Understanding Temperature Control on the RDS2, RMS800, and RDA2

Of considerable interest to the user is accurate temperature control of your Rheometrics instrument. Each class of instrument has its own unique temperature control system; however, one group of instruments uses the same control functions that this document will examine.

RDS2, RMS800 and RDA2

These three instruments use the same temperature control setup and temperature sensing devices. This document assumes the instruments in question are using Orchestrator software and similarly the firmware and hardware have been upgraded to be compatible with Orchestrator.

Before we start with the details of accurate temperature control, it is absolutely essential the instrument in question be calibrated for temperature. This is described in your user manual and can be performed by a competent technician using a MicroMite temperature calibrator. If you are not comfortable performing this operation then you should contact our service department to arrange for a temperature calibration by one of our trained service technicians.

The RDS, RMS and RDA share the same configuration in terms of temperature sensing. The user can choose between 2 thermocouples to report temperature. The first choice is the thermocouple in the bottom tool (tool thermocouple), the second choice is the thermocouple located inside the oven (oven thermocouple). The user chooses between either of these by configuring the “jumper” connector to the left of the oven (on the RDS/RMS) or inside the trap door on the test station (on the RDA2). There is a third temperature sensing device located in the oven which is the PRT (RTD Resistive Temperature Device). This sensor is used as a feed back loop for the heater gun in order to control temperature in the oven.

Now that the temperature sensor has been selected by configuring the thermocouple jumper, the next consideration is the “**Temperature Loop Control**” as found in the software under Utilities/Service/Instrument configuration. Click on Temperature Control. At the bottom of this window you will see Temperature Loop Control; click on the pull down menu and you will see four choices. Only the first two apply to the group of instruments under consideration and they are: “**Oven air temperature**” and “**Tool/sample temperature**”. Users quite often

assume that this choice must correspond with the choice of thermocouples they choose in the first part of this instruction, that being either the tool thermocouple or the oven thermocouple, but this is a common mistake. This choice will simply close the temperature loop or control around either the tool thermocouple or the oven PRT.

For example, if the user chooses the oven thermocouple using the jumper and “Oven air temperature” in the software, the commanded temperature will be controlled by the temperature detected by the PRT and thus the commanded temperature will most likely not appear in the Parameters and Indicators temperature window on the CRT once the ON TEMP indicator is on. In other words, the oven thermocouple will report the temperature in the window labeled TEMP on the CRT, however, it is the oven PRT that is controlling the temperature in the oven. Because a PRT and a thermocouple are different in their accuracy and sensitivity, there will always be a difference between the two even though they are side by side in the oven.

Let’s choose a different example, again we will use the oven thermocouple in the jumper selection but instead of choosing “Oven air temperature” in the software let’s choose Sample/Tool Temp. Now the commanded temperature will be controlled by the temperature detected by the oven thermocouple and be reported to the window labeled TEMP on the CRT. The user will notice the ON TEMP indicator will be on when the commanded temperature is displayed in the window labeled TEMP.

It is important to understand that when the temperature at the temperature sensor in the oven reaches the commanded temperature the indicator ON TEMP will show on the CRT screen and similarly, if the temperature has not reached the commanded temperature TEMP LOW will show on the screen and of course if the temperature has over shot the commanded temperature the TEMP HIGH will show on the screen.