

# TECHNICAL SUPPORT MATERIAL

## Routine and Preventative Maintenance

### POOR or NO HEATING OF WASH TANK

#### ADC 44 CONVEYOR (11 gallon wash tank)

The 12 kW, 208v wash heater in an ADC 44 would normally draw 34 amps on each leg. The factory setting of the thermostat is “on” at 161F, “off” at 165F. However, as of 2011 the NSF minimum temperature for the wash tank is 150F-degrees on a multiple tank conveyor (ADC-44/66), so it is permitted to operate at 150F in high temp sanitizing mode. This NSF decal for ADC-44 is available at ADS P/N 289-9204, for ADC-66 is 289-9222 and the prior and current machines are rated so. The ADS thermostat is adjustable from 100F below zero to 500F above zero. To turn it all the way up (left turns) would be a large error.

#### **UNSTIRRED TANK** (Background Information)

The unstirred tank principle (meaning unless stirred, the column of water will have differing levels of temperature) is common to any tank of water. For the ADC 44, the wash pump running for a period of 3 to 5 racks, the column of water then equalizes after mixing the levels of temperature, which then begins to equalize the heating of pipes, pump, and walls of the machine. All equalized metal heated by the water help maintain temperature once the machine is being used constantly. NOTE: with a tank sitting idle on the thermostat set point (161F), the water in the sump and pump will actually only be 90 -100F degrees. When mixed, these cooler levels of water drop the overall tank temp on start up—typically dropping to 152F. This is true of any dishwasher; all water below the heater will remain lower in temperature. Once all the water temps are mixed in the tank, the sustainer heater will remain on until the water reaches the set point.

CAUTION: The tank should not be set at temperatures of 170F and above trying to compensate for this start up drop. Those first racks hit with that high temperature will bake on starch and results will suffer. Keep the factory set point, check for the disturbances, and follow the installation instructions.

ALL REPLACEMENT HEAT IN A TANK OF WATER COMES DOWN TO WATTS.

More cooling effects in the process, the more watts are needed to replace the lost temperature of the water. Beyond a certain point of cooling, more wattage will not help the exchange process during spraying; they will only shorten the recovery time after the water spraying ends. When the pump starts up, tank temperature will equalize if “disturbances” to the energy transfer process are not in excess of the watts available. When the disturbances interfere with the heating process, the cooling-effect can exceed the potential of the heater’s wattage and tank temperature drops. Because of evaporation’s physical properties, spraying water out of a jet will have the greatest cooling effect on tank temperature. It is the action of water being forced into the air through a jet that causes rapid cooling of the water.

## DISTURBANCES

- 1 Low voltage to the heater—size heater kW according to available voltage. Volts are directly related to watts.
- 2 Poor heater—check amps, look for water mineral build up on element (1/16 thick can reduce effectiveness), look for burned elements
- 3 Filling during washing—table problems, sink problems. This turns off the heater.
- 4 Too much suction from HVAC—values above 400 cfm will draw air through the machine causing greater evaporation.
- 5 Fans blowing on the employees also blow on or through the machine—point fans away from the machine
- 6 Curtains missing or open—replace curtains. Long curtains are placed on the ends. The conveyor is an open process because of the two openings; this allows greater disturbance to the energy transfer.
- 7 Racks washing large trays—trays will divert water out of its tank
- 8 Washing plastic trays—plastic will act as a heat absorber. Do not wash large plastic trays rack to rack, alternate with glasses, silverware racks so heat is not totally drained out of the water.
- 9 Racks over loaded with too many ceramic plates become a heatsink—space out plates properly
- 10 Not pre-rinsing the ceramic plates and other ware with hot water means they enter the machine at room temperature or cooler and tamp down the tank temperature—especially true in the fall or winter months.
- 11 Finally, individual accounts may have disturbances that are not commonly seen. Everything takes heat away from water, the only way to replace it is with wattage.

Even if all eleven points in this ADS heating guide are addressed, nothing will change the fact that an idle water tank heated to a set temperature, when the pump first starts spraying, will not be able to equalize the layers of water temperature for several minutes. The same is true of an electric grill, which has better transfer from element to metal than from element to liquid. It still takes time for the entire grill to equalize in temperature when first turned on, it is not instant.

We don't trivialize this or dismiss it, but it is a reality we must live with. All manufacturers of commercial dishmachines (that have a holding tank with a sustainer heater) experience a drop in temperature when the tank is first stirred. Depending on conditions at the account, once the machine is used in a continuous manner, the temperatures will equalize around the set-point. If, under normal use, this does not happen there may be one or more of the eleven points in play, as noted in our guide. This is unless they are washing racks of plastic trays back to back, in which case the curtains are pushed open and the plastic draws off all

sustaining temperatures. Nothing can be done to prevent this except to space out the racks of plastic trays with other racks of dishware giving the tank some recovery.

### ADC 66 Conveyor

Volts make the difference. An 18 kW, 220v heater will draw 44.7 amps on each leg on 208v and put 16.1 kW in the water. On 200 volts it will be 42.9 amps but only put 14.8 kW in the water. The wash motor will be drawing about 8 amps each leg on 208v. Test each leg on the heater and motor and compare to those rates above. If both are lower amps than 44.7 or 8 respectively, then the tester needs calibration. If the heater is in the 30ish amp range and your motor is at 8 amps, then that will indicate there is a problem with the 18 kW heater, or it is a 12 kW or 14 kW put in the 66 by mistake. If the machine is refilling during operations it will be caused by a weakened float switch (replace), poor racking procedure (training), table problems (sink too close to machine), or spray arms not in position or jets are bent spraying into other tanks (training).

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