



U S Chemical

Providing Exceptional Quality Since 1962

Selecting Nonservice Products



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Selecting the proper nonservice products can be a confusing task. In any given category, there will be multiple products to choose from. Apart from cost per container, there are many other factors that play a part in selecting the correct products. U S Chemical manufactures several hundred nonservice products, so often more than one product may be acceptable for a particular application. Knowing which products are appropriate for an application is the purpose of this brochure.

COST PER APPLICATION

One of the most common mistakes made when selecting products is buying the product with the lowest unit cost. Most products are designed to be used when diluted. A better way to compare products is by the cost per use gallon of solution. If two 5 gallon pails of different all purpose cleaners sell for \$64.00 and \$128.00, many customers will select the \$64.00 product because the unit cost is lower. If the \$64.00 product has a use dilution of 1 ounce in 1 gallon of water and the \$128.00 product has a use dilution of 1 ounce in 5 gallons of water, it is easy to show that the \$64.00 product costs \$0.50 to make 5 gallons of cleaning solution, while the \$128.00 product costs \$0.20 to make 5 gallons of cleaning solution.

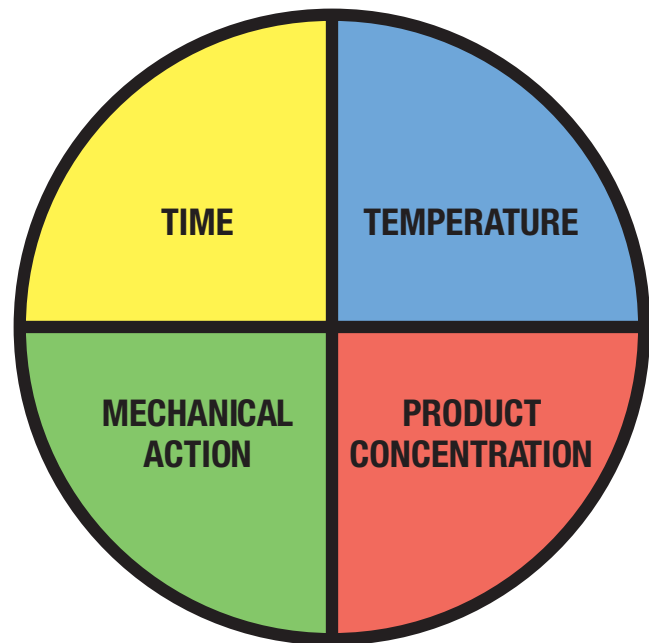
	Product A	Product B
Cost per Pail	\$64.00	\$128.00
oz/pail	640	640
Cost/Ounce	\$0.10	\$0.20
Use Dilution	1 oz/1 gal	1 oz/5 gal
Ounces needed for 5 gallons of cleaning solution	5 oz	1 oz
Cost for 5 gallons of cleaning solution	\$0.50	\$0.20
Cost per gallon of diluted cleaning solution	\$0.10	\$0.04

Product A, which costs half as much per pail, costs two and a half times as much to use per use gallon. This simple illustration demonstrates why products that cost more per unit are generally LESS expensive to use in the long run. This analysis assumes that when diluted, the 2 products perform comparably.

ESSENTIAL COMPONENTS OF CLEANING

The four essential components of cleaning are: time, temperature, mechanical action and product concentration. These four factors work in balance with each other to clean. If any one area is to be decreased, such as cleaning time, there must be a corresponding increase in another area. These factors hold true for all cleaning, not just warewash. Water works hand-in-hand with these components. Water is known as the universal solvent and is necessary to perform proper cleaning in the dishmachine. There are 2 basic soil types: water soluble and non-water soluble. Whenever the soils are water soluble, the presence of large quantities of water will aid in the cleaning.

ESSENTIAL COMPONENTS OF CLEANING



Time

In mechanical warewashing, the standard doortype high temp dishmachine has a 60 second cycle that can be broken into 3 parts. The wash is the first portion of the cycle and lasts 45 seconds. The wash is followed by a 3 second dwell and then a 9 - 12 second final rinse. For low temp dishmachines, the cycle can be up to 90 seconds long, while for undercounter dishmachines, the cycle can be 2 to 3 minutes long. In all cases, once the cycle is set, it always runs for the same amount of time on that particular dishmachine. The specifications for the time of a cycle can be found on the NSF sticker that all dishmachines must carry.

Temperature

High temp dishmachines have a wash temperature of 140 - 160°F and a final rinse temperature of 180 - 195°F. Some high temp dishmachines have 165°F final rinse water, but this is not common today. If that is the case, the final rinse is a minimum of 30 seconds instead of the 9 - 12 seconds it is in a door-type dishmachine. Low temp dishmachines have a wash temp of 120 - 140°F. The final rinse temperature is 120°F or higher.

Mechanical Action

In an industrial dishmachine, an impeller pump with (typically) a 1.5 hp motor sprays the detergent solution through small jets in metal tubes called wash arms. These wash arms may be fixed or may rotate. In either case, the wash arms create a spray pattern that allows the machine to spray all of the surface of the ware. The velocity of the detergent solution helps remove food soils from the ware. In a door-type single rack dishmachine, when the final rinse water is sprayed on the ware, the final rinse water is sprayed through a separate set of jets and arms. The pressure of the water is 15 - 25 psi, which is again based on an NSF guideline. Some dishmachines (fill & dump low-temps) pump the water through the same arms as the wash water. The action of washing and rinsing provides the friction or mechanical action that does the majority of the cleaning in a dishmachine.

Product Concentration

The concentration of mechanical warewash detergent used in a dishmachine varies due to the environmental conditions discussed in this brochure. While the amount of product varies, product concentrations from 1000 ppm to 2500 ppm are the most common. As a percentage of the whole circle of essential components of cleaning, product concentration is the smallest slice. However, it is a very important slice because the use of chemicals allows us to have a short (60 second) total cycle. All the other 3 essential components of cleaning are fixed and can't be changed. This is the only component that is easily changeable in dishwashing.

THE ENVIRONMENT

The environment for any cleaning task consists of the following 5 areas. By surveying all 5 areas, all of the factors that can cause poor results can be identified.

A. Procedures

B. Water Quality

C. Equipment

D. Nature of Substrate

E. Nature of Soil

A. Procedures

Procedures are those steps employees use when working to clean an area. In some cases, employee procedures make cleaning tougher, such as allowing spills to dry rather than cleaning them up as they occur. Reviewing how a soiled area becomes dirty can allow for implementing changes that make an area easier to clean. Procedures are the only things that can improve with inservice training.

B. Water Quality Parameters

The water quality can affect cleaning results and the products selected. The water hardness is the most important parameter we need to consider. Water hardness (lime scale) is made up of calcium and magnesium. Where there is heat, cold, or alkalinity, water hardness will become insoluble and attach itself to surfaces. Water hardness can lead to white films on surfaces. Water softeners are often installed to remove the water hardness so that it doesn't have to be dealt with in general cleaning.

C. Equipment

If the customer is using any equipment to aid in cleaning such as spray guns, floor machines, etc., products should be selected with this equipment in mind. Sometimes cleaning products need to have more or less foaming ability depending on the type of equipment used in cleaning.

D. Nature of Substrate

The substrate is the surface being washed. The wide variety of surfaces that are encountered behave differently, so it is important to know what materials are being cleaned. Plastic scratches and stains easily, but it is more durable than glass or ceramics. When

plastics are being cleaned, products should not be abrasive, as the abrasives will scratch the plastic. Ammoniated cleaners should never be used on Plexiglas.

Metals can be categorized into several groups. Chemical safe hard metals include most varieties of stainless steel. Soft metals include aluminum, gold, tin, copper, lead, silver and pewter. Cleaning products can be either heavy duty or metal safe. Heavy duty detergents contain high active alkalinity in the form of caustic soda (sodium hydroxide) or caustic potash (potassium hydroxide). This strong alkalinity will damage any soft metal by pitting or blackening it. If any of the listed soft metals are being washed, use a metal safe detergent. The use of a heavy duty degreaser on shiny ornamental aluminum is a common and costly mistake.

Many of the soft metals, especially gold and silver, are also damaged by chlorine. If anything with gold or silver trim or silver plated flatware is being washed, use a nonchlorinated metal safe detergent. A chlorinated detergent may be metal safe on soft metals, like aluminum, but may not be safe on precious metals. This distinction is very important. Selecting the wrong product can be a very expensive mistake.

E. Nature of Soil

It is important to know what type of soil is being cleaned. Certain food soils, especially those that are heavy starches or heavy greases, can be tougher to clean. Before explaining how to clean soils, however, the concept of pH first needs to be explained.

pH is a measure of the relative acidity or alkalinity of a substance. Everything has a pH. Chemicals, water, milk, skin, everything. pH is not strictly a measure of strength, but rather a measure of the ability of the substance to react with other substances. It is a logarithmic scale ranging from 0 to 14. A pH of 7 is neutral, meaning it is neither acidic nor alkaline. As the pH changes from 7 to 8 to 9, the substance becomes more alkaline. Whereas pure water has a pH of 7, baking soda has a pH of 8 - 9, meaning that it is slightly alkaline. Bar soap is more alkaline with a pH of 9 - 9.5, while mechanical warewash detergents have a pH from 11 - 12.5. Pure caustic soda (sodium hydroxide or lye) has a pH of 13.2. The higher the pH, the more the substance will desire to react with an acidic soil.

On the acidic side, the lower the pH the more acidic the substance. The pH of skin is 5 - 5.5. The pH of a laundry sour is 3 - 3.5. The pH of a strong mineral acid, like phosphoric or hydrochloric (muriatic) acid is 1 - 1.5. The lower the pH, the more a substance desires to react with something alkaline.

Foods that are acidic, such as tomato sauces and fats, greases and oils, will react with alkalinity. This reaction makes them easier to remove. Foods without much acidity, like starches, can be tougher to remove. Some soils, such as dust and dirt are relatively pH neutral. Knowing the soil type, a product can be selected that provide a particular cleaning process as described in the next section.

Cleaning Processes

1. Saponification is the reaction of an alkaline detergent with an acidic soil which forms a water soluble soap. The water soluble soap can then be easily rinsed away. Acidic soils are generally fats, greases, and oils associated with food, food preparation and humans. Acidic soils can be found in fryers, grills, ovens, kettles, dishes, dishmachines, floors, grill vents and screens, floor grates, drains, sinks, toilets, walls, coolers and freezers.

2. Emulsification is the process by which soils are broken down, held in suspension, and prevented from depositing back onto ware. Unlike the other cleaning processes, which chemically change the soil being cleaned, emulsification works by breaking down the soil into small bits which are then easily rinsed away. Emulsification can be used on a wide variety of alkaline, acidic, and pH neutral soils. Surfactants (surface active agents) are chemicals which reduce the surface tension of water, making it easier for water to penetrate and emulsify soils. All surfactants foam, so if a product foams, it is usually because there are surfactants in the product.

3. Dissolving is the reaction of an acidic detergent with an alkaline soil. The acidic detergent breaks down (dissolves) the alkaline soil. All acidic cleaners use this cleaning process. Alkaline soils are associated with water, water minerals, and many detergent residues. Alkaline soils can be found in sinks, dishmachines, toilets, ice machines, coffee machines, steamers, chafing dishes, coolers and freezers.

4. Oxidation is a reaction that removes the color or pigment of an organic stain. Chlorine or oxygen bleaches are used to do this. Chlorine does very little cleaning, it mostly destains, which is why bleach is not an effective cleaner. Destaining does not remove the small amounts of soil that cause the stain, but by removing the color of the stain, makes the stain not visible.

NONSERVICE PRODUCT CATEGORIES

Here is a brief discussion of the 15 main nonservice product categories. Specific product names are not used, but rather the criteria used in selecting an appropriate product are given. By reviewing the technical data sheet for the products in a category, an appropriate product can then be selected using the criteria given below.

Aerosols

Aerosols are pressurized cans of chemicals. Aerosols are interesting because they are both the most expensive way (per ounce) to buy chemicals and the most cost effective way to get a small amount of product onto a surface. The main reason for using an aerosol is that the way the aerosol is applied enables the user to apply chemical only where it is needed. Because of this, aerosol cleaners are most appropriate for spot cleaning. Where there are heavy soils in a small area, aerosols allow for a concentrated dose of cleaner. Aerosols generally contain an inert propellant, such as isobutane, to force the chemical out of the can. The propellant

should not be a chemical that can cause environmental damage, such as chlorofluorocarbons (CFC's), which damage the ozone layer of the atmosphere.

Air Fresheners

Air fresheners are deodorants. They mask offensive odors with a pleasant scent. Air fresheners are either ready to use, dilutable liquids or aerosols. In hotel room cleaning, air fresheners are often sprayed in the room after cleaning to leave a fresh scent for the next guest. Unless the product contains an odor counteractant, any existing smell is not removed, only masked. Odor counteractants can either contain a chemical to destroy microorganisms or they can decrease the nasal sensitivity to an odor. In the first case, the bacteria causing the odor are destroyed, which eliminates the source of the odor. In the second case, The odor is still present, but a person's ability to detect the odor is diminished, making the person perceive that the odor is gone. Air fresheners come in a variety of scents.

Bathroom Cleaners

Bathroom cleaners can be divided into two groups; toilet bowl cleaners and general bathroom cleaners. Toilet bowl cleaners are usually acidic products often formulated with surfactants to help emulsify the soils present. Some toilet bowl cleaners are thickened to cling better to the walls of the toilet. The quality of the product is determined primarily by the strength of the acid present. The higher the percentage of acid present, the stronger the product. Products containing up to 23% hydrochloric (muriatic) acid are the strongest and will remove iron deposits from the toilet as well. Toilet bowl cleaners with phosphoric acid are milder, but don't remove iron stains. Any acidic toilet bowl cleaner will remove minerals and scale from the toilet.

When strong acids are used, the acids will generally kill the bacteria present that cause the odors. Some toilet bowl cleaners are registered with the Environmental Protection Agency (EPA) as disinfectants. When using a disinfectant, there is a higher degree of confidence that the product is killing germs which can cause odors. Some toilet bowl cleaners are nonacid cleaners. These products work fine for toilets that are cleaned at least daily, but do not remove iron and struggle to remove scale buildups. Chemically they are similar to general purpose cleaners. Bathroom cleaners are designed to be used on floors, tile, sinks, showers and any other hard nonporous surfaces present. Bathroom cleaners may also be disinfectants and kill germs. Pleasant scents are often added to bathroom cleaners to make the area smell nice when cleaning is finished. Bathroom cleaners come in dilutable or ready-to-use forms. If a bathroom cleaner is acidic, it will also remove water mineral buildups commonly caused by the water. Although bathroom cleaners and toilet bowl cleaners often appear to be the same, toilets are not made from the same materials as sinks and tubs. As a result, the use of a strong acid toilet bowl cleaner on a sink or bathtub will invariably remove the shiny protective finish. Bathroom cleaners, however, are generally safe for use on sinks and tubs.

Deep Fat Fryer Cleaners

Deep fat fryer cleaners are very high alkaline (caustic) products designed to saponify the heavy oils and greases left in a deep fat fryer. Once the dirty deep fat fryer is emptied of oil, the deep fat fryer cleaner is put into the fryer with water and boiled. A brush is used to scrub the walls of the fryer. This removes all of the buildups of baked on greases and oils. Ineffective or infrequent cleaning of a deep fat fryer results in poor frying, off tastes to the food, darker colors to food being deep fried, and greasy breading of food after frying.

Delimers

Delimers are acid based cleaners used mostly inside dishmachines. Used to remove mineral buildups from hardness or bicarbonate alkalinity, delimers are either a single acid, such as phosphoric acid, or a blend of acids, such as phosphoric and hydrochloric (muriatic) acids. The delimers that are only phosphoric acid based can be used on plated metals found in equipment such as ice machines. Any delimer with hydrochloric acid is designed for stainless steel only. Although the hydrochloric does contain an inhibitor to keep the acid from reacting with the stainless, if hydrochloric acid were left on stainless steel overnight, the stainless can be damaged. Delimers can be used to remove mineral deposits from any surface not harmed by the acids in the delimer.

Disinfectants

Disinfectants are germ killing products, generally pH neutral, registered with the Environmental Protection Agency (EPA). These products may also do some cleaning, but are designed to be used to kill germs on hard surfaces. If the product makes claims to kill specific organisms, these organisms will be listed on the label or on accompanying literature. This is helpful because it provides a convenient way to check the effectiveness of a disinfectant against specific organisms. Disinfectants often have a scent to freshen the air as well.

Disinfectants are labeled with specific use dilutions. Federal law requires that only those use dilutions shown on the approved label be used for the product. Overuse and underuse can cause various problems. As an example, overuse of disinfectants for mopping floors can cause "black mop syndrome" where the disinfectant causes the mop to entrap dirt that is not easily released when laundered. For additional information on these products, please review the U S Chemical publication "Sanitizers vs. Disinfectants."

Drain Maintenance Products

Drain Maintenance products are either drain openers or drain maintainers. An opener is used when there is a clog in the pipe. Openers usually contain caustic soda (sodium hydroxide) and/or liquid sodium hypochlorite (chlorine bleach). Maintenance products contain enzymes or bacteria and biologically digest the organic wastes on the inside of the pipes to allow water to flow. These types of products are generally not good drain openers. They are used on an ongoing basis to keep water flowing. Drain

maintenance products do not eliminate the need for having a service mechanically clean the pipes, but it prolongs the time between cleanings. For additional information on these products, please review the U S Chemical publication "Enzymes vs. Bacteria in Drain Treatment".

Floor Cleaners

Selecting an appropriate floor cleaner is one of the most complex areas of nonservice products. There is a wide variety of flooring types requiring different products to clean them. Floor cleaners can be acidic, alkaline, or pH neutral, with the selection depending on the flooring type. All three types of cleaners may contain solvents and surfactants.

Generally, floors coated with strippable finishes should only be cleaned with pH neutral products. If a higher alkaline product is used on a waxed floor, the alkalinity will damage the finish. Concrete floors can be cleaned with alkaline or pH neutral floor cleaners. If acidic products are used on concrete, the acid will etch the concrete. Quarry tile floors, found in many institutional kitchens, require the use of pH neutral or acidic ("no slip") cleaners. In heavier grease or soil situations, the acidic cleaners generally work best. Alkaline cleaners can be used on quarry tile without damaging the tile. However, when fats, greases and oils are present, the alkaline detergent will saponify these soils leaving soaps. These soaps can make the floor even more slippery than before cleaning, so U S Chemical does not recommend the use of highly alkaline cleaners on greasy floors. On a quarry tile floor without heavy grease, an alkaline product is fine.

Tile floors, such as in school hallways, are cleaned with a pH neutral cleaner. While highly acidic or alkaline products may not damage the tile, they are not needed because the dirt, dust, and other soils present can be effectively cleaned by a safer pH neutral cleaner.

General Purpose Cleaners and Degreasers

General purpose cleaners and degreasers contain surfactants and can contain solvents and alkalinity. The more solvents and alkalinity present, the more of a degreaser the product is. Products that are only cleaners are generally surfactant based with small amounts of solvents or alkalinity. When painted, waxed or "soft metal" surfaces are being degreased, high alkaline products cannot be used as the alkalinity will damage the surface. pH neutral products should be used. Soft metals include tin, aluminum, copper, and pewter. Use a solvent and surfactant based product to degrease these surfaces.

Some cleaners have pine oil or ammonia as a cleaning booster. Ammonia is alkaline and cannot be used on plastics, Plexiglas, or painted surfaces. Pine cleaners are generally safe for all surfaces, but read the label to be certain of compatibility.

If the product contains solvents, it should not be used on heated surfaces. Heat will drive off the solvent and in certain circumstances can cause a fire hazard.

Glass and Window Cleaners

Glass and window cleaners (a.k.a. light duty cleaners) come in many styles, but the two main types are ammoniated and nonammoniated. In addition, they usually contain fast evaporating solvents and some surfactant. The fast evaporating solvents help the glass or plastic quickly dry streak free. Nonammoniated cleaners can be used on glass and plastics, including Plexiglas. Ammoniated cleaners will cloud or haze plastics, permanently damaging it. Glass and window cleaners are available in concentrated, ready-to-use, and aerosol forms.

Grill and Oven Cleaners

Grill and oven cleaners are alkaline and surfactant based. If a grill and oven cleaner contains solvents, special high flash point solvents are used. When standard solvents, such as ones found in most general purpose cleaner/degreasers, are used on heated surfaces, the solvents “flash off” creating a health and fire hazard. High flash point solvents can be used on heated surfaces without this danger. Grill and oven cleaners are designed to be used on stainless steel grills only. Some grills have aluminum surfaces or sides. These lower quality grills are damaged by a grill and oven cleaner. An aluminum grill is cleaned with an abrasive block called a grill brick. This abrasive brick scratches the food off of the grill. This also damages the grill surface, but with aluminum grills, alkaline grill and oven cleaners can not be used. Grill and oven cleaners are available in ready-to-use, dilutable, and aerosol forms. These cleaners can also be used for cleaning the inside of an oven, although often cleaner/degreasers are used as well. The advantage to using a grill and oven cleaner is that the oven can be cleaned hot. With a cleaner/degreaser, the oven must be cool. Some grill and oven cleaners provide good vertical surface clinging, which aids in cleaning the walls of ovens and stainless steel walls behind fryers and grills.

Hand/Skin Care Products

Hand/skin care products are available in three basic groups. There are soaps, lotions and antimicrobials. Soaps are for general handwashing and have dyes and perfumes added to make them pleasant to use. Body washes would also be found in this group. These products can be natural soap based or surfactant based and are designed to be of low irritancy to skin. Aloe, lanolin or other skin conditioners are often added to protect the skin from drying out.

The second group is lotions. These products are not for hand washing. They are only for moisturizing the hands as they become dry.

Antimicrobials are designed to kill germs on the hands. While handwashing removes most of the microorganisms present, antimicrobials provide an additional level of safety by means of chemicals that kill germs. These products are usually soaps as well, so hands can be cleaned at the time of use. Some products are alcohol based instant hand sanitizers. These products cannot be used in place of handwashing. They are used in areas where

hands have possibly been contaminated, such as when handling money, but are not dirty. These products can be used to sanitize hands prior to handling food or touching other people. Another common use is for dishwashers to be able to sanitize their hands between loading dirty dishes and unloading clean dishes. The dishwasher's hands are often wet, but not necessarily dirty. In such a case, the hands just need to be sanitized.

Insecticides

Available in aerosol or liquid forms, these products are designed to kill insects and other bugs. These products are not safe for use around food, so any food must be covered and removed prior to their use. Food contact surfaces must be washed prior to reuse.

Specialty Products

Freezer cleaners are specialty products, which are ready-to-use liquid products used in freezers and coolers down to -20°F. They melt the ice and clean the freezer floor and walls without turning off and/or defrosting the freezer.

Cleaners are specialty products for use in bathrooms on porcelain and plastic. Cleaners are abrasive, so the surface must not be damaged by the use of an abrasive. They are available in both powder and liquid forms.

Where conveyors in a food environment have a self-lubricating system, a soap based conveyor lubricant is diluted and automatically sprayed on the drive surfaces and belts. These products both clean and lubricate without the use of petroleum based greases.

Stainless Steel Cleaners

Stainless steel cleaners come in liquid ready-to-use and aerosol forms and are either water based or petroleum based. Water based cleaners are food grade and can be used near food (with the food protected, of course) while petroleum based stainless steel cleaners are for nonfood areas only. The petroleum based stainless steel cleaners have a much higher shine, but can't be used near or on food contact surfaces. In many states, petroleum based stainless steel polishes are not even allowed to be present in a kitchen environment.

QuarryGrip™

QuarryGrip™ is a buffered acidic floor cleaner that can be poured directly onto quarry tile floors to perform a “traction treatment”, which increases the slip resistance of the floor, or diluted and used as a daily cleaner. Unlike traditional acid etching of quarry tile floors, which can damage the floor, QuarryGrip™ does not damage the floor. Instead, it reestablishes the slip resistance through a patented process.

QuickLine™

QuickLine™ is a selection of high quality ready-to-use liquid products in easy to handle spray bottles.

SPECIALTY SYSTEMS

In addition to the groups of nonservice products, there are specialty systems associated with many of the nonservice products. Systems may feature product dispensers and groupings of products based on some physical characteristic or common applications. U S Chemical's product line includes aerosols under the trademarked IND/COM[®] label. IND/COM[®] stands for "Industrial and Commercial".

MixMATE™

The MixMATE™ System is a group of highly concentrated dilutable products designed to be used through wall mounted pumps that dilute the product to a chosen concentration. The pumps work with dilution tips to control the use dilution coming out of the pumps. These pumps are available in high flow (3.5 gallons per minute) for filling mop buckets and low flow (1 gallon per minute) for filling spray bottles.

Personal Hygiene System™

The Personal Hygiene System™ is a group of hand care products that use the Personal Hygiene System™ Dispenser. The capsules are 1500 ml (50 fl oz). The system allows for product dispensing without the risk of contamination of the dispenser or the product. Hand soaps, lotions, and antimicrobial products are all part of the Personal Hygiene System.

SUMMARY

Selecting appropriate nonservice products to effectively perform the myriad of cleaning needs in a foodservice operation can be a difficult and confusing task. Done properly, however, the product selection process can provide overall savings in use and labor costs, which is a major benefit to the end user.