

Date Completed: _____

Performed By: _____

1. Test Name: Subsystem Heat Sink Test Procedure

Test Author: Tyler

Addresses Specs: S8 – Heat transfer to TEM

The heat sinks are essential to achieving and maintain the appropriate temperature difference to operate the TEM.

2. Required Equipment

	Equipment Description	Quantity	Settings	✓
1	Heating Unit (Assembled) OR	1	N/A	
2	Heating Unit AND Power Plug	1	N/A	
3	Power Supply	2	12V	
4	Insulation	1	N/A	
5	Thermocouple	2	N/A	
6	Heat sink	1	Optional	
7	Clamps	2	N/A	
8	Multimeter	2	Measure temperature	
9	Fan	1	N/A	

Table 1: Required equipment and its settings.

3. Test Procedure

1. Apply insulation to all sides of the heating unit with the exception of the side that will make contact with the heat sink
2. Affix heat sink to the top of the heating unit using clamps
3. Insert channel over the heat sink
4. Plug power regulator into a wall outlet
5. Plug heating unit into power regulator (If heating unit is not assembled, solder wires of heating unit to a three prong power plug which can be plugged into the power regulator.)
6. Measure and record the power that is being provided to the heating unit
7. Wait 3 minutes until the heat is evenly distributed throughout the aluminum block portion of the heating unit
8. Insert fan into channel
9. Connect fan to power supply or through the circuit that will be used for the project
10. Insert one thermo-couple into the channel past the heat sink to record the values of the heated air
11. Manually record the temperature at the base of the thermo-couple by touching a thermocouple probe to the base
12. Record data every 15 seconds

- 13. Continue to record data points until the temperature of the base reaches a consistent value
- 14. Using the power provided to the unit indicated on the power regulator, the temperature of the heated air, and the temperature of the base, determine the resistance of the heat sink using the formula:

$$Q = \frac{T_{base} - T_{air}}{R}$$

- 15. Check the measured heat sink resistance again provided and calculated values for heat sink resistance

4. Measurements

To be made Before Testing:

Ambient Temperature = _____

Measurements should be taken every 15 seconds.

Reported in Excel Table

5. Results

Calculated Heat sink resistance

6. Pass/Fail

Did the unit pass or fail the test? Defend your decision.

PASS	FAIL

Table 2: PASS/FAIL

Additional Comments:

Signoff upon completion: _____