**Results**

The first set of data that was collected in the running of this experiment was the time it took for dye injected into the water tunnel to travel 0.87 m. This was accomplished through the use of three separate timers, each of which recorded a separate value for said time. An average of these values was then taken and was in turn used to estimate the velocity of the water passing through the water tunnel’s test section, as shown in Equation (1), where V refers to velocity in m/s, d refers to distance, and t refers to time.

(1)

The standard deviation of each velocity measurement was then found, as shown in Equation (2) below, were refers to the average velocity, Vi refers to each velocity measurement, and n refers to the number of measurements taken.

(2)

The average values obtained from Equation (1) were then compared to those indicated by the digital flow speed measurement on the water tunnel itself.

Finally, the uncertainty of each velocity measurement was found through the use of Equation (3) below, where Δt refers to the uncertainty of each time measurement and Δd refers to the uncertainty in the distance measurement.

(3)

The results of these calculations are shown in Table-1 below.

**Table-1. Indicated and Calculated Flow Speed Measurements, with Error Characteristics**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Trial Number** | **Time (s)** | **Velocity (m/s)** | **Uncertainty (±m/s)** | **Standard Deviation (m/s)** | **Mean Velocity (m/s)** | **Indicated Velocity (m/s)** |
| **1** | 3.6 | 0.242 | 0.005 | 0.00672 | 0.242 | 6.28 |
| 3.7 | 0.235 | 0.005 |
| 3.5 | 0.249 | 0.005 |
| **2** | 2.3 | 0.378 | 0.010 | 0.01648 | 0.379 | 9.48 |
| 2.4 | 0.363 | 0.010 |
| 2.2 | 0.395 | 0.011 |
| **3** | 1.8 | 0.483 | 0.016 | 0.03023 | 0.513 | 13.56 |
| 1.7 | 0.512 | 0.018 |
| 1.6 | 0.544 | 0.020 |