitizer there are always going to be lingering droplets in the can. This in turn starts out the fill of that can with oxygenated droplets causing a direct increase in the cans TPO.

How an ionized rinse works is ionized air in blown into the can while at the same time pulling a slight vacuum. The ionized air neutralizes static charge within the can by providing positive and negative ions that attach themselves to opposite charges. Neutralizing the static charge causing dust and other debris to fall from the can. The vacuum then pulls the debris out. Evidence also suggests ionized air reduces microbial and viral counts in the air providing dual benefits within your facility.

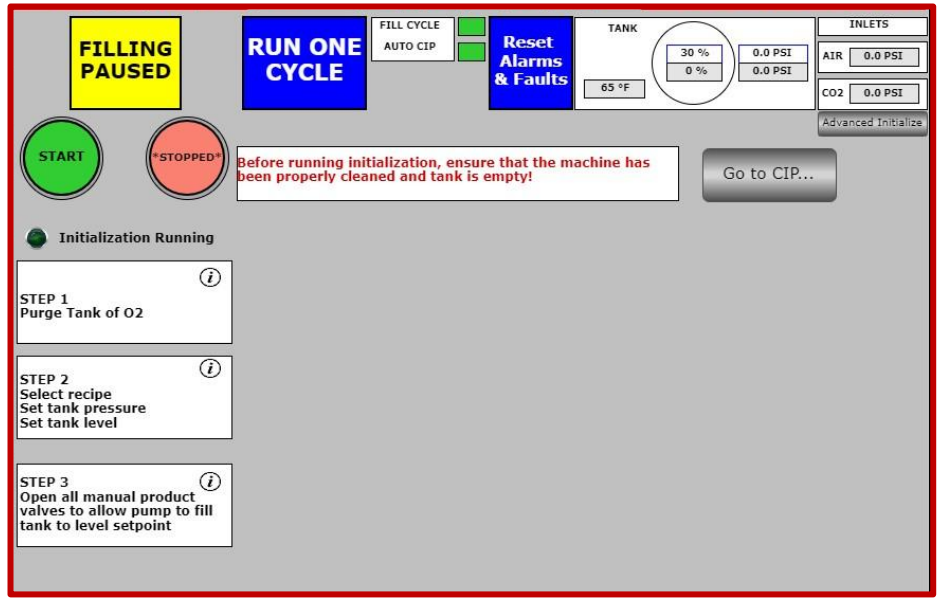
Initialization

Basic VS Advanced Initialization

Initialization is the process of purging the machine to create an oxygen free, CO2 environment before we introduce beer into the system. We have two options of doing this procedure; basic and advanced. For the best quality control practice we recommend running the advanced initialization. We also recommend checking the DO in the filler tank prior to introducing beer. You can do this by adding a sample port on the 1” ½ tri-clamp cap on the side of the filler tank.

Basic Initialization

During the basic initialization process we pressurise the tank to a set point and purge for a number of cycles. As an example set the purge pressure to 30psi and run 3 cycles. What will happen is CO2 flows to the tank until the pressure reaches 30psi, the first purge is out of our fill lines. Then the tank refills to 30psi and releases the pressure out of the tank to atmosphere valve. It will then repeat pressurising and releasing out of the atmosphere valve two more times. When releasing the pressure the tank will not drop below 2psi to ensure we maintain positive pressure. Once the purge cycles are complete we then set our operating tank pressure and level, then bring beer into the tank.

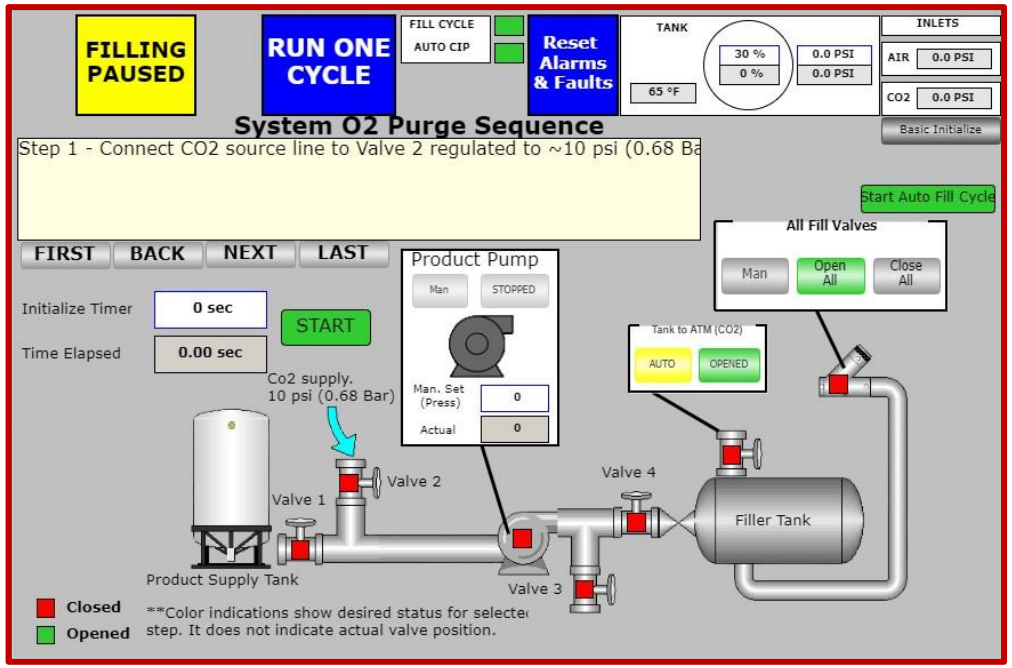


Initialization

Advanced Initialization

For a more thorough purge of the product lines, pump, tank and fill heads, we recommend the advanced initialize process. This a more manual step by step that takes into account each stage of the process, purging all the way from brite to the fill heads.

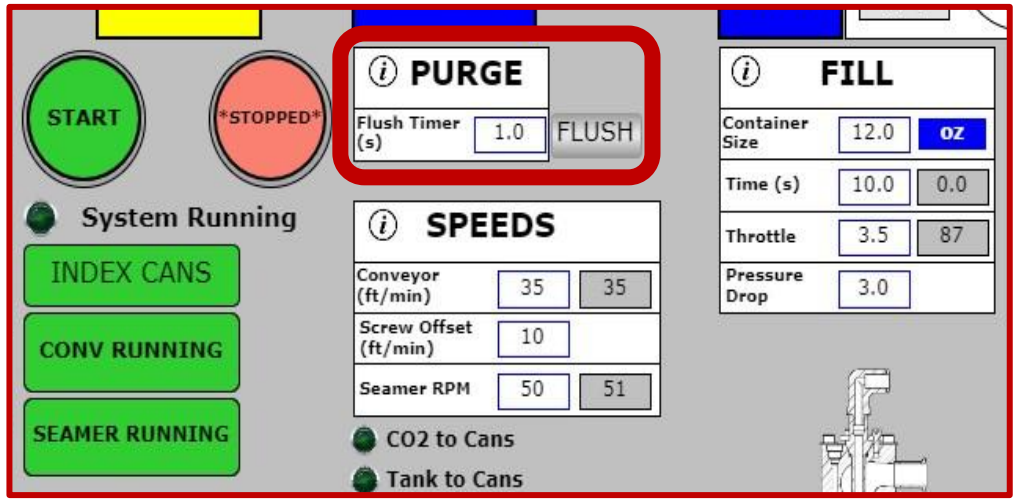
We start by connecting CO2 to valve 2 on the block and bleed at the brite tank and do a rolling purge through product hose to the tank. The importance of this is we are purging the diaphragm pump as well as the check valve prior to the tank. We use CO2 from the block and bleed to pressurise the tank then open our fill valves purging the fill lines, then repressurise and open the tank to atmosphere. We alternate this purge as many times as needed before setting the tank level and pressure and filling the line with beer.



Purging the can

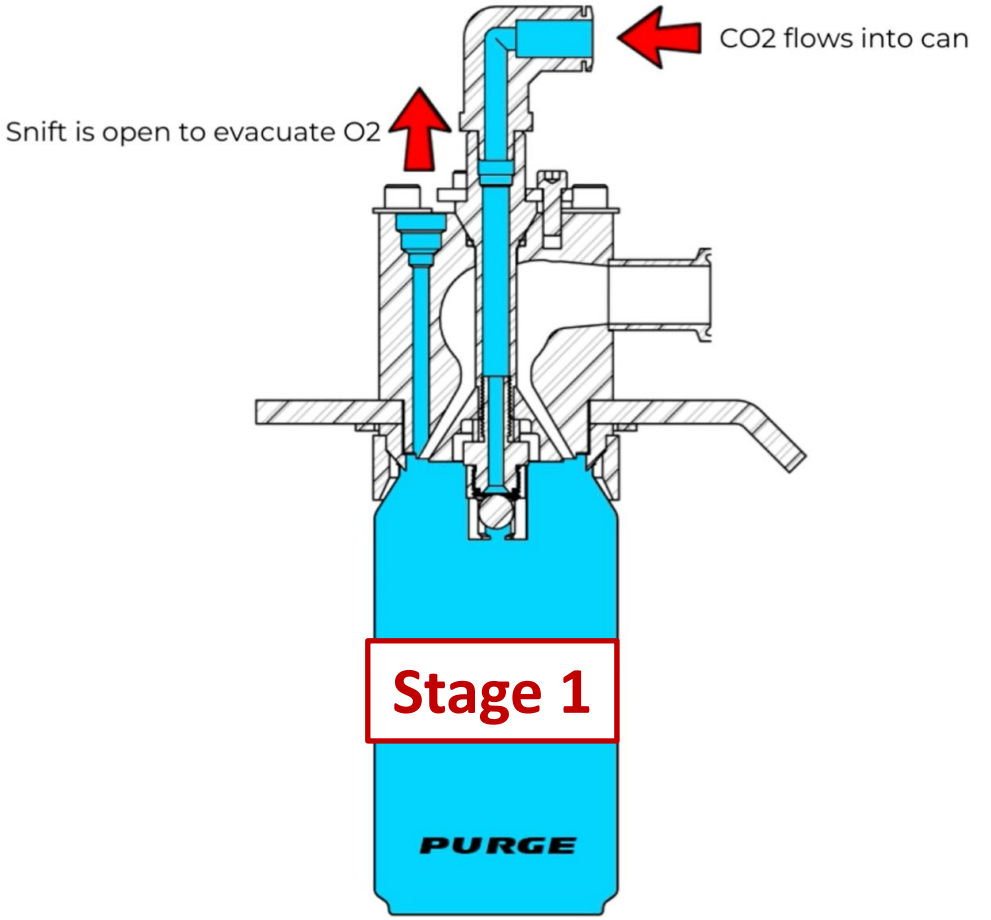
FLUSH vs. EVAC Purge

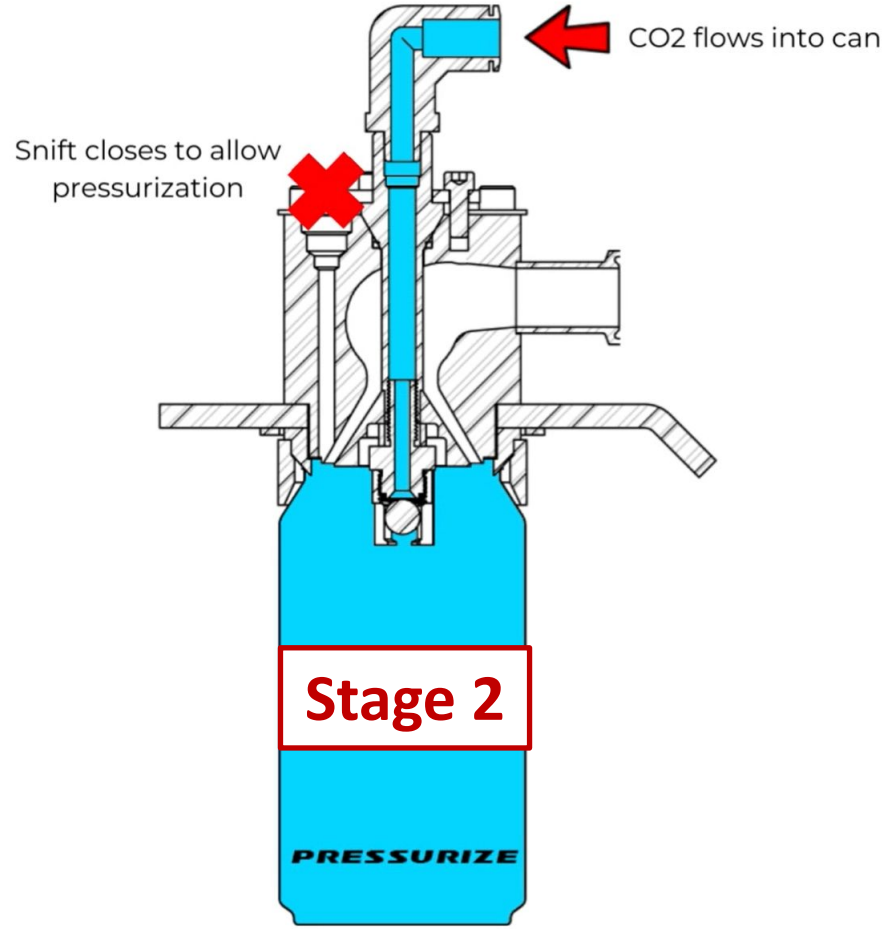
The first step in the fill cycle is a purge. We have two different ways to complete this purge. The first option is the flush setting. This opens our CO2 to cans valve a flushes the can for a duration of seconds we set it to. The second option is an EVAC. An EVAC will pressurise the can release the pressure and then re-pressurize as one cycle. We can set the number of cycles we want to perform. Doing a EVAC opposed to a flush will more thoroughly purge the can and can make a direct impact of can TPO. The trade off in doing an EVAC is a slower fill cycle in turn slowing the machine CPM and more CO2 consumed per cycle. To switch between a FLUSH and EVAC tap the word on the screen to toggle between the two.



Flush

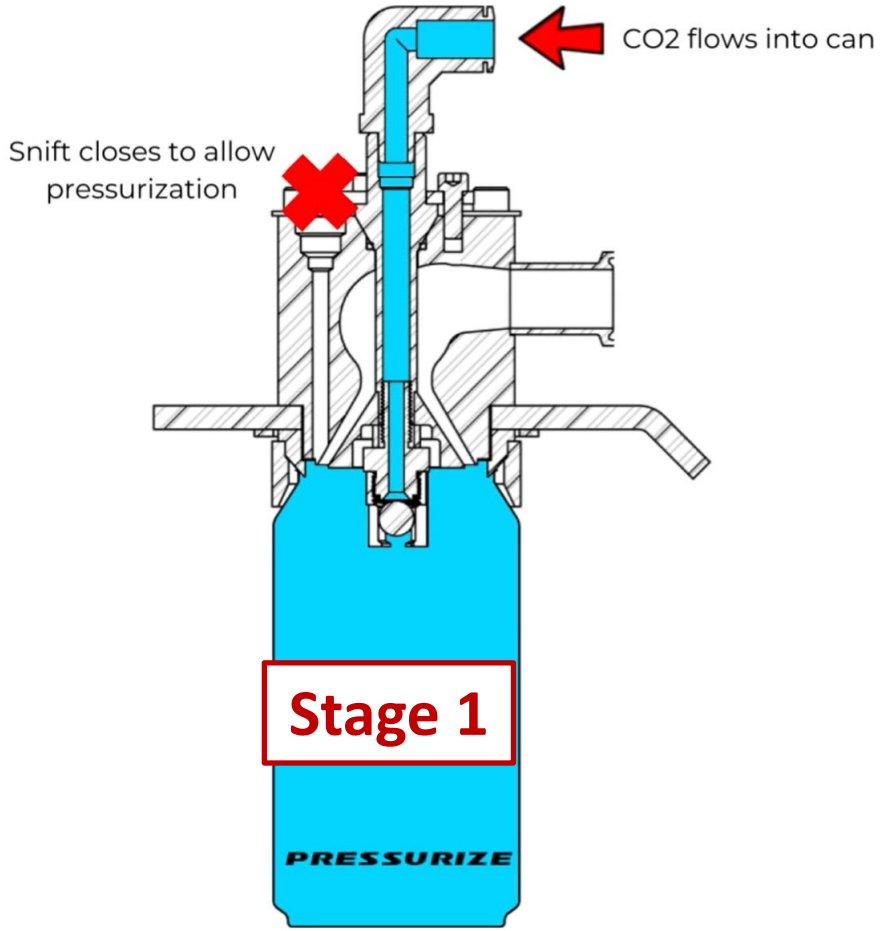
When running the flush cycles, it is a 2 stage process. Based on the timer setting, the fill heads will come down on the cans, and will push CO2 into the can with the sniff open for the set amount of time. At the end of that timer, the snift specific pinch valves will close and the can will be brought to its pressurization point for filling. The expectation of this process is to expel oxygen out the top through the sniff lines. This is the quicker, yet less thorough option. When running flush, we suggest .8-1.5 seconds.

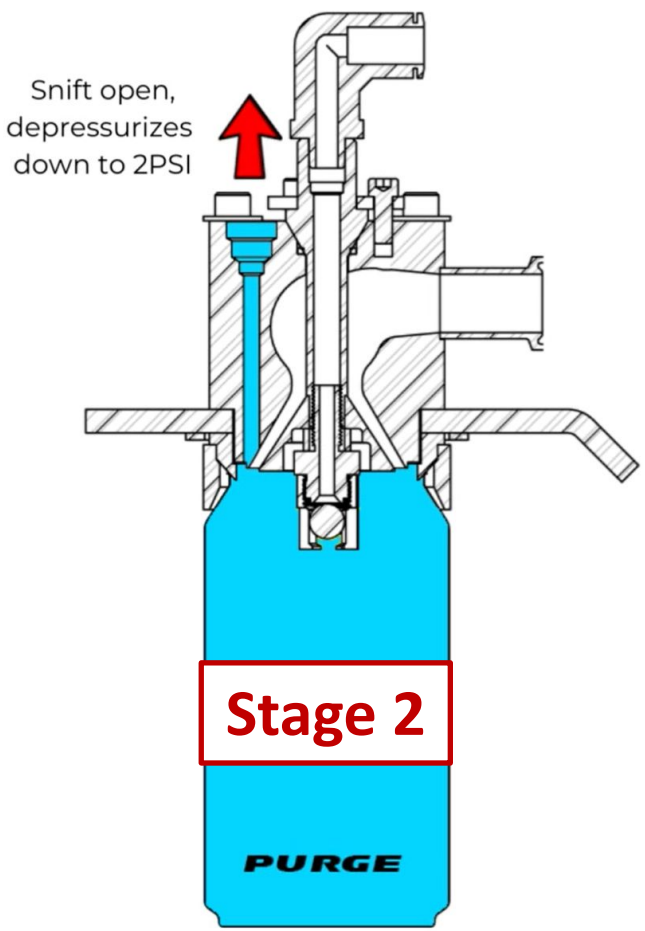


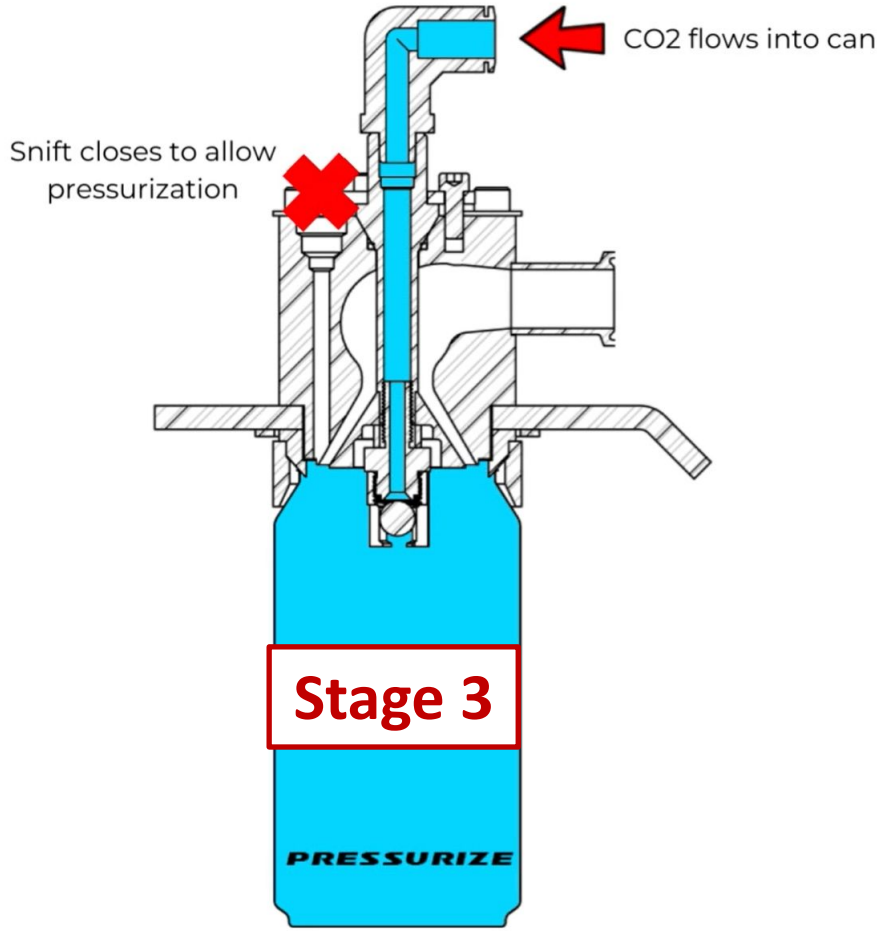


Evac

When running evac cycles, it is a 3 stage purge before filling. The biggest difference here is the 1st stage is to pressurize with all the snift pinch valves closed, displacing any oxygen to the top of the can. Stage 2 then opens the snift pinch valves while venting the fill heads to allow the oxygen to be released to atmosphere, with stage 3 finally pressurizing before filling. Depending on how many cycles of evac you would like to run, it will bounce between stages 1 and 2 until that number of cycles is met before final pressurization. Evac is quite a bit slower, but much more thorough. When running evac, we suggest 2-4 cycles.







Fill Head Carriage

Creating a good seal on the cans plays a role in maintaining low O2 pickup, as well as fill quality in general.

Important guides to reference for this are:

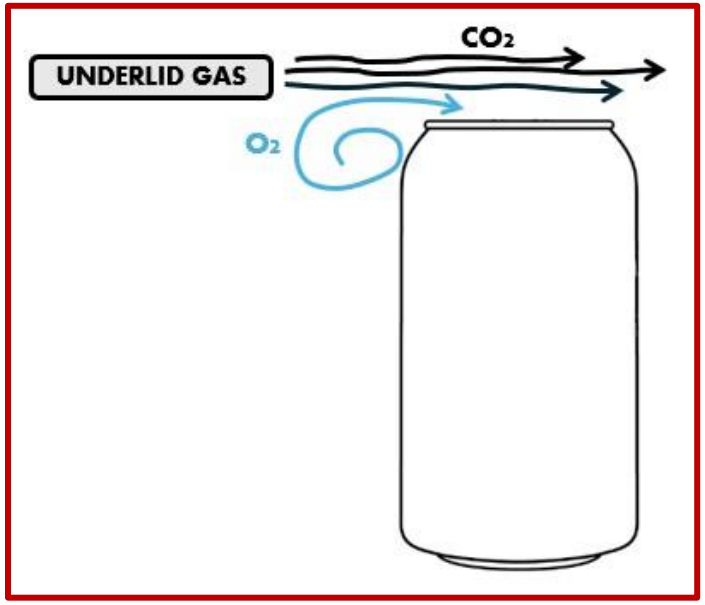
- Fill Head Alignment
- Manual Pressure Test

Onlycans:

- Ep 28 - Properly Adjusting the Filler Transfer Plate
- Ep 12 - Replacing a can seal gasket
- Ep 4 - Performing A Manual Pressure Test
- Ep 3 - Setting Your Filler Joyce Jack

Underlid Gas

When setting our underlid gas flow, our goal is to lay a gentle blanket of CO2 on the fob of the beer to fill in any gaps and displace any oxygen. We do not want to crank the CO2 full blast or it will have an adverse effect. We will cause a sort of venturi effect which will draw up O2 as the CO2 flies past the can as demonstrated below.

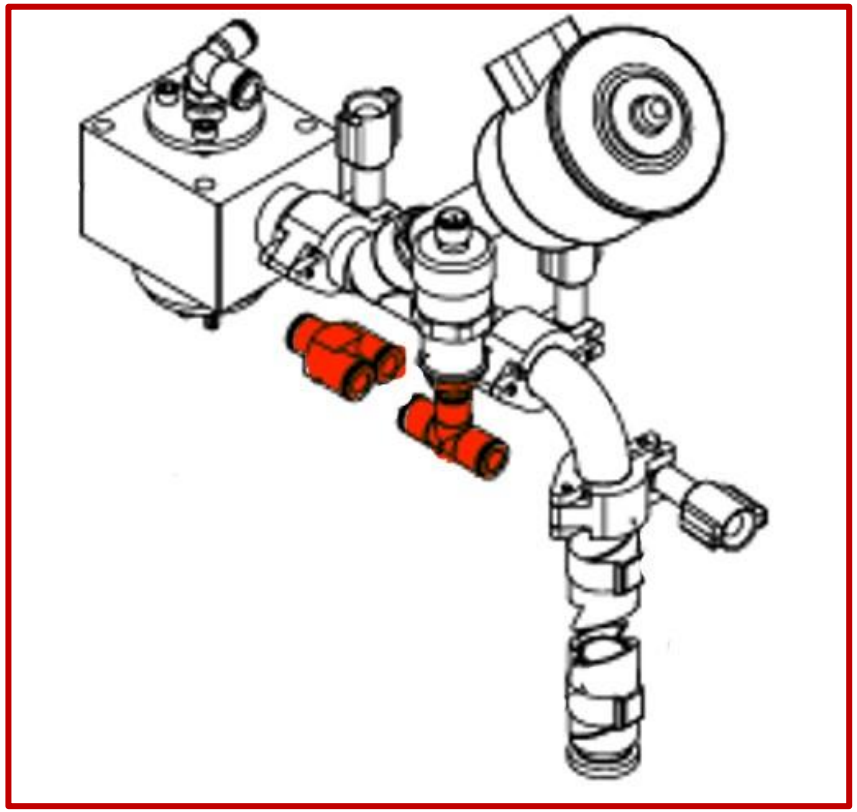


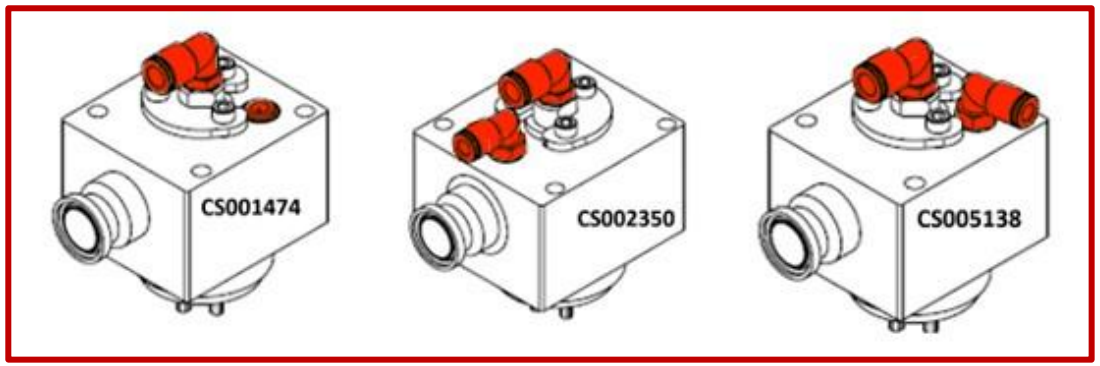
Using the needle valve located just upstream of the CO2 connection to the underlid gas vent. Dial in the flow by setting your hand on the opposite side of the conveyor as the vent and then adjust until you feel gentle flow on the palm of your hand.

Checking for leaks on push to connect fittings

Fill Heads

There are a handful of push to connect fittings that play a critical role in maintaining a sealed environment while purging and filling the can during the fill cycle. Worn out fittings can become unable to secure a bite on the tubing allowing for a loose connection. On the elbow fittings there is a gasket in the swivel of the elbow that can wear and cause a loose connection between the two parts of the fitting. Highlighted in red are the fittings that play a critical role in the sealed CO2 environment.



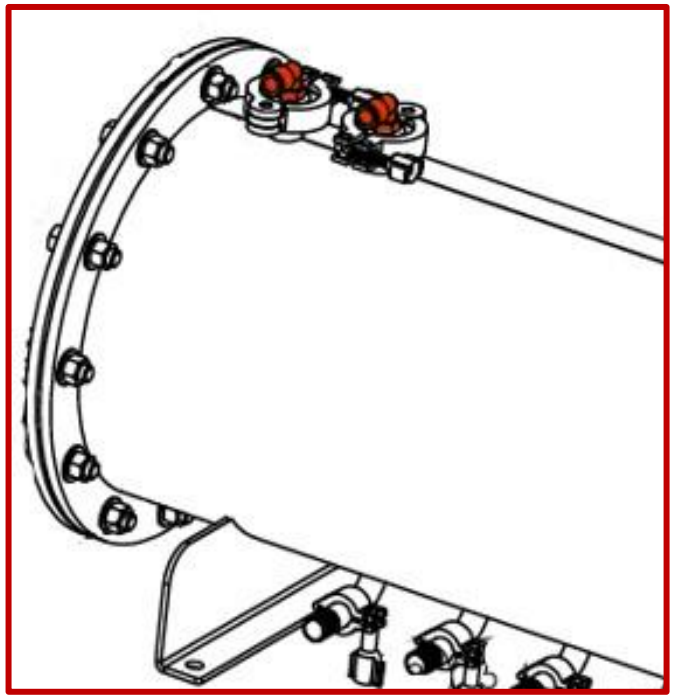


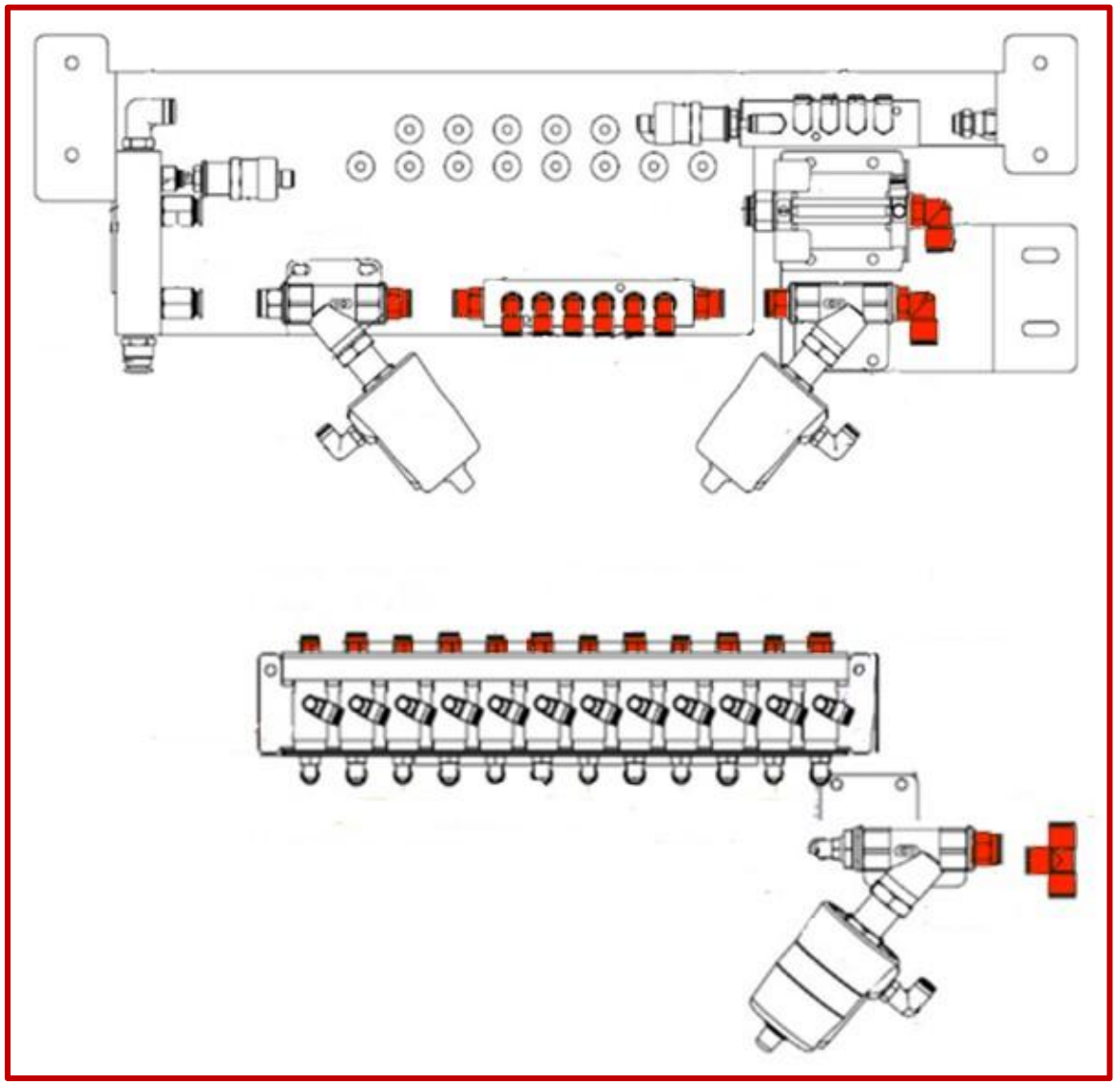
Fittings vary depending on style of fill head

Checking for leaks on push to connect fittings

Pinch valves & Tube map

The fittings highlighted here are all the push to connect fittings that require a seal to maintain a closed system between the tube map, pinch valves and tank.



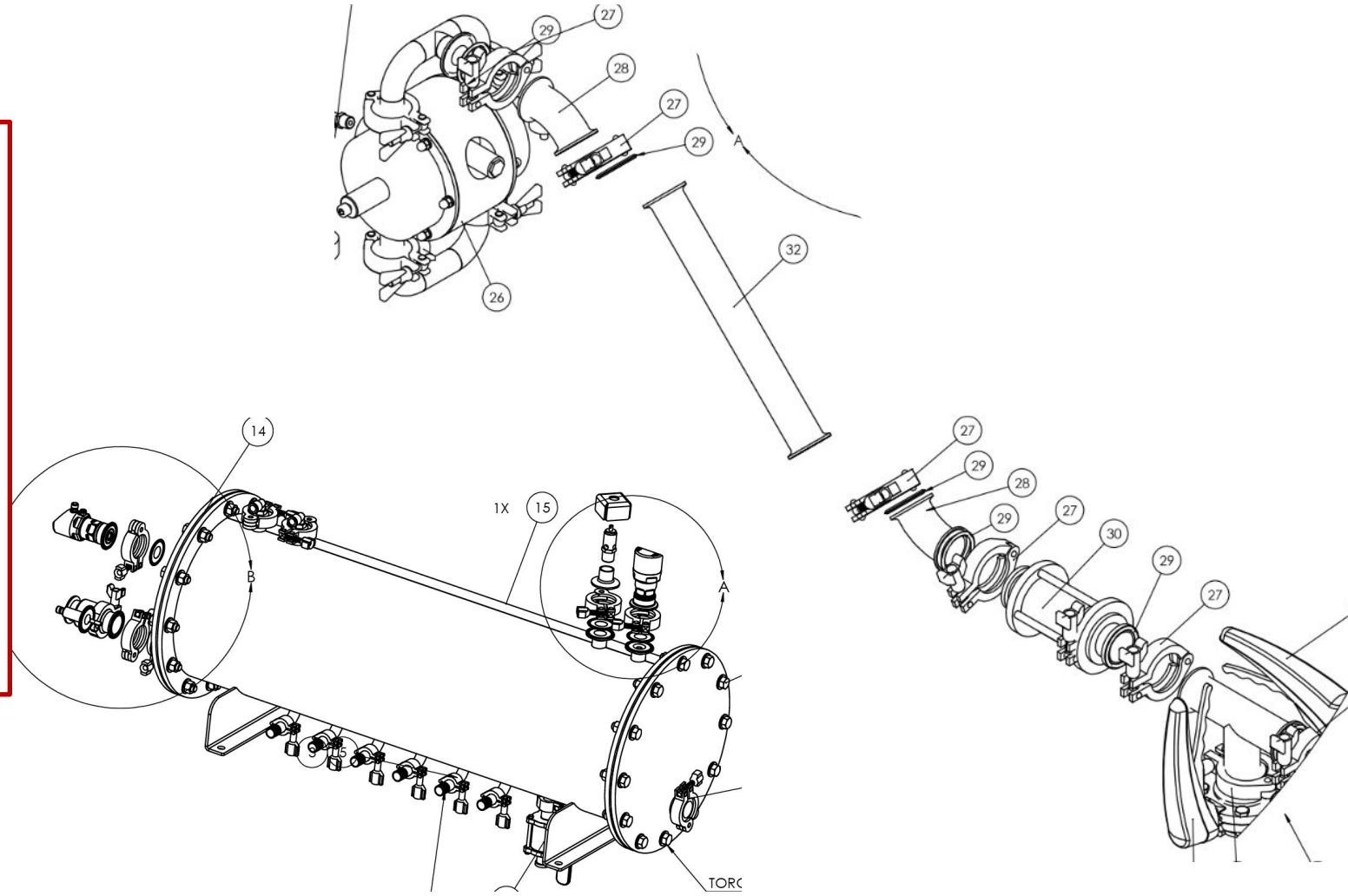


Checking Tri-Clamp fittings

The CCL-45 has many tri-clamp fittings. Making sure the gaskets are seated properly, in good condition, seated properly and tightened down is a key to a sealed system.

Each 6 head machine consists of 25 - ¾” tri-clamps and 20 - 1 ½” tri-clamps. We want these tri-clamps to be cinched about one full rotation past hand tight.

The same can, and should be said for our product lines going from the brite to the product pump at the filler.



Pinch Valve inspection

Pinch valves on the Codi play a large role in getting good fills and also a nice head of fob on top of the fills. These valves are made up of an internal bladder, that gets pinched closed using air pressure to regulate the flow through the valve. Over time the internal bladder can develop wear and tear over time. Follow along on the video found on codiservicecenter.com called “Pinch Valve Inspection” to learn how to take apart and inspect the valve.

Getting the best fob through run settings

When creating foam, there is a blatant point to keep in mind; I don't need good foam the second the fill heads come up, I need good foam at the lid dropper. By this, the implication is that I want the beer to be breaking out all the way from the fill heads to the lid dropper. As long as the foam is rising, and CO2 is leaving suspension, and O2 cannot enter the environment.

The foam itself is created through agitation, and we have 2 options of doing so; during the fill, and during the snift. When running a higher throttle, the beer is agitated as it enters the can, and that breakout will show itself in foaming up. Too much agitation, and the beer will overflow immediately after the fill heads raise. Too little agitation here, or a lower throttle, the beer will be quite still.

When using the snifts for agitation, we are deciding how much pressure is held in the sealed environment, and when the fill heads come up, how does the beer react to being at ambient pressure. Running a short snift will keep more pressure in that environment and will in essence "shock" the beer when the fill heads raise, causing it to break out. Longer snifts will bring our product back to the ambient environment slowly and more stable.

The name of the game is agitating the beer by use of the fill throttle and snifts take cause the beer to break out all the way from filler to seamer. Beer to beer, day to day, run to run, even season to season, these set points will change and vary, but your goal will always be the same.

CO2 Upgrade modifications

Pre Purge

The pre-purge is a device used for filling the cans with CO2 before they are even indexed under the fill heads. This device is the most effective and thorough of any Codi DO mitigation devices. It is made to handle any height or type of can you run and requires no changeover. A needle valve throttle controls the flow of CO2 into the cans on deck, purging the oxygen contained in them.

CO2 Upgrade modifications

CO2 Tunnel

The CO2 tunnel is a nifty little device that can keep the oxygen at bay after the fill cycle. As the cans are being indexed out from under the fill heads, a valve is opened to push CO2 through the pores of the underside of the tunnel, with the idea of that CO2 falling into the can, taking up any space that oxygen could. This device is quite helpful for beer, and almost necessary for products without head retention like hop water, tonics, etc.

CO2 Upgrade modifications

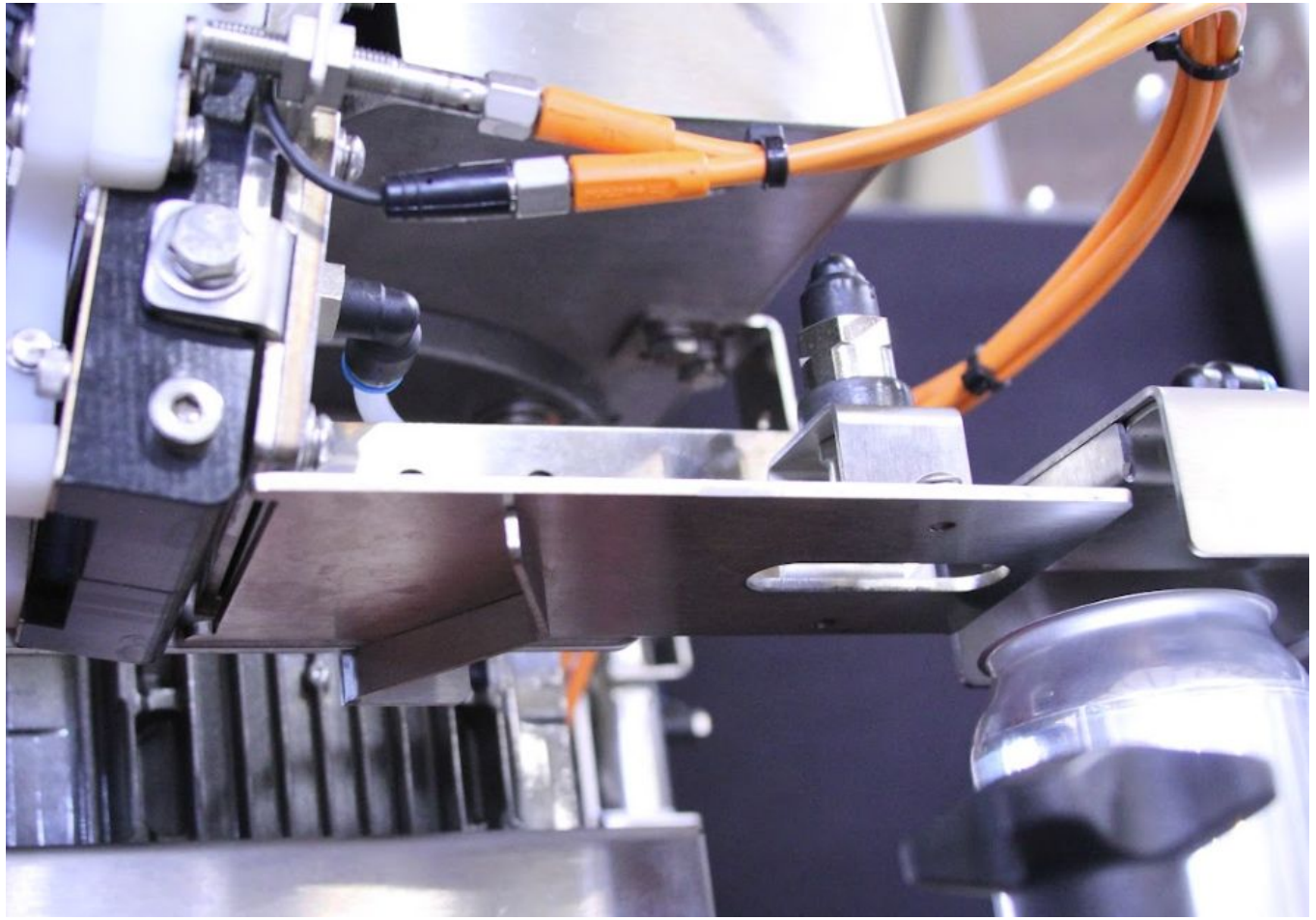
Good Phil Fob Flinger

Hailing from Bierstadt lagerhouse, this simple device is the way of the future! Designed by Phil Joyce, the Fob Flinger uses CO2 as a knife to wick off the top foam. This device works the same as a traditional foam knife, the major benefit here being that there is no physical contact. The worry of contaminants when dealing with a stationary foam knife are no more, as the Fob Flinger is using a stream of CO2 to perform the same function.

CO2 Upgrade modifications

Foam Jetter

The foam jetter is a nifty device used for a jolt of product agitation just before the lid is applied. There are a couple options for what to use to agitate, CO2 and DAW being the most common, however using the product you're running at the time is the most appropriate, pushing out of a keg and into the valve that opens while the can is underneath.



Closing Statements and Notes

- One of the biggest frames of mind when working on DO mitigation is allowing for trending information. A random can that tests high or low is in no way a benchmark, nor a cause for alarm. Without trending data, we have no real point to go from.
- Testing cans is not the way to truly see the DO pickup. Seeing what the system reads from tank, to valve 3, to the filler tank, and then a pierced can gives the full scope.
- Once again, we can't fix it in post, if it goes in with high DO, you better believe its gonna have an insane DO coming out.

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If you have any further questions, please email: service@codimfg.com or call (303) 277-1542. For parts email: orders@codimfg.com