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| **TITLE:** Infrared Thermometer Calibration Report | | **DOC NO:** | |
| **DISTRIBUTION:** PFGS Guider Upgrade | | | |
| **1. PURPOSE:**  To determine the accuracy of the Infrared Thermometer temperature readings. | | | |
| **2. METHOD:**  A thermocouple was used to determine to the accuracy of the Infrared Thermometer, both devices were used to measure different temperature cups of water. The Thermocouple measurements were taken as the correct temperature.  Required Materials:   * 3 cups * Large bowl or jug for holding excess water * Thermocouple * Infrared Thermometer   **C:\Users\tsecc\AppData\Local\Microsoft\Windows\INetCache\Content.Word\Thermometer Calibration (1).jpgC:\Users\tsecc\AppData\Local\Microsoft\Windows\INetCache\Content.Word\Thermometer Calibration (2).jpg** Left: Thermocouple in cold water Right: Materials and Apparatus  Steps:   1. Two cups were filled with boiling water from a kettle, and another cup with cold water from a tap. 2. The thermocouple was placed into the cup of cold water, and the temperature reading allowed to settle. The stable thermocouple temperature reading was recorded. 3. The cold water was emptied into a bowl, followed immediately by using Infrared Thermometer to measure the temperature. This was done by placing its sensor as close to the inside base of the cup as possible. The measured temperature was recorded. 4. The steps for measuring using the thermocouple and infrared Thermometer where repeated for different temperature cups. A “lukewarm” temperature water was created by mixing ~50% hot and cold water together, a “warm” temperature water came from one of the cups of hot water that had cooled down. The final “hot” water was from the remaining cup that retained its heat better than the others. 5. The temperature recordings were converted to Kelvin and then analysed in Excel. | | | |
| **3. RESULTS:**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Ambient Thermocouple (K) | Thermocouple (K) | Infrared Thermometer (K) | Difference | Difference % | | 289.1 | 288.4 | 287.3 | 1.1 | 0.4 | | 289.1 | 310.8 | 308.7 | 2.1 | 0.7 | | 289.1 | 327.0 | 320.3 | 6.7 | 2.0 | | 289.1 | 333.0 | 328.2 | 4.8 | 1.4 |   The data suggests that over the range of 290K – 310K (17ºC - 37ºC) the error is small and within the specification of ±2% or 2ºC. As temperatures increase the difference increase, however it remains within the specification of ±2%. The linear trend line for the percentage difference is shown and indicates how to adjust the Infrared Thermometer measures to get the correct value. | | | |
| **4. CONCLUSION:**  The temperature range that the Infrared Thermometer will be measuring is within the 17ºC - 37ºC range where the thermometer is most accurate. The Infrared Thermometer measurements can be adjusted to correct for its inaccuracy, as the change in temperature is of most interest the Infrared Thermometer is fit for the task. | | | |
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