Frequently Asked Questions about Peracetic Acid

What is Peracetic Acid?
Peracetic acid (also known as peroxyacetic acid, or PAA), is an organic compound with the formula CH_3CO_3H. This organic peroxide is a colorless liquid with a characteristic acrid odor of acetic acid. It can be highly corrosive. The brand name is Purisan.

Is PAA dangerous?
Yes. PAA liquid and mist can cause skin burns. Direct contact could cause irreversible damage to eyes including blindness and/or irreversible destruction of skin tissue. Vapor/mist will irritate nose, throat and lungs but will usually subside when exposure ceases. Personal Protective Equipment: gloves and eye protection are necessary.

Where should I store the PAA container? Does the lid need to be vented?
It is good practice to store all cellar chemicals away from heat and light. The container will build pressure over time as the PAA breaks down. I recommend that the lid to the PAA container be unscrewed a quarter turn to vent and that the container be stored inside of a ziplock bag.

How does PAA work against microbes?
PAA is an ideal antimicrobial agent due to its high oxidizing potential. It is broadly effective against microorganisms and is not deactivated by catalase and peroxidase, the enzymes that break down hydrogen peroxide. It kills microorganisms by oxidation and subsequent disruption of their cell membrane, via the hydroxyl radical ($HO\cdot$). As diffusion is slower than the half-life of the radical, it will react with any oxidizable compound in its vicinity. It can damage virtually all types of macromolecules associated with a microorganism: carbohydrates, nucleic acids, lipids and amino acids. This ultimately leads to cell lysis and true microbial death. It also breaks down in food to safe and environmentally friendly residues (acetic acid and hydrogen peroxide), and therefore can be used in non-rinse applications. It can be used over a wide temperature range (0–40 °C), wide pH range (3.0–7.5), in clean-in-place (CIP) processes, in hard water conditions, and is not affected by protein residues.

Do I need to use a cleaner prior to using PAA as a sanitizer?
Yes. To sanitize winery equipment, first you need a caustic cleaner like potassium hydroxide (KOH), sodium hydroxide (NaOH), or sodium percarbonate ($Na_2CO_3 \cdot 1.5H_2O_2$ brand name Proxy Clean) to remove tartrates, protein scum, debris and particulates. After the equipment is visually clean, then it can be sanitized with PAA. See below for sanitation protocol.

Do I need to neutralize the caustic with an acid rinse before using PAA?
No. After cleaning with caustic, you should rinse the residual caustic off of the winery equipment with water. The PAA will serve as a neutralizing acid rinse as well as a sanitizer.

How much should I dilute PAA before using it as a sanitizer?
Use concentration of 80 ppm. Per 10 gallons of ambient temperature water (do not use warm or hot water), add 59 ml of 5% PAA. The concentration of the PAA solution should be checked daily with a test strip (LaMotte (www.lamotte.com) – catalog # 3000) and, if necessary, add PAA to 80 ppm. The entire solution of PAA must be replaced on a weekly basis.

After the PAA do I need to rinse the equipment with water?
Following PAA rinse, wait 30 minutes before putting wine into tank or rinse tank with water immediately prior to moving wine into tank.

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Routine Sanitation Protocol for Equipment

How long is the equipment considered "sanitized" after sanitizing with PAA?
Equipment can be considered ready for use for 10 days upon completion of sanitation. If last sanitation was completed over 10 days from date of use, resanitize with PAA only.

Cleaning and Sanitation of Tanks Protocol
This protocol is for routine tank washing from top using potassium hydroxide (KOH) cleaner and peracetic acid (PAA) as sanitizer. Prior to starting to wash the tank, verify that the tank is empty and that the area is clearly identified with warning or caution signs.

1. Open the tank door, remove the door gasket and lay it on the tank floor. If applicable, remove the top door gasket and lay it on the tank floor as well.

2. Open all tank valves ¼ to ½ open, to facilitate proper rinsing of tank.

3. Place the spray ball in the top of the tank, and connect a hose from the washer to the discharge of the tank washing pump. Connect the inlet of the pump to the water source.

4. After closing the tank door, open the water source and then start the pump, ensure the spray ball is operational by listening to the water hit the walls of the tank.

5. Perform an initial rinse of the tank to ensure any loose debris (lees remainder, seeds, tartrate flakes) have been rinsed out of the partially opened valves. (Generally tanks <10,000 gallons should be rinsed for 5 minutes and tanks >10,000 gallons should be rinsed for 10 minutes). Debris can affect the efficacy of the tank cleaning and sanitation; all debris must be removed prior to cleaning the tank.

6. After the tank has been thoroughly rinsed, close all valves and let the tank fill to the specified amount of water in the following table.

Tank Capacity (Gallons)	Water Volume (Gallons)	KOH (Gallons)	KOH (Liters)	PAA (Liters)
≤500	25	0.25	1	0.15
500-999	40	0.4	1.5	0.1
1000-1999	50	0.5	2	0.3

7. Once the tank has the specified amount of water, turn off the water source, disconnect the pump from the water source and attach it to the bottom valve.

8. Dispense KOH cleaner to make 1% solution (see table above) and pour solution into tank. CAUTION: When handling KOH, ensure all PPE is used and area is appropriately identified that tank washing will be taking place.

9. To restart tank washing, open bottom valve, prime and start pump.

10. For tanks under 10,000 gallons, circulate KOH for approximately 10 minutes, for tanks over 10,000 gallons, circulate KOH for approximately 20 minutes.

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11. After circulating tank for the appropriate time, turn off the pump and inspect the interior of tank (take caution around KOH solution). If tank is visually clean, disconnect the hose from the inlet to the pump, open bottom valve and let KOH solution drain. If tank is not visually clean, continue to circulate the solution for an additional round of cleaning. An alternate cleaning method may be necessary to completely clean tank interior.

12. Upon verification that tank is visually clean, rinse tank with water to ensure residual KOH has been rinsed out of tank.

13. After water rinse, close the bottom valve and reconnect the hose to the pump. Refill the tank with water to the specified amount in the table above and dispense appropriate amount of PAA in tank. (take caution around PAA solution).

14. Carefully dispense PAA into tank, open bottom valve and restart pump to begin recirculation of PAA. For tanks under 10,000 gallons, recirculate PAA for 10 minutes and for tanks over 10,000 gallons, recirculate PAA for 20 minutes.

15. Upon completion of sanitation, close the bottom valve and disconnect valve from pump, then drain tank of solution.

16. Clean up work area, replace all applicable fittings to their storage area and refit gaskets on tank. Additionally, ensure tank is identified as cleaned/sanitized with date completed.

17. Tank can be considered ready for use for 10 days upon completion of sanitation. If last sanitation was completed over 10 days from date of use, resanitize tank following PAA steps above.

18. If going immediately back into tank and tank looks visually clean after initial water rinse, KOH cleaning step can be omitted and tank can be sanitized only with PAA. Following PAA rinse, wait 30 minutes before putting wine into tank or rinse tank with water immediately prior to moving wine into tank.

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