

Chemistry Formulas For Hospitality

By: Alan McPherson

The development and use of surfactants, enzymes, bleaches, boosters, sour, and solvents, can create confusion in fully understanding the steps that are essential to processing quality linen within the wash formula. First, we need to understand what we are trying to accomplish within the wash formula or laundering of the linen. The goal is to remove local or general soil, stain removal, sanitization/ disinfection, whitening, and maintaining the original condition of goods without chemical or physical damage that shortens the life of the goods.

Through the years chemistry has changed, but the basic principles of the wash formula remains the same: time, temperature, mechanical action, and chemicals. The objective of these four components is to create the optimum cleaning condition within the wash wheel. Any decrease in one of these variables must be compensated for by an increase in at least one of the three remaining variables to prevent a reduction in wash quality. For example, a decrease in time can be compensated for with an increase in chemical concentration.

Time - This is a requirement for each step within the wash formula and is usually based entirely on factors that exist within the individual laundry. For example: A "suds bath" or "break" may average eight to ten minutes with a surfactant or solvent type detergent but may require twelve to fifteen minutes when utilizing an enzyme detergent. Other factors that directly affect time include water temperature, water conditions, and water level. Load size and soil classification can also affect time for a formula step.

Temperature - The ability to control the temperature of the water being introduced to the washer in any given step during the formula is a crucial element. The proper choice of temperature is driven by the composition of the fabric that is being processed. Temperature selection can also be driven by the step in the formula. For example: Rinses may start off at a higher temperature and end up at a lower temperature. Enzyme based detergents usually

can be less effective at higher temperatures than other types of detergents. When bleaching, temperature directly affects chlorine and oxygen differently. Other factors include linen classification, soil content and soil type.

Mechanical Action - This component is probably the most overlooked element of the wash process. This is the pounding action that the washer creates within the wash wheel to remove embedded soil. There are several variables that directly affect the efficiency of this process. The most common throughout the industry is overloading. By overloading the washer, the goods cannot fall and receive the "washboard effect" that the washer is designed to achieve. It also does not allow complete dispersion of the chemicals within the washer. Other factors that may affect the mechanical action is over-sudsing. This will often act as a cushion or a float and will not allow goods to pound against the wash wheel. Water levels may also affect mechanical action. High water levels with small loads can have the same affect as over-sudsing.

Chemistry - This is the process of adding chemicals into the washer at specific times during the wash formula to assist in removing soil, discoloring stains, sanitizing and disinfecting, softening, and starching goods during each step of the formula. Chemicals are added directly to the wash wheel through different types of dispensing systems. Chemical selection is based on water conditions, goods being processed, and the laundry's individual needs and goals.

Wash formulas, simply stated, are steps within a wash that utilize the above components to create the optimal cleaning condition within the washer. Every company has their own idea or theory on the perfect formula design. However, formulas are generally based on the individual laundry and the conditions that exist within. It can be said that the most common general formula will consist of a flush, break/suds bath, carryover, bleaching, rinses, and a sour or softener bath.

Below you will find a typical wash formula for processing white polyester napery. (Note: with cotton products a higher alkaline break will be utilized; and with polyester products the wash formula will typically utilize more surfactant.)

Cycle	Water Level	Temp	Time	Supply
Flush	High	Split	3	-
Break	Low	120-160	12	Alkali-Surfactant
Carry Over	Low	120-160	4-6	
Bleach	Low	140-150	7-8	Chlorine
Rinse	High	120-160	2	
Rinse	High	120-130	2	
Rinse	High	95-110	2	
Sour/Starch Extract	Low	90-100	6	Sour/Starch
			4-6	

Flush - This step in the wash process is designed to prepare the goods for the washing procedure. Classifications and soil content will directly affect the time, temperature and chemicals required for this step in order to achieve optimal outcomes. The flush will break-up and remove gross soils so that the subsequent steps are effective.

Break/Suds Bath - The term break is derived from the fact that it is at this point in the wash formula that the bulk of the soil is broken loose from the fabric and suspended in the washing solution. This is where most of the soil is removed and the stains are broken-up and where the detergency is doing the work. This is also usually the longest step during the wash formula.

Carry over - This step usually employs no chemicals, but can remove or flush residual soils that were not

removed during the break/suds. Its main function is to lower the soil and alkalinity concentration, usually prior to the bleaching step.

Bleach - This step is used for whitening or to discolor stains. Sodium Hypochlorite is the most commonly used but oxygen or peroxide is gaining ground. This step is also affected by time, temperature and mechanical action. For most operations, sanitizing and disinfection is accomplished here.

Rinses - Once all the washing and bleaching is accomplished, we can now begin to rinse out and flush the chemicals and soils out of the goods. Typically this is a high water step and the temperature gradually decreases through each rinse. Rinses usually average around two minutes with up to three rinses per formula.

Sour or Softener - The last step in the formula! Often called a "finish step," the softener and or sour is added to this step to condition the goods for removal. The chemicals added here will directly affect the quality of the goods after being processed and customer ready.

In this ever changing industry, it has become a challenge to create the "perfect wash formula." The challenge is to provide a formula that will clean, sanitize, and remove stains without degrading the integrity of the goods while saving utilities, chemicals and labor.

One of the keys to ensuring success can be the procedures outside of the wash formula. For example: Sorting into proper soil classification will help the chemical supplier design a formula that will not overuse utilities or chemicals. Why wash lightly soiled linen on a heavy soiled formula? And processing heavily soiled linen on a light soil formula will only serve to increase rewash percentages and thereby increase utility and labor costs while decreasing the life of the textiles. Laundry managers need to make sure that adequate training is provided on proper linen classification.

A good quality management step would include spot checking the formula selection by employees and personnel dedicated to maintaining visual checks on chemical pumps and proper washer operation. Have the chemical supplier

help in developing a laundry procedure. Once a laundry procedure is in place and it is being followed, the facility will be rewarded with a lower reclaim percentage and lower chemical and utility cost. It is often found that seemingly large quality issues have simple solutions. For example: Scratchy and rough terry usually can be attributed to drying temperature and drying time more often than a problem with chemistry. Most facilities can improve their terry softness just by decreasing drying times and temperature. This simple but effective solution also pays dividends by increasing the efficiency of the laundry process through time and labor.

The laundry industry is always evolving. We will continue to see changes in the chemicals, washers, and new improved fabrics. But, what will always remain the same is the need for an individualized laundry program.

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