SECTION 1

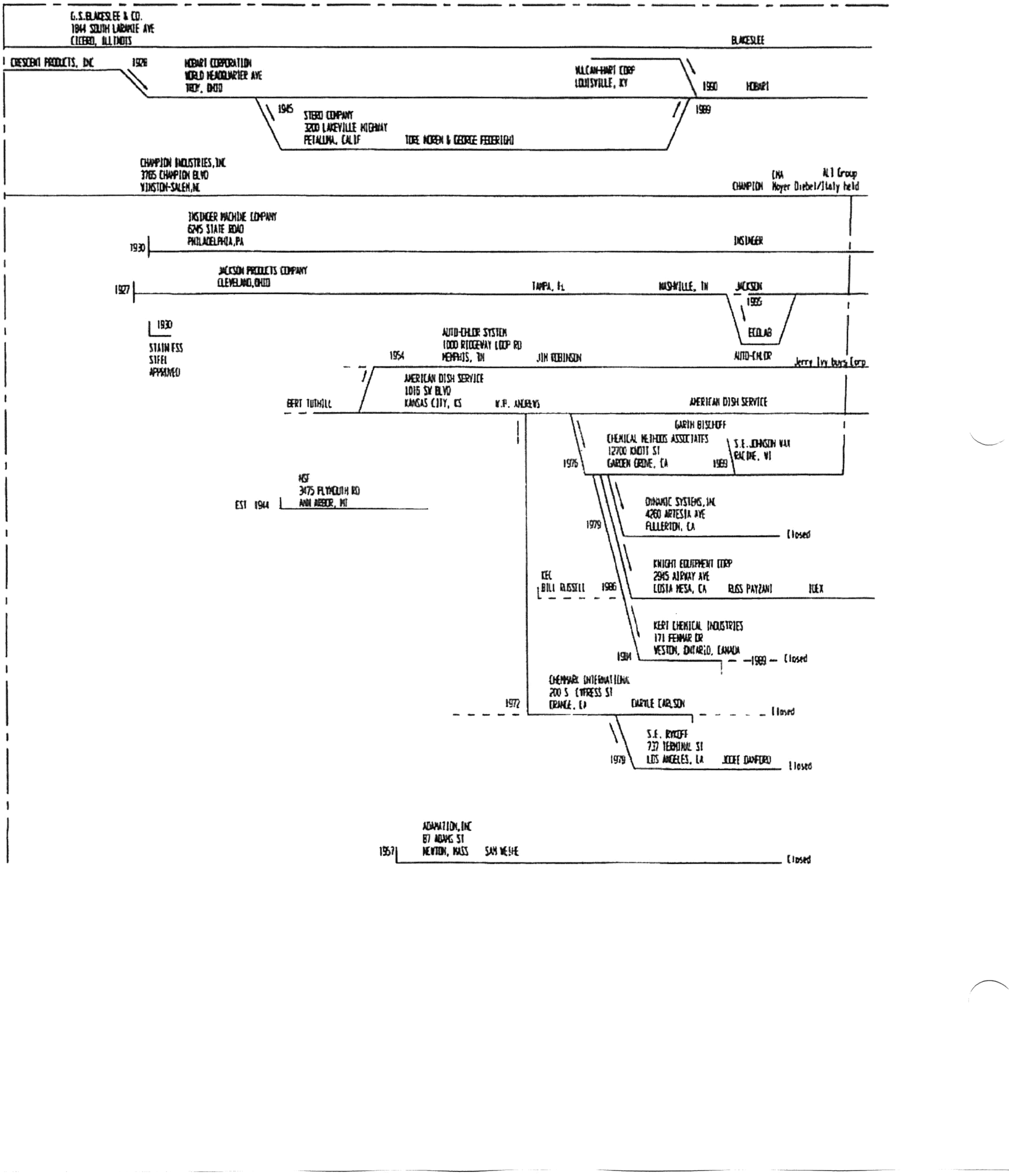
Introduction to Ware Washing

This Section Contains:

- History of Commercial Dish machines
- The Low Temp/High Temp Story
- Elements of Cleaning Process
- NSF Standards

Section I: Introduction to Ware Washing

100 YEAR HISTORY
MANUFACTURERS OF LISTED COMMERCIAL DISHMACHINES



TECHNICAL SUPPORT MATERIAL

The Low Temp/High Temp Story

Commercial Dishmachine types and the advantages vs. limitations

Ware washing more correctly stated is a commercial 'dishware' washing process. It has a history that extends back through antiquity, but has recently come into standards application during the last century. With the establishment of NSF in 1944, the industry began applying a standard (NSF #3) of performance to the machines and processes of washing dishware in public food service facilities.

Chemical companies and the sale of chemical products drive the warewashing industry. Originally the machines were sold outright, but the cleaning process required commercial grade detergents, those chemical sales soon became the economic superior to machine sales (1930). Also, the machines were service intensive and required an ongoing program to maintain satisfactory results. Consequently, the service rental program, provided by independent chemical companies, became a standard for the warewashing industry, and an opportunity for detergent sales. The [dish]machines, although large and complex, have simply become the dispensers for the detergent chemicals.

Dishmachine design is designated by two sanitizing types: High Temp and Chemical sanitizers. Water usage, energy usage, and time are the competitive marks for all commercial dishmachines.

HIGH TEMP DESIGN

Originally (1890), the first units were made of wood and copper, washed dishware with soap and hot water (detergents were not developed until 1916), and these machines were subsequently referred to as High Temps after the introduction of 120° F chemical sanitizer (1954). The term "Hi Temp" refers to the sanitation process of the dishmachine. Or, in other words, the type of process used to achieve an acceptable kill rate in bacteria. There are typically two methods, chemical or thermal sanitizing. In high temperature sanitizing, the surface of the dishware must reach a temperature of 165° F for a minimum of ten seconds. It is assumed that a minimum of 3600 HUE ensures adequate sanitization. One second of 165° F corresponds to 346.8 HUE points (although 160° F only provides 91.9 points). This is accomplished by spraying 180° F water over the dishware during the final rinse. This elevates the surface temperature to 165° F during 10 seconds, which reduces organisms by 99.999%. HUE points are also added for seconds spent in hot wash water. This is the Heat Unit Equivalent (H.U.E.) test required for NSF certification (Reference: Mallmann, *A Study of Mechanical Dishwashing*, University of Michigan, 1947).

The ADC conveyor and HT-25 door type supports both methods of sanitizing, and NSF lists these dishmachines as dual sanitizers. This means the machine design can serve in both roles without modification. The final rinse manifold will accomplish the task of applying chemical sprays or high temperature sprays with the same water consumption rates and systems. The difference is in the type of chemical dispenser application (min. 50 ppm chlorine) or the boosted incoming hot water (min. 180° F) for final rinse. (Reference: ANSI/NSF Standard 3, 1996)

LOW TEMP DESIGN (chemical sanitizer)

"Low-Temp" is a term that refers to batch-type (sometimes called Dump and Fill) machines. This design uses the fresh rinse water of a prior batch during the next batch's wash. This method "re-uses" the water during two separate operations or cycles. The greatest difference of the Low-Temp is the method of sanitizing the dishware. Instead of thermal kill, a chemical agent such as chlorine is added to the rinse water (50 ppm), a 99.999% reduction of microorganisms is accomplished without the elevated temperatures. In fact, water temperature is not critical for the sanitizing process—except for one phenomenon. A soiled dish can provide harborage for bacteria and protection from the sanitizing chemical. For the sanitizing to take place, the dishware must be clean. Grease emulsifies around 130° F water, and this temperature represents a minimum level for the cleaning process.

The Low-Temp's advantage is mainly the ability to provide the cleaning process without the requirement of boosting primary heated water. Heating water above the 140° F rapidly increases cost.

Typical booster heaters have been electrical; although more efficient in the workspace they are costly to run and maintain. Consequently, during a 1970's oil crisis, energy awareness propelled the Low-Temps into general use. They are still an advantage for the restaurant. When maintained and tuned for the variables, a Low-Temp can provide an inexpensive cleaning process.

Overall

The commercial dishmachine of today works in an environment that is similar to a trash hauler or garbage bin, and yet the expectation is that the machine will deliver sanitized, sparkling clean results on dinner ware. The personnel, who work with the dishmachine, typically receive no training or instruction. They seldom speak the language of the instruction posters, and rely entirely on the words of fellow dishwashers. They are paid the least amount, and employee turnover is high among most dishwashers. The basic requirement of the machine (heated, pressurized water) will inevitably be undersized or inadequate for the task.

Expectations

Given these tremendous limitations, the dishmachine is expected to deliver a pleasing appearance, sanitized ware, and do so with speed and ease. The more competitive machines must also accomplish these tasks with the additional feature of reduced water consumption and robust functionality. Much has been accomplished in regard to higher speed and less energy consumption, but the aspect of *results* will continue to be a deciding factor in the choice of detergent vendors and end-users. Still all of the elements of the cleaning process must be present to obtain the desired level of performance. There is no short cut.

The Installation

The greatest cause of *poor results* has come from misinterpretation of the basic elements for the cleaning process and the appropriate sequence for installation. The machines are seldom adjusted, water conditions are not addressed, chemical levels are unbalanced, and machine efficiency is reduced due to poor follow-up. The greatest single cause of poor machine efficiency (for any brand or model) is the installation for commercial machines and yet most accounts will demonstrate a deficiency in applying those instructions. It is a fallacy to believe that a commercial dishmachine can be plugged in like a toaster. Table layouts, menus, procedures, water pressures, hardness conditions, and temperature supplies from the building will require a setup and adjustment of all machines.

Regulations

Because of public health requirements, commercial ware washing equipment is highly regulated. Listings, with the various standards agencies (ANSI/NSF, UL, CSA, ASSE, BOCA and local municipalities), are demanding in cost, accountability, and maintenance. Once a machine design has been tested and listed, it is most difficult to alter.

On the Horizon

The *complex* dishmachine designs of the past have demonstrated an inherent weakness, that of unreliability. Reliability is a key issue because establishments usually employ only one dishmachine. The dishes must be washed. Detergent formulas tend to be basic chemistry; it is up to some agent of motion to put the caustics, surfactants, and sanitizer to work. The machine stands alone as the facilitator in the process and must account for a host of complaints when it quits. Not surprisingly, the dishmachine is usually targeted by one phrase: "it's broken again!". To overcome the multitude of problems facing the commercial ware washing processes, the dishmachine continues to evolve into ever simpler and stronger designs.

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