

# TECHNICAL SUPPORT MATERIAL

## The Low Temp/High Temp Story Commercial Dishmachine Types

Ware washing, correctly stated is a public food service cleaning process for dish ware. It has a history that extends back into antiquity, but has come under standards and code review during the last century. With the establishment of NSF in 1944, the industry began applying NSF standard #3 to the process performance of washing dishware for 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 improved with the invention of detergent, chemical sales soon became more profitable than machine sales. Also, the machines were service intensive and required an ongoing program to maintain operational serviceability. Consequently, the full-service rental or lease program provided by independent chemical companies became the standard model for the warewashing industry. The dishmachines have simply become the dispensers for cleaning chemicals. Dishmachines are designated by sanitizing type: High Temp or Chemical sanitizers.

### HIGH TEMP DESIGN

Originally (1890), the first units were made of wood and copper, these washed dishware with lye soap and hot water (detergents were developed later in Germany during 1916). This type of washing machine would later be referred to as a High Temp to differentiate it from the chemical sanitizing machines, which used lower water temperature (Tuthill patent 1954). There are typically two methods: chemical or thermal-kill sanitizing. For thermal-kill, commonly identified as high temp, the surface of the dishware must reach a temperature of 160F. NSF standard 3 assumes that a minimum of 3600 HUE ensures adequate sanitization. These heat units are gained by spraying heated wash water of 160F and final rinse water at a minimum of 180F (measured in the manifold) over the dishware. This elevates the surface temperature of the ware to 160F. HUE points are also accumulative and all seconds spent in the cycle and 10 seconds after the end of the cycle, account for some of the total points. 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 conveyors and HT-25 door-type supports both methods of sanitizing, and NSF lists these dishmachines as dual sanitizers. This means the same machine design can serve in both roles without modification. The final rinse manifold will apply chemical sprays or high temperature sprays with the same water consumption rates.

### LOW-TEMP DESIGN

“Low-Temp” is a term that refers to batch-type (sometimes called Dump and Fill or chemical sanitizing) machines. These names all mean the same machine design. The design uses the fresh rinse water and water temperature from the prior batch for the next wash. This method “re-uses” the rinse water during the wash cycle. The greatest difference of the Low-Temp is the method of sanitizing. 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. For both forms of sanitizing to take place, the dishware must be clean. The Low-Temp’s advantage is mainly the ability to provide the cleaning process without the requirement to boost the temperature of the building’s heated water. Heating water above 140F rapidly increases cost. Typical booster heaters have been electric; while more efficient in the

workspace, they are more costly to run and maintain than gas heaters. Consequently, during the oil crisis of the 1970s, energy awareness propelled the Low-Temp design into general use. When maintained and tuned for account conditions, a Low-Temp can provide an inexpensive cleaning process.

### **Industry Overall**

The commercial dishmachine of today works in an environment that could be called 'the hot, pressurized, caustic, garbage, underwater business.' Yet the expectation is that the machine will deliver sanitized, clean results on dinner ware without needing much attention. The personnel, who use the dishmachine, typically receive no training or instruction. They seldom speak the language printed on the instructional posters, and usually rely on the words from fellow dishwashers. The employee turnover is high among most dishwashers. For these reasons, the ware washing industry has some challenges.

### **The Installation**

Historically, the greatest cause of service calls is inadequate installations. The machines are seldom adjusted, water conditions are not addressed, chemical levels are not measured, and machine efficiency is reduced due to a lack of timely service. Table layouts, menus, procedures, water pressures, hardness conditions, and temperature supplies from the building water heater will require attention for most machine sites.

### **Regulations**

Because of public health requirements, commercial ware washing equipment is highly regulated. Listings with the various standards agencies and codes (ANSI/NSF, Energy Star/EPA, FDA Food Code, UL, CSA, ASSE, BOCA, IMC, and local municipalities), require verification, record keeping and certification testing, including renewals.