Brewery Cleaning

Nordeast Brewers Alliance -- Minneapolis, Minnesota

As brewers we have myriad solutions to clean our equipment and spaces before, during, and after brew day.
For the January 2021 club meeting, we drilled into what each of these products do and how to use them properly.
This information is based on manufacturers' sites as often as possible. Please consult product labels before using.
Cheers!

Cleaning Products

Product	Purpose	What is it?	Best use: temperature, duration, frequency, etc.	Other notes
Five Star PBW	Alkaline Cleaner	• 30% Sodium Metasilicate (makes things alkaline) • Percarbonate (Oxyclean) (creates hydrogen peroxide) • Sodium bicarbonate • Agents to remove beerstone (attaches to calcium) • Buffering agents (stabilizing pH) • Surfactant (foaming agent) • Filler, anti-caking, etc.	• 1-2oz/gal for kettles • 0.75oz/ga for fermenters, kegs, etc. • When circulating, heat to **130°-180°F and circulate for at least 30 minutes**. • If soaking, heat to **140° and soak for 4 hours** or allow to **cold soak up to 8 hours** • Rinse thoroughly • **Good for 10 hours in solution**	• **Shelf life: 6-12 months** • May turn blue when soaking copper • Avoid with aluminum • Safe for stainless steel • Affects taste if not rinsed • May not be safe for consumption • Also works great for coffee equipment and similar
Five Star StarSan	Acidic Sanitizer	• Food-grade phosphoric acid	• 1oz per 5gal • Apply with cloth, sponge, spray, immersion, etc. • Spray within 6-8" and follow with brush or sponge • Allow **1-2 minutes of contact** time • **Use within 1 hour of mixing** • **Effective at 2.5-3.5 pH** • Works best **50-120°F -- ideally closer to 120°F** (and increasingly ineffective above 120°F due to pH becoming lower at higher temperatures)	• Avoid with aluminum • Safe for humans (no-rinse) but hazardous to animals • Safe for septic systems, but ensure to rinse down the drain thoroughly to dilute • Cloudy solution may occur with hardness in water, which is an indicator of less effectiveness • **Concentrate shelf life is 2 years** • Higher concentration (more than 1oz/5gal) makes it no longer 'no-rinse'
Five Star SaniClean	**Both/Neither**? Acid-based	• Phosphoric acid • Sulfonate oleic acid	• 2oz per 5gal • Apply with cloth, sponge, spray, immersion, etc. • Spray within 6-8" and follow with brush or sponge brush or sponge • Allow **2-3 minutes of contact** time • **Works best 90-120°F** • **Effective at 3.0 pH**	• **Low-foaming** • Avoid aluminum • **Concentrate shelf life is 2 years**
One Step	Cleaner	• Sodium carbonate	• 1tbsp per gal • Requires **2 minutes of contact** time if using as a sanitizer	• Oxygen-based • Chlorine-free • **Although a cleaner, it releases hydrogen peroxide so acts as a sanitizer to some extent**

OxiClean	Cleaner	• Sodium percarbonate
		• Sodium carbonate
		• Surfactants
		• Polymer
			• Best in **"warm to hot" water**, but not boiling
			• **Use within 6 hours of mixing** - after that, the hydrogen peroxide process end and is no longer as effective
				• Creates hydrogen peroxide as cleaning agent when mixed
				• **No shelf life if kept cool and dry** according to manufacturer
				• Competing products
				  ○ **Clorox 2**: has chemical to convert hydrogen peroxide into **peracetic acid**
				  ○ **Biz Laundry Booster**: **enzymes** to break down organics

Bar Keepers Friend	Acid-based cleaner	• Oxalic acid	• Available as **powder or liquid** • Works best by sprinkling onto a damp surface and using a wet cloth or sponge to spread as a paste • Used at **room/warm temperature**	• Best option to clean **stainless steel** • **Makes stainless steel resistant to oxidation via the process of passivation** and can remove rust on stainless steel • Removes small scratches from stainless steel
BLC (Beer Line Cleaner)	Alkaline cleaner	• ??? (Details not available anywhere!)	• 0.5oz/quart • **Cold or warm water**	• Best for **inside of beer lines** (kegerator, etc.) • Loosens beer stone, biomass, organics, and mineral deposits from commercial and home draft systems
Iodophor	Disinfectant (sanitizer)	• Iodine • Solubilizing agent (surfactant or polymers)	• Recommended in cold water (not hot) • Requires **2 minutes of contact** time	• Effective against all bacteria • May stain (but may clean up with bleach) • Low foaming

Bleach	Alkaline cleaner	• Sodium hypochlorite	• Many sources say to mix 1 gallon cold water with 1 tablespoon bleach and 1 tablespoon vinegar as a cleaning/sanitizing agent
			• NOTE: mixing bleach and other cleaning products creates toxic gas, so **DO NOT MIX BLEACH WITH ANYTHING** to be safe
			  ○ + vinegar = chlorine gas
			  ○ + ammonia = chloramine gas
			  ○ + rubbing alcohol = chloroform
			• It is best not to use bleach
			• If you feel you need to use bleach to recover a plastic or glass fermenter, just spend the $10-50 to buy a new fermenter instead!
				• **Bad for stainless**
				• Toxic if not rinsed thoroughly
				• Kills everything
				• **DO NOT MIX BLEACH WITH OTHER CLEANERS**
				• In fact, use different products instead of bleach in general

Trisodium Phosphate (TSP)	Alkaline cleaner	• Phosphate	• Warm water	• Great at degreasing • Bad for metal • Causes algal bloom (bad for sewer/septic) • The **best use is to clean a brewery space, not the equipment**. Wash walls, floors, tables, etc. and then rinse thoroughly. Find a different product to clean equipment

Note: Hot water faucets are often set at 120ºF maximum, which is also helpful to determine cleaning product needs

Note: "Anecdote" is not the singular version of "data". If you use these products in other ways (e.g., StarSan at 40°F) and do not have problems, keep on keepin' on. The data above is from manufacturers' sites as often as possible. RDWHAHB.

Sources:

- https://www.midwestsupplies.com/
- https://homebrew.stackexchange.com/questions/10244/chemicals-of-pbw-and-starsan-diy-solutions
- https://fivestarchemicals.com/pbw-cleaner-1bs
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Common Alkaline Brewery Cleaner Formulations:

Builders: make the water softer *(e.g., sodium metasilicate)*
Oxidizers: “oxygen cleaner” that produces hydrogen peroxide and also raises the pH to support cleaning action; alkaline pH can destroy organics *(e.g., sodium percarbonate)*
Sequestrants/Chelating Agents: bind with metal ions, which prevent them from reacting with other elements and thereby preventing scale buildup. *(e.g., TSP, EDTA, DTPA, sodium citrate)*
Buffering Agents: raise pH and resist change in pH to maintain ideal alkalinity *(e.g., sodium carbonate aka washing soda; sodium citrate)*
Surfactants: disassociate lipids, lower the surface tension of water (makes water “wetter”) and this aids the detergents and foaming properties promote distribution of cleaner *(e.g., ethoxylated alcohol C12-C1)*
Anti-Caking Agents: reduce tendency of the cleaner to clump up and cake *(e.g., sodium sulfate)*
Fillers/Bulking Agents: obvious

Product	**Builder**	**Oxidizer**	**Sequestrant/ Chelating Agent**	**Buffering Agent**	**Surfactant**
PBW (Five Star)	sodium metasilicate	sodium percarbonate	pentasodium triphosphate (TSP) tetrasodium EDTA (tetrasodium ethylenediaminetetraacetic acid tetrahydrate)	sodium carbonate	isopropanol (ethoxylated?)
Oxygen Brewery Wash	<2.5% disodium metasilicate	40-60% sodium percarbonate	N/A	25-50% sodium carbonate	N/A
Alkaline Brewery Wash *(designed to be most effective at room temp)*	25-50% disodium metasilicate	N/A	< 2.5% trisodium orthophosphate (TSP)	40-60% sodium carbonate	N/A
Easy Clean	N/A	sodium percarbonate (also contains sodium sulfate as a filler)	N/A	N/A	N/A
Oxiclean FREE Versatile Stain Remover powder	N/A	sodium percarbonate	N/A	sodium carbonate	ethoxylated alcohol C12-C16
“DIY PBW” (70% Oxiclean FREE / 30% Red Devil TSP-90)	sodium metasilicate pentahydrate (100% in TSP-90)	sodium percarbonate (from Oxi)	N/A	sodium carbonate (from Oxi)	ethoxylated alcohol C12-C16 (from Oxi)
One-Step *(promoted as a cleaner-sanitizer, but probably requires 15-min soak to sanitize)*	N/A	> 40% sodium percarbonate	> 10% sodium citrate (also a buffer)	> 20% sodium carbonate > 20% sodium chloride	N/A
B-Brite *(won bottle de-labeling shootout)*	N/A	< 50% sodium percarbonate	N/A	< 40% sodium carbonate	
C-Brite *(warning: chlorine-based so do not use with SS)*	No info	No info	No info	No info	No info
Straight-A	>15% sodium metasilicate	> 10% sodium percarbonate	> 5% diethylenetriaminepentaacetic acid pentasodium salt (DTPA) and tripolyphosphoric acid	> 40% sodium carbonate	N/A

PBW (Five Star): https://fivestarchemicals.com/sds
One-Step (LOGIC Inc.): https://www.ecologiccleansers.com/wp-content/uploads/2017/08/One-Step-MSDS-US.pdf
Easy Clean (LD Carlson): https://storefront.ldcarlson.com/storefrontCommerce/binaryContent.do?contentKey=ac7e3b4d-ddaa-4dfb-ac44-b5a59546039f
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C-Brite (_____): _____