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SOAP IS NOT AN OPERA:
How to Buy Cleaning Chemicals (Part One)

by

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Soaps are staple products of the cleaning industry, yet most contractors do not understand how to pick from among the myriad choices on the market. I base this comment on thirty-plus years of experience in janitorial supply sales and service. Lack of knowledge makes contractors susceptible to ridiculous advertising too. Genies, captains, ditsy housewives, and talking bubbles play heavily in this arena. There's a lot of hype and voodoo surrounding the soap industry which needs to be dispelled. This is especially true when it comes to "green" products. Like a soap opera, with constant turmoil as the rule of the plot, regulatory agencies, the Green Movement, and major manufacturers keep the show riveting. To save money and get the job done, cleaning contractors must become savvy buyers; otherwise, precious dollars will be flushed down the toilet. With this in mind, let's begin to dispel the misconceptions.

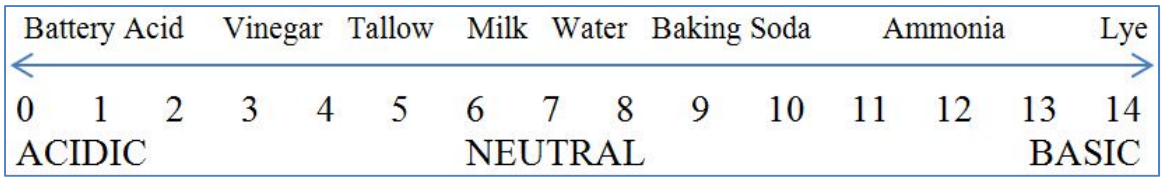
SOAP MAKING

First, it is important to know a teeny bit of chemistry. Soap is nothing more than a basic reaction between animal fat or vegetable oil and caustic soda, commonly called lye. Mix the two components together and poof, you've made soap. Your great-great-grandmother used to do it at home with lye water made from fireplace ashes and leftover grease from cooking. Soap itself if nothing more than a salt, the result of combining acidic fats or oils with alkalis like caustic. There are many types of salts, table salt being the most familiar; however, we are concerned with salt of a fatty acid – soap.

Creating soap is known as saponification, from the Latin word *sapo,* meaning soap. Modern day soaps are a bit more complex to make, however the chemical reaction is basically the same. We call them detergents these days, but they perform the same basic task as great-great-granny's lye soap – lowering the surface tension of water (more on this later). Detergents have many uses, from synthetic lubricants to disinfectants. We will only concern ourselves with those used in the cleaning industry.

pH SCALE

Now for a bit more chemistry: the pH Scale. This scale measures the strength of an acid (like vinegar or battery acid) and a base (like caustic, an alkali). Here is a simplified version of the scale:



What is most important to understand here is that acids and alkalis are not the same – they are opposites – opposites attract and very possibly react. Many problems arise from not grasping this concept. For instance, a marble floor must never be cleaned with acid (i.e., vinegar) because acids react with the limestone in the marble to permanently damage the stone; an acrylic waxed floor must never be cleaned with a base (i.e., household ammonia) because it will strip the acrylic. Taking time to thoroughly comprehend the pH scale is imperative when it comes to purchasing the right detergent for the task (See Chart, Figure 1, Page 7). Both the composition of the surface to be cleaned and the type of cleaning chemical to use must be taken into account to avoid damaging reactions. [When in doubt, a good janitorial supply house should be able to offer assistance. Build a relationship with one you trust.]

Without having to test every cleaning chemical with litmus paper or a meter to determine the pH, there are easier ways to get this information: the Material Safety Data Sheet (MSDS) on all chemicals as required by Occupational Health and Safety Administration (OSHA), the manufacturer's Product Technical Bulletin (tech sheet), the seller of the product, and the internet. Most manufacturers provide both MSDSs and Tech Sheets via their websites. Yet another way to determine the compatibility of a detergent with a job type is to READ the product label. I can't say this strongly enough. Labeling contains instructions for use, precautions, and warnings. As a cleaning contractor, all of these sources of product information should be used and stored as a matter of permanent record at the contractor's place of business.

SURFACE TENSION

Now, let's get back to surface tension and how it affects your bottom line. Surface tension is the ability of a liquid to resist external force. Ever seen a paper clip floating on water (see Figure 2)? Surface tension is what keeps it afloat. The same principle makes plain water a relatively poor way to clean a surface of any type. Every surface has tiny pores and blemishes that harbor dirt and germs (see Figure 3). The surface tension of water covers over those blemishes much like a skin, which in turn traps the debris in those near-microscopic pockets. The addition of a detergent to water reduces the surface tension so that the cleaning solution will sink into the blemishes, allowing the dirt and germs to float free (see Figure 4). The detergent then

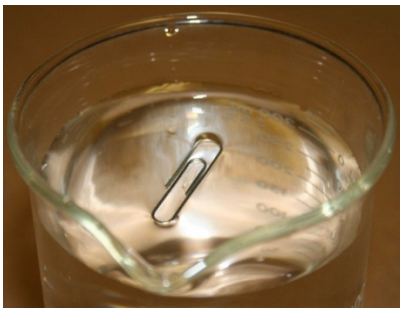


Figure 2

buoys and surrounds the dirt and germs so they can't sink back to the surface as easily. We call this increasing the surface's "wettability." This is why you never clean anything with just plain water. A good quality cleaning detergent makes the job go faster – simple as that. One further way to enhance the cleaning ability of any water-based detergent or soap is to dilute them in warm water. The surface tension of warm water is less than cold water, thus the ability to get in tinier pores is improved, therefore freeing more dirt and germs. Axiom: increasing the ability to clean a surface reduces labor and chemical costs dramatically.

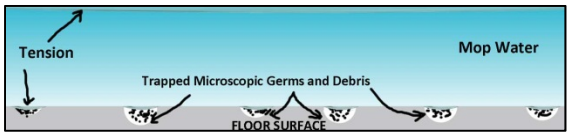


Figure 3

The next consideration toward saving money on cleaners is to use commercial quality detergents as opposed to consumer brands designed for home use. Homeowners are not generally as knowledgeable as professional cleaning contractors when it comes to using detergents; thus, household products are not normally as strong as their commercial counterparts. After all, cleaning contractors are supposed to be bonded, insured, and competent in the use of stouter commercial detergents. [Example: while a full 8-ounce cup of the name brand household pine cleaner is required in a gallon of water, many commercial equivalents can be diluted as much as an ounce per gallon.] Overuse not only increases chemical costs, but also the possibility of causing damage to both people and surfaces. While it is very important to use commercial cleaners to keep costs down, it is equally important to obtain proper training in their use.

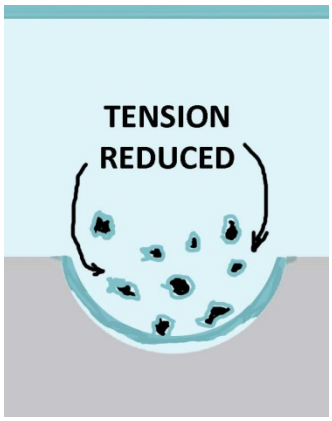


Figure 4

GOING GREEN

Now, here comes the voodoo. Most manufacturers would like you to think that they have the finest, "greenest," most concentrated quality cleaning chemicals on the market today. While constant research is being done to make better, "greener" detergents, that doesn't mean there is much progress. The Green Movement, supposedly geared toward making the world more environmentally conscious, is actually driving up manufacturing costs by lobbying for more stringent rules and regulations over cleaning products and procedures. OSHA complies without hesitation because it means more fines, fees, licenses, and restrictions that fill government coffers with money. Biodegradability is a buzz word of the Greenies. The fact is, nearly all water-based cleaning detergents are biodegradable and always have been. When they breakdown in nature they become mostly fertilizer (various salts, remember). Simply put, they rot. Most cleaning detergents only become hazardous once they are contaminated with dirt, grease, germs, and other more hazardous materials.

FOR THE EXCITING CONCLUSION TO "SOAP IS NOT AN OPERA," TUNE IN NEXT ISSUE.

DETERGENT CONCENTRATES

Since "going green" means more expense for everyone, it is important that cleaning contractors learn how to stretch their detergent dollars. The biggest savings will come from purchasing quality concentrates in bulk. Water, commonly known as "the universal solvent," is a key ingredient, and a cost, in the making of detergents. While some water must be present, more water is an extra cost – purified water is not free. Production of concentrated detergents costs less than making those with low or nonexistent dilution rates, mainly because of packaging labor and materials. The increased labor of putting detergents in quart bottles versus fifty-five gallon drums is astronomical. It takes ten times longer to pour a case of a dozen quarts as it does to pour fifty-five gallons into a drum. Oh, but what about automation? Sure, expensive filling machines can cut costs over time for packaging zillions of gallons. Not all manufacturers of quality detergents are large enough to support them though. Let's look at some real figures:

EXAMPLE: A gallon of a quality concentrated degreaser currently runs about $13, having a proven dilution ratio that works for the job at the rate of 1 part degreaser to 64 parts water. A gallon of "use-as-is" degreaser costs around $8 and will do the job too. How much is the real cost per square foot for each product? Given: a gallon of liquid detergent covers about 1200 square feet.

A. The Concentrate: 1/64 = .016 dilution ratio. Multiplying $13 x .016 = $0.21 per gallon. This makes the real cost of degreasing 1200 square feet a mere 21 cents!
B. The Use-As-Is: 1/1 = 1 dilution ratio. Multiplying $8 x 1 = $8 per gallon. This makes the real cost of degreasing 1200 square feet a whopping $8!

From the example we can see that the actual cost of degreasing 1200 square feet with the proven concentrated degreaser, even though we pay dramatically more, is by far the most economical product to use! This same method of calculation can be used to determine the real costs involved with every type of detergent. A final tip: avoid buying fancy packages, especially dilution control bottles and premeasured pods. Often the packaging costs more than the actual detergent. Buy in bulk.

DILUTION CONTROL

Once the chemical costs have been calculated and the best product for the job is chosen, it comes down to proper training of the end user to insure that we eliminate the biggest drain on our investment – waste. This brings us to dilution control. Nearly any container can be filled using exact ratios, thus removing the possibility of human error and waste. As long as the proper ratio for the job is achieved, it doesn't matter how simple or complex the dilution method. Use of a measuring cup is about as easy as it gets. Buy one. Make copious notes on the dilution ratios that work best with each detergent in your cleaning arsenal.

Figure 5 – Push Button Blend Centers

Images courtesy of DEMA Engineering (www.demaeng.com)

If you are a larger contractor and are still allowing your

employees to use the glug-glug method of dilution control, it would be extremely prudent to obtain a proportioning system. Also known as chemical proportioners, blend centers, dispensing systems, and dilution control stations, these devices meter specified amounts of detergent into water automatically (see Figure 5). These systems come in many configurations and range from about $80 to $600. Find a proportioning system that handles all of the cleaning detergents you use no matter what the final expense in equipment. Equipment costs are minimal when compared to detergent waste. The investment will be recouped very quickly.

As bulk chemicals have a lower cost per gallon, it behooves us to buy in as large a container as we can afford. For a contract cleaning service, that means a bare minimum size of five gallon pails of the best concentrates we can find. Since the shelf life on detergents is measured in years (if in a properly sealed container), and since contract cleaning services use these products every day, I have always recommended purchasing in thirty or fifty-five gallon drums. Dispensing into smaller containers, properly diluted, cuts detergent costs as far as they can go. Just think, if an employee uses three glugs from the jug of disinfectant, that's a bare minimum of ten ounces. If that same employee only puts two gallons of water in the mop bucket, that's a ratio of five ounces per gallon. If the detergent calls for one ounce per gallon of water, that employee just quintupled the detergent cost for the job! Consider this: your company currently buys 180 gallons of neutral cleaner each year. The glug-glug method causes a minimum of one-fifth of the 180 gallons to go down the drain. That's 180/5 = 36 gallons wasted. The detergent cost is $6.90 per gallon, so 36 x 6.90 = $248.40. Since dilution control units for drums only run about $100, you tell me, is it worth it to control waste?

DETERGENT QUALITY

Our next consideration is quality of the detergents used. If a detergent does not help get the job done in a timely fashion with a reasonable amount of labor, get another detergent that does. Once the proper type of detergent is picked for the job, following instructions on the label will establish the quality. For instance, general damp mopping of waxed floors calls for a neutral cleaner; your brand of neutral cleaner states to pour three ounces in a gallon of warm water to damp mop a waxed floor. Further, the detergent label says to apply liberally with a mop and allow five minutes to soak, and then sop up. Does it work? If so, purchase more; otherwise, find another brand. The worst case scenario: your cleaning crew of three (hourly wage of $7.25) was slated to spend six hours mopping the gym floor at a church. Your detergent indicated that you would use five gallons (cost of $6.90 per gallon) and be able to mop once. Instead, it took nine gallons, plus fourteen hours of labor. That's 14 – 6 = 8 x 3 = 24 hours extra time, 24 x 7.25 = $174 extra labor, and 9 – 5 = 4 x 6.90 = $27.60 extra detergent for a total extra cost of $201.60. There goes the profit!

The point is you get what you pay for. Buy quality to save money. This does not mean you have to buy name brand detergents either. There are many smaller manufactures making quality products too. Do the research. Run the tests. Keep the notes. Find the products that work best for your cleaning team!

CONCLUSION

We've covered much territory in the realm of cleaning chemicals, mainly geared

toward how to choose cost efficient, quality detergents to help reduce cleaning costs. Along the way we learned why detergents are used, why cheap is not actually cost conscious, why dilution control is imperative, and why becoming knowledgeable about basic chemistry as it pertains to detergents will help us exorcise the voodoo surrounding soap making. The "soap opera" of changing rules and regulations perpetuated by the Green Movement, manufacturers, and the feds does not have to break our contract cleaning companies. We may have to take into account all the directives pushing our costs higher, but at least now we can filter out much of the hype so we can get down to the business of making a profit through educated detergent purchasing.

TIP: AVOID USING HOUSEHOLD BLEACH AND AMMONIA AS CLEANING DETERGENT REPLACEMENTS

by

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Bleach and ammonia have been prime chemicals used by the cleaning industry since the Industrial Revolution. They're cheap, at least in their undiluted form. Cheap does not mean clean however. Sure, both chemicals are stout and will clean stuff, but are they a good way to cut cleaning costs? Let's look at some of the pros and cons:

CONS:

1. Bleach and ammonia are dangerous and hazardous. Thinking of "going green?" Forget it with these chemicals. Both are heavy disinfectants used in water purification and waste treatment facilities. They eliminate creatures from the water supply – including fish.
2. These chemicals contain no detergents, so improving the wettability of the mopping solution is limited. Dirt simply falls back to the surface even as you mop. (See article, "Soap is Not an Opera" for more information.)
3. They both burn skin and damage incompatible surfaces like waxed floors.
4. Neither is very dilutable for cleaning purposes, which means greater chemical costs.
5. There are certainly a few surfaces that respond well to bleach or ammonia, but I can't think of any. Both chemicals put wear and tear on most types of surfaces.
6. The two products accidently mixed together will give off toxic chloramine fumes and kill you.

PROS:

1. Bleach takes out some stains from some surfaces, mainly fabrics.
2. Ammonia makes an okay glass cleaner if you can stand the smell.

By employing Benjamin Franklin's method of decision-making, we see that the cons outweigh the pros. Don't use these chemicals to replace detergent cleaners unless you want to pay more to get less cleaning done, plus add to your liability on the job.

COMMON CLEANING CHEMICALS CHART (FIGURE 1)			
pH	**DETERGENTS**	**SURFACE USAGE**	**COLOR CODING**
1	Muriatic Acid	Concrete, brick, various metals.	Clear yellowish.
1	Acid Brightener	Most metals including stainless steel.	Usually dark like brown or navy blue.
1-3	Tile & Grout Cleaner	Ceramic Tile, Porcelain, Grout.	Usually clear to yellow.
1-3	Acid Bowl Cleaner	Toilet Bowls and Urinals.	Usually clear to white.
3.5-4	Hydrogen Peroxide Cleaners	Acrylic floor finishes, carpets, ceramics, porcelain, grout, countertops.	Usually clear to any light color.
4-6	Pine Oil Disinfectant	Any surfaces not harmed by water or liquids.	Usually light brown.
6	Hand Dish Wash Detergent	All types of utensils, pots, pans, and dishes.	Usually clear to yellow.
6	Oil Based Furniture Polish	All types of furniture, chrome, stainless steel, plastic and Formica, ceramic, tile, and vinyl.	Usually clear to yellow.
6.5	Hand and Body Cleaner	Skin Cleaning.	Usually light pink, blue, green, or white.
6.5-7	Natural Citrus Degreaser	Deodorizing, Degreasing, Drain De-clogging, Cold Parts Cleaning.	Usually light orange or yellow.
7	Foaming Carpet Shampoo	Carpet and Upholstery.	Usually clear of light blue.
7-7.5	All Purpose “Neutral” Cleaner	Any surface not harmed by water or liquids. Great for waxed floors and all types of stone.	Usually light pink.
7-7.5	All Purpose Disinfectant	Any surface not harmed by water or liquids.	Usually light blue, green, or yellow.
8-8.5	Enzyme/Bacteria Cleaners, Deodorizers, Bio-odor Eliminators, Drain Openers	Any surface not harmed by water of liquids except waxed floors. Mostly used in restrooms.	Usually white.
8.5-8.8	Heavy Duty Citrus Hand Cleaners	Removes grease, grim, and ink from skin.	Usually orange or yellow.
8-8.6	Acrylic Based Floor Finishes	Resilient floors, concrete, and wood.	Milky white.
9.5-10	Pine Disinfectant Concentrate made with REAL Pine Oil	Disinfecting and General Purpose Cleaning. Do not use on acrylic floor finishes.	Usually light to deep brown.
9	Glass Cleaner Liquid with Alcohol	Glass, ceramic, porcelain, metal, and plastic.	Usually light blue.
8-10	Heavy Duty Cleaner and Degreaser	Any surface not harmed by water or liquids.	Usually deep purple, burgundy, or blue.
11	Non-Acid Bowl Cleaner	Toilet Bowls and Urinals.	Usually clear or milky.
11-13	Concentrated Degreaser with Butyl or Petroleum Solvent Additives	Most surfaces EXCEPT automotive paint, glass, polished aluminum, and waxed floors.	Usually deep burgundy or purple.
11.6	Liquid Ammonia	Strips wax, cleans glass, ruins polyurethane, dangerous.	Clear light tan.
12	Steam and Extractor Carpet Cleaner	Carpet and Upholstery.	Usually clear or light blue.
12-12.6	Household Bleach	Disinfects most surfaces but ruins wax, dangerous.	Clear
13-14	Degreaser Concentrate (non-Butyl)	Grease, wax, gum, ink, dirt, and oil removal.	Usually deep purple, burgundy, blue, or green.
13-14	Wax Stripper	Removes acrylic floor finishes and paste wax.	Usually clear or deep burgundy.
14	Caustic Type Oven & Grill Cleaner	Fry vats, stainless steel counters, and grills.	Usually clear or deep burgundy.
14	Powdered and Liquid Concrete Cleaner	Extreme concrete cleaning and degreasing.	White powder, deep colored liquid.