Process & Packaging, Inc.

Keg & Keg Plant Quality Control Procedures

The following is a recommended series of procedures that a Q.C. manager might wish to use to verify correct kegging equipment operation and to ensure that the kegs are being washed, sterilized and filled to within specification.

DETERGENT TANK TITRATION:

The hot water/detergent set is the system that provides the keg washer(s) with the rinse water(s), caustic and or acid supplies for washing the keg internals.

It is STRONGLY recommended that this system is NOT used as a CIP system for your product mains and beer filling heads, as supplied and recommended by some manufacturers. Cross contamination is a real risk.

The hot water/detergent set, detergent tank(s) titration checks, should be made prior to start-up and at least twice during each 8 hour operating shift. The frequency can be adjusted to meet the Q.C. departments "comfort level". The acid titration level (phosphoric) should be in the range 0.25% to maximum of 0.4% v/v. The alkali titration level (caustic) in the range of 1.5 to 2.5% v/v. The keg washing acids and caustics should be in the temperature range of 140 to 160F (60 to 70C).

There is little to be gained when operating above these levels. Many adverse effects to the keg, valve and machinery can be induced when operating above these levels.

Systems running at high temperatures and concentrations to obtain satisfactory wash results are generally being operated as such to make up for other deficiencies in the systems operation.

KEG WATER CARRY-OVER AND TITRATION CHECKS:

After the keg has completed the wash head(s) sequence(s), the keg must be allowed to continue through the sterilizing sequence and then rejected (stopped), immediately prior to commencing the racking (filling) head(s) sequence(s). When the keg is retrieved at the discharge point of the machine, the keg can be cooled down by placing a cold water hose over the outer surfaces (if steam is used). A Q.C. "sample" or coupler is then used to tap the keg. The keg must be inverted to remove the contents via the CO2 port of the coupler by allowing the keg to drain or forcing the contents out with air or CO2. The condensate or rinse residuals in a 50 liter or U.S. ½ barrel keg normally measures between 40 to 80 ml. A limit of 100 ml. should be set as a maximum allowable limit.

If the "residuals" carryover is 100 ml. or more, the keg system must be checked together with that of the steam quality and relevant steam main condensate traps to ensure that excessive condensate is not present.

The condensate obtained from the keg can be titrated to ensure that there is no acid and/or alkali carry-over from the wash head(s). This check should be carried out once a day for each machine lane and then reduced to suit the Q.C. departments "comfort level".

NOTE: For this check, the pH. of the steam condensate supplied to the keg line should be a known factor if steam is used for purging.

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KEG CONDENSATE OR SANITIZER CARRYOVER:

Another keg is used to do a similar check after it has been allowed to complete the sequences through the racker head(s) up to the point of immediately prior to starting the beer filling sequence. The keg sequence is stopped and the keg rejected immediately prior to starting the beer filling sequence. The keg is removed from the system after discharging from the machine. When checking for the quantity of condensate or sanitizer residuals present in the keg, it should be less than 50ml. This check should be carried out once a day for each machine lane and then reduced to the suit the Q.C. departments "comfort level".

MICROBIOLOGICAL CHECKS TO THE KEG:

Introduce a liter of sterile liquid, (preferably beer), into a keg having just completed the sequence as described above via a sterilized keg valve and "funnel" coupler. This allows the keg to be checked for microbial integrity by removing 250 ml. of the sterile liquid into a sterile flask. Split the sample into two, 100 ml. samples via Millipore type membranes, plate and incubate the membranes on agar suitable for aerobic and anaerobic organisms.

Methods of doing this vary slightly. The main objective, however, is to ensure that consistency in sampling is maintained, i.e. having introduced the sterile liquid into the keg, each keg should be rotated a set number of times to ensure all surfaces have been covered equally before it is extracted. A known quantity should always go into the keg and a known quantity should always be extracted, filtered and plated. This procedure should be carried out at least once every two weeks.

AFTER A C.I.P. SEQUENCE:

After the C.I.P. sequence, the beer process mains, bright beer tank and/or sterile beer tank and racker connection head(s), can be swabbed and checked for visual cleanliness to ensure that the cleaning operation frequencies are effective and adequate. This should be carried out at least once a week.

BEER MICROBIAL STABILITY SAMPLING:

Samples are taken from the BBT and/or SBT and keg at a frequency laid down by the brewery Q.C. department. A suitable stability test is to set aside a keg of beer from the keg line after filling and "forcing" the contents by leaving the keg in an environment of 70F (21C). Taste, odor and clarity tests can then be taken after 72 hours and at regular duration thereafter as desired to suit the Q.C. departments standards.

KEG PRESSURE SAMPLING:

A keg filled with beer should be removed from the keg line and allowed to stand for 5 to 10 minutes. A "Pressure Test" coupler is connected to the keg after being sterilized along with the keg neck. Pressure in the keg should be approximately 75% of the counter pressure used during the latter part of the filling sequence.

SUMMARY:

It is possible to determine the following about the keg, machine function and cleaning procedures from the aforementioned:

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1. The wash water and detergent is being cleared from the keg by the final CO2 or steam purge sequence on the final wash head.
2. The final rinse on the final wash head is removing all detergent residuals from the keg.
3. The CO2/N2 purge is removing the condensate trace from the keg on the racker head prior to filling with beer.
4. The microbial integrity, via steam sterilizing or Oxine (Cl02) sanitizing of the keg is being achieved.
5. The process main C.I.P. sequence(s) are effective in removing all traces of beer protein and other residuals from the keg plant connection head(s) and piping system(s).
6. The cleanliness and microbial integrity is being maintained by the separate C.I.P. regime.
7. The residual pressure in the keg after filling will indicate that the keg CO2/N2 in solution is going to be maintained. If the pressure in the keg is above that of the filling counter pressure, then it is highly probable that the keg was overfilled and creating a hydraulic pressure within the keg. When filling kegs upright or in the inverted position against a "back-up" probe, this hydraulic pressure condition will be common.

Sample Coupler

Funnel Coupler

Pressure Test Coupler

NOTE: Stainless Steel "Sample", "Funnel" and "Pressure Test" couplers with autoclavable handles can be purchased from IDD to suit your keg valve type.

It is the intent of IDD that your kegging system provides you with the best environment for your product in keg. This information is offered as an advisory only; no liability is accepted or implied. If you have any questions pertaining to the above, please contact us.

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