



**March 28, 2019**  
**Maintaining a Clean Brewery**  
**Presenter: Richard Rench**  
**Q&A Session**

1. **Does increasing caustic solution temp above 60-70°C no longer increase effectiveness significantly, or does it just no longer continue to double every 10° beyond that temp?**

Answered in Webinar – temperatures greater than 70C are not more effective and higher temps can cause premature wear of gaskets and increase risk of scale formation.

2. **Are there any problems using diluted peracetic acid to rinse caustic? If testing pH to assess rinse, could lowering the pH quickly with acid suggest a complete rinse while leaving behind some components of your caustic solution (additives)?**

The Peracetic acid will react with the caustic forming sodium acetate – this will need to be removed by rinsing. PAA is not a strong acid so you may need to use rather a lot – more costly than using say diluted phosphoric acid. Also, you may have difficulty determining, if after neutralizing the caustic, that you have sufficient PAA for sanitizing (req 150-200 ppm active PAA) I would try burst rinsing with water – ensure that the tank is completely drained after each burst. If the water is warm (say 35-40C) it will be more effective at removing the caustic residues.

3. **What is your experience using MSA Acid in CUP? (MSA is Methane Sulfonic Acid) (CUP: Cleaning under pressure)**
  - a. **MSA attaches Calcium Oxalate faster and more effectively.**

I misunderstood the question and thought that the filler cups were being cleaned. I have no experience with MSA but I think that it is quite an aggressive acid. Apply as per the supplier's recommendations – be aware of corrosion risks with stainless steel. If you are trying to remove oxalate scale it may be better to use EDTA.

4. **What is the best practice for packing lenticular membrane filters between use?**

It depends on the intervals between uses. If this is a day or two then hot water should be fine. If the time is several days or more then a sanitizer such as 100-150 ppm PAA.

5. **Is PAA known to be a potential oxidizer in finished beer?**

Answered during webinar. Answer is yes – it may add up to 9 ppb of oxygen. In comparison filter aids such as DE will add about 20 ppb (I think). In addition, the amount of oxygen can be minimized by thoroughly draining/rinsing the PAA with D-water.

**6. What is maximum recommended application temperature for 1% nitric acid CIP in all 304 SS systems?**

Answered in Webinar – temperatures in excess of 60C (140F) will cause nitrogen dioxide (brown fumes) to come out of solution – very unpleasant for operators in the area.

**7. How can sufficient flow be assured through an external calandria?**

Answered in Webinar. The best way is to boil the caustic during the brew kettle clean.

**8. Do you have any experience with the mixture of sodium hydroxide and hydrogen peroxide causing corrosion?**

Answered in Webinar. It depends on the materials of construction. I am not aware of any issues with stainless steel.

**9. What is maximum recommended application temperature for 1% nitric acid CIP in all 304 SS systems?**

60C – temperatures in excess of 60C (140F) will cause nitrogen dioxide (brown fumes) to come out of solution – very unpleasant for operators in the area.

**10. How effective is ambient cleaning using sodium hydroxide? What is an appropriate soaking time using 2% solution?**

Depends on what is being cleaned, the amount of soil etc. I would expect most soils to be removed or be easily removed with a little mechanical cleaning after 1 hr.

**11. When a soaking method is required, what minimum time would you recommend for the soak? It will be uninsulated, and the caustic solution will lose temperature.**

If soak cleaning then probably not a good idea to go above say 40-50C. Depends on what is being cleaned, the amount of soil etc. I would expect most soils to be removed or be easily removed with a little mechanical cleaning after 1 hr.

**12. What is the ideal pH of a caustic wash?**

Using pH to determine concentration is not accurate due to the logarithmic nature of pH – a solution of pH 13 is 10 times stronger than a pH of 12. It is far better to use a conductivity meter or titration using test kits. To answer the question, I would think a pH of 12.5 -13 but this is very much a guess and I am assuming that you are trying to clean an FV or brewhouse.

**13. if I can't afford stainless steel drains what else can I use?**

Mild steel painted with a corrosion resistant paint.

**14. You mentioned equipment for chlorine dioxide, can you give example of cost and style of equipment?**

It depends on how much water you are trying to treat. This is dealt with quite extensively in my book. The short answer is that if you buy a fairly simple low capital cost equipment the efficiency of converting the sodium chlorite is low so the cost of generating the chlorine dioxide is higher compared to the high efficiency systems which have higher capital costs. Each breweries case will be different.

**15. Any experience using ozone as a sanitizer within the brewery and tips or suggestions on its use?**

I have no experience with using ozone as a sanitizer in breweries. Ozone is corrosive to Stainless steel, so I have always avoided using it or considering using it.

**16. Can Chlorine Dioxide potentially corrode stainless over time? I've heard both yes and no from different sources.**

Answered in Webinar. Chlorine dioxide is not corrosive to stainless steel. However, the chlorite and chlorate ions will if not converted to chlorine dioxide in time break down to chloride. Therefore, it is best to get as much conversion of the sodium chlorite to chlorine dioxide and make sure that surfaces are rinsed after the sanitizer has been allowed to act (say 10 mins).

**17. You mentioned measuring in caustic active and bicarbonate levels. What are the disadvantages of the increased bicarbonate levels (>5%)?**

Answered in Webinar? The sodium carbonate and sodium bicarbonate are not good cleaning agents but they do contribute to the conductivity and hence automated control systems cannot tell the difference between them and sodium hydroxide. At levels above 5% the test kits become increasingly less accurate so you have no idea how much active sodium hydroxide is present and the quality of the clean is jeopardized. If not rinsed properly the carbonate and bicarbonate may form a loose white scale – not desirable.

**18. You mentioned charges for use of some acids is an organic acid like lactic as effective as phosphoric?**

Unfortunately, no as a direct comparison. However, chemical suppliers are developing products that may use a low concentration of an acid such as sulfuric in combination with acids such as glycolic acid. I have used them in trials and they worked as well as phosphoric acid-based formulations and were cost effective.

**19. What is the ideal pH of a caustic wash?**

See answer to question 12

**20. If I can't afford stainless steel drains what else can I use?**

See answer to question 13

**21. You mentioned equipment for chlorine dioxide, can you give example of cost and style of equipment?**

See answer to question 14

**22. You mentioned charges for use of some acids is an organic acid like lactic as effective as phosphoric?**

See answer to question 18

**23. I recently started using a non-caustic alkaline cleaner which has Disodium Trioxosilicate and have found that it leaves a film that is not easily removed with acid cleaners. What is your experience using this alternative to caustic?**

I have no experience with this cleaner. I usually find that non-caustic alkaline cleaners are not as effective as caustic based cleaners. It does depend on the area being cleaned and soils that have

to be removed. As a guess I think the film is a silicate scale – best removed by EDTA in a low caustic formulation. Talk to your chemical supplier for additional advice.

**24. Hi Richard, I thoroughly enjoyed the talk. One quick question: when you say 'regularly', how often should the sanitizer in a sanitizer bath be changed?**

It depends on how much soiling is encountered – this is reduced if all components have been cleaned internally and externally before placing in the sanitizer bath. I think once a week is realistic figure but more often if the solution becomes visibly soiled. Check the concentration (using suppliers test kit) after making up a fresh solution and check daily to see how quickly the solution deteriorates.

**25. Due to local regulations, I collect all CIP in a tote post CIP. Currently we add sulfuric acid to drop the pH below 12 before discharge. I am exploring the idea of neutralizing the caustic solution by bubbling CO<sub>2</sub> through the collected solution. Tips?**

CO<sub>2</sub> is very effective for reducing pH. It is less hazardous and easier to control than sulfuric acid additions but more costly. I would install a sparge ring – such as a garden hose with fine holes in it at the base of the tote – hose to be connected to the CO<sub>2</sub> line. When the CO<sub>2</sub> is turned on you want to see a stream of fine bubbles in the solution. Check the pH regularly – discharge to the sewer when the pH reaches 9.5.

**26. A lot of new chemical companies are popping up now and they claim their caustic products are the best on the market. How can we as consumers test and select the right one or best caustic for our needs?**

This is a good question. One of the problems is that the suppliers will not tell you what is in their products. However, certain components are listed in the MSDS for each product, so you can compare for example your main caustic cleaners. I used to identify say 3 major products (most \$ spend) and compare. I preferred to have only one or two supplier's products on site, so I would not concern myself with comparing the smaller spend items. I would try and ascertain how much technical expertise could be provided and how long the company had been in existence – I was not interested if someone made up their chemicals in their garage for example. Could they provide certificates of analysis? The technical representative is very important – do you have confidence in him and will he be available to come in and work with you to resolve issues or was their service just one of delivering on time and price? Was there a charge for them providing a service visit? What would they do during a regularly scheduled service visit and would they provide reports. The service component was always important for me since there is not much to choose between chemical products provided by the chemical suppliers BUT if you cannot apply the products correctly and consistently then your cleaning results will be affected. This is where you need their help and they need to be able to provide it.

**27. Any recommendations for effectively cleaning an element in an electric brew kettle?**

Depends on the nature of the scale and the materials of construction of the heating element. If its inorganic scale then EDTA with caustic or acids such as nitro-phosphoric should be effective. However, if your heater is made of copper then these approaches will lead to destruction of the heating element. Often it is easier to replace a copper element with one made of SS. If you regularly descale then lower concentrations may be applied.

**28. A lot of new chemical companies are popping up now and they claim their caustic products are the best on the market. How can we as consumers test and select the right one or best caustic for our needs?**

[See question 27](#)

**29. Any recommendations for effectively cleaning an element in an electric brew kettle?**

[See question 27](#)

**30. For sanitizer bath if using PAA what is the life expectancy of the chemical? how frequently should it be changed?**

It depends on the amount of soil brought into the bath – minimized by cleaning the fittings internally and externally before placing in the bath. Normally, solutions of PAA should be good for 2 or 3 days and probably longer. To determine the life-expectancy make up a fresh solution and use test kits to ensure 100 -200 ppm PAA. Check the PAA content daily. When it goes below 100 ppm change it and this will give you a fair idea for the frequency of changing.