|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 1** | | | | | | | | |
|  | Intended puffing duration | Puff count | Actual puffing duration (s) from display **(a)** | From GUI | | Duration Difference  **(a-b)** | From website | |
| Recorded puffing start to end time | Recorded duration (ms) **(b)** | Recorded puffing start to end time | Duration (s) |
| Mid Night | 2.0s | Puff 1 | 2.43 | 2024-10-29 01:34:31.416-01:34:34.380 | 2964.6 | -0.5346 | 01:34:32:43 - 01:34:34:93 | 2.50 |
| Puff 2 | 2.07 | 2024-10-29 01:35:00.427-01:35:02.504 | 2077.0 | -0.0070 | 01:35:01:63 - 01:35:03:73 | 2.10 |
| Puff 3 | 2.58 | 2024-10-29 01:35:31.427-01:35:33.610 | 2183.1 | 0.3969 | 01:35:32:66 - 01:35:34:93 | 2.27 |
| Puff 4 | 2.35 | 2024-10-29 01:36:01.521-01:36:04.114 | 2593.2 | -0.2432 | 01:36:02:60 - 01:36:05:10 | 2.50 |
| Puff 5 | 2.26 | 2024-10-29 01:36:32.631-01:36:34.191 | 1560.5 | 0.6995 | 01:36:33:00 - 01:36:35:26 | 2.26 |
| Puff 6 | 2.28 | 2024-10-29 01:37:01.183-01:37:03.367 | 2184.0 | 0.0960 | 01:37:02:13 - 01:37:04:50 | 2.37 |
|  |  |  |  |  |  |  |  |
| 3.0s | Puff 1 | 2.46 | 2024-10-29 01:38:00.257-01:38:02.583 | 2325.4 | 0.1346 | 01:38:01:33 - 01:38:03:90 | 2.57 |
| Puff 2 | 3.16 | 2024-10-29 01:38:32.332-01:38:35.185 | 2853.0 | 0.3070 | 01:38:33:07 - 01:38:36:16 | 3.09 |
| Puff 3 | 3.56 | 2024-10-29 01:39:02.613-01:39:06.360 | 3747.2 | -0.1872 | 01:39:03:89 - 01:39:07:40 | 3.51 |
| Puff 4 | 3.37 | 2024-10-29 01:39:33.145-01:39:36.271 | 3125.6 | 0.2444 | 01:39:34:02 - 01:39:37:26 | 3.24 |
| Puff 5 | 3.50 | 2024-10-29 01:40:03.420-01:40:06.579 | 3159.5 | 0.3405 | 01:40:04:54 - 01:40:07:83 | 3.29 |
| Puff 6 | 3.19 | 2024-10-29 01:40:30.607-01:40:34.111 | 3503.6 | -0.3136 | 01:40:31:96 - 01:40:35:13 | 3.17 |
|  |  |  |  |  |  |  |  |
| 4.0s | Puff 1 | 4.38 | 2024-10-29 01:42:02.266-01:42:06.574 | 4307.8 | 0.0722 | 01:42:03:39 - 01:42:07:80 | 4.41 |
| Puff 2 | 4.27 | 2024-10-29 01:42:34.495-01:42:39.285 | 4789.7 | -0.5197 | 01:42:35:56 - 01:42:40:00 | 4.44 |
| Puff 3 | 4.29 | 2024-10-29 01:43:03.859-01:43:07.281 | 3421.3 | 0.8687 | 01:43:04:03 - 01:43:08:47 | 4.44 |
| Puff 4 | 4.33 | 2024-10-29 01:43:33.596-01:43:38.190 | 4593.8 | -0.2638 | 01:43:34:73 - 01:43:39:30 | 4.57 |
| Puff 5 | 4.27 | 2024-10-29 01:44:07.252-01:44:11.262 | 4009.9 | 0.2601 | 01:44:08:02 - 01:44:12:40 | 4.38 |
| Puff 6 | 4.34 | 2024-10-29 01:44:36.984-01:44:40.359 | 3374.3 | 0.9657 | 01:44:37:26 - 01:44:41:60 | 4.34 |

**FRIENDS GUI testing records**

**The website Clock Zone (**[**https://clock.zone/**](https://clock.zone/) **) was utilized for real-time clock monitoring, while the Zoom platform was used to record the testing process.**

Calculation for **Midnight** Data:

Here,

**a :** Puffing Duration recorded from vape display

**b:** Puffing duration collected from GUI

**(Sum(a-b) / Sum(a))\*100 :** Percentage of missing / extra puffing duration

|  |  |  |  |
| --- | --- | --- | --- |
| **Intended Puffing Duration** | **Sum(a)** | **Sum(a-b)** | **(Sum(a-b) / Sum(a))\*100** |
| 2.0 | 13.97 | 0.4076 | 2.92% (Missing) |
| 3.0 | 19.24 | 0.5257 | 2.73% (Missing) |
| 4.0 | 25.88 | 1.3832 | 0.0534% (Missing) |
| **Total** | **59.09** | **2.3165** |  |

**Total percentage of Missing Duration: (2.3165 / 59.09)\*100 = 3.92%**

**Important Note:** The time discrepancy between the human-readable time processed by the GUI and the real-time recorded time is approximately 1 second across all samples. Refer to the yellow-highlighted areas in Table 1 for details.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 2** | | | | | | | | |
|  | Intended puffing duration | Puff count | Actual puffing duration (s) from display **(a)** | From software | | Duration Difference  **(a-b)** | From website | |
| Recorded puffing start to end time | Recorded duration (ms) **(b)** | Recorded puffing start to end time | Duration (s) |
| Morning | 2.0s | Puff 1 | 2.29 | 2024-10-29 08:30:58.584-08:31:00.192 | 1608.8 | 0.6812 | 08:31:01:38 - 08:31:03:65 | 2.27 |
| Puff 2 | 2.11 | 2024-10-29 08:31:28.613-08:31:31.933 | 3319.7 | -1.2097 | 08:31:32:25 - 08:31:34:58 | 2.33 |
| Puff 3 | 2.44 | 2024-10-29 08:32:00.110-08:32:02.428 | 2318.1 | 0.1219 | 08:32:03:45 - 08:32:05:98 | 2.53 |
| Puff 4 | 1.99 | 2024-10-29 08:32:27.509-08:32:29.514 | 2005.5 | -0.0155 | 08:32:31:12 - 08:32:33:15 | 2.03 |
| Puff 5 | 2.07 | 2024-10-29 08:33:00.436-08:33:02.508 | 2072.0 | -0.0020 | 08:33:04:09 - 08:33:06:15 | 2.06 |
| Puff 6 | 2.24 | 2024-10-29 08:33:31.254-08:33:33.425 | 2170.6 | 0.2694 | 08:33:34:70 - 08:33:36:98 | 2.28 |
|  |  |  |  |  |  |  |  |
| 3.0s | Puff 1 | 3.26 | 2024-10-29 08:34:31.224-08:34:34.204 | 2979.8 | 0.2802 | 08:34:34:42 - 08:34:37:71 | 3.29 |
| Puff 2 | 3.22 | 2024-10-29 08:35:01.415-08:35:04.592 | 3177.3 | 0.0427 | 08:35:05:05 - 08:35:08:18 | 3.13 |
| Puff 3 | 3.36 | 2024-10-29 08:35:30.200-08:35:33.497 | 3297.2 | 0.0628 | 08:35:33:64 – 08:35:37:05 | 3.41 |
| Puff 4 | 3.35 | 2024-10-29 08:36:02.340-08:36:05.590 | 3250.0 | 0.1000 | 08:36:05:82 – 08:36:09:25 | 3.43 |
| Puff 5 | 3.26 | 2024-10-29 08:36:33.446-08:36:37.116 | 3670.3 | -0.4103 | 08:36:37:15 – 08:36:40:48 | 3.33 |
| Puff 6 | 3.09 | 2024-10-29 08:37:04.268-08:37:07.356 | 3088.2 | 0.0018 | 08:37:07:79 – 08:37:10:91 | 3.12 |
|  |  |  |  |  |  |  |  |
| 4.0s | Puff 1 | 4.25 | 2024-10-29 08:38:01.502-08:38:06.276 | 4774.6 | -0.5246 | 08:38:05:12 – 08:38:09:39 | 4.27 |
| Puff 2 | 4.09 | 2024-10-29 08:38:33.187-08:38:37.273 | 4086.0 | 0.0040 | 08:38:36:71 – 08:38:40:84 | 4.13 |
| Puff 3 | 4.17 | 2024-10-29 08:39:01.514-08:39:06.138 | 4623.9 | -0.4539 | 08:39:05:19 – 08:39:09:41 | 4.22 |
| Puff 4 | 4.21 | 2024-10-29 08:39:36.363-08:39:40.579 | 4216.6 | -0.0066 | 08:39:39:99 – 08:39:44:18 | 4.19 |
| Puff 5 | 4.25 | 2024-10-29 08:40:05.353-08:40:09.577 | 4223.5 | 0.0265 | 08:40:08:98 – 08:40:13:22 | 4.24 |
| Puff 6 | 4.20 | 2024-10-29 08:40:35.193-08:40:39.367 | 4174.7 | 0.0253 | 08:40:38:78 – 08:40:42:94 | 4.16 |

Calculation for **Morning** Data:

Here,

**a :** Puffing Duration recorded from vape display

**b:** Puffing duration collected from GUI

**(Sum(a-b) / Sum(a))\*100 :** Percentage of missing / extra puffing duration

|  |  |  |  |
| --- | --- | --- | --- |
| **Intended Puffing Duration** | **Sum(a)** | **Sum(a-b)** | **(Sum(a-b) / Sum(a))\*100** |
| 2.0 | 13.14 | -0.1547 | 1.18% (Extra) |
| 3.0 | 19.54 | 0.0772 | 0.395% (Missing) |
| 4.0 | 25.17 | -0.9293 | 3.69% (Extra) |
| **Total** | **57.85** | **-1.0068** |  |

**Total percentage of Extra Duration: (1.0068/57.85 )\*100 = 1.74 %**

**Important Note:** The time discrepancy between the human-readable time processed by the GUI and the real-time recorded time is approximately 4 seconds across all samples. Refer to the yellow-highlighted areas in Table 2 for details.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 3** | | | | | | | | |
|  | Intended puffing duration | Puff count | Actual puffing duration (s) from display**(a)** | From software | | Duration Difference  **(a-b)** | From website | |
| Recorded puffing start to end time | Recorded duration (ms) **(b)** | Recorded puffing start to end time | Duration (s) |
| Afternoon | 2.0s | Puff 1 | 2.31 | 2024-10-29 16:43:57.412-16:43:59.604 | 2192.5 | 0.1175 | 04:44:03:08 – 04:44:05:33 | 2.25 |
| Puff 2 | 2.19 | 2024-10-29 16:44:28.183-16:44:30.176 | 1993.0 | 0.1970 | 04:44:33:46 – 04:44:35:71 | 2.25 |
| Puff 3 | 2.25 | 2024-10-29 16:44:59.275-16:45:01.448 | 2173.0 | 0.0770 | 04:45:04:89 – 04:45:07:33 | 2.44 |
| Puff 4 | 2.32 | 2024-10-29 16:45:56.277-16:45:58.515 | 2238.1 | 0.0819 | 04:46:01:97 – 04:46:04:35 | 2.38 |
| Puff 5 | 2.41 | 2024-10-29 16:46:26.494-16:46:29.113 | 2619.8 | -0.2098 | 04:46:32:14 – 04:46:34:63 | 2.49 |
| Puff 6 | 2.21 | 2024-10-29 16:46:56.181-16:46:58.343 | 2162.1 | 0.0479 | 04:47:01:76 – 04:47:04:01 | 2.25 |
|  |  |  |  |  |  |  |  |
| 3.0s | Puff 1 | 3.21 | 2024-10-29 16:47:27.430-16:47:30.609 | 3178.7 | 0.0313 | 04:47:33:17 – 04:47:36:32 | 3.15 |
| Puff 2 | 3.34 | 2024-10-29 16:47:57.284-16:48:00.531 | 3246.6 | 0.0934 | 04:48:03:04 – 04:48:06:28 | 3.24 |
| Puff 3 | 3.27 | 2024-10-29 16:48:28.498-16:48:32.273 | 3775.2 | -0.5052 | 04:48:34:29 – 04:48:37:57 | 3.28 |
| Puff 4 | 3.14 | 2024-10-29 16:48:59.440-16:49:02.590 | 3149.8 | -0.0098 | 04:49:05:20 – 04:49:08:36 | 3.16 |
| Puff 5 | 3.23 | 2024-10-29 16:49:28.328-16:49:31.502 | 3174.1 | 0.0559 | 04:49:34:07 – 04:49:37:24 | 3.17 |
| Puff 6 | 3.12 | 2024-10-29 16:49:59.426-16:50:02.522 | 3096.8 | 0.0232 | 04:50:05:20 – 04:50:08:29 | 3.09 |
|  |  |  |  |  |  |  |  |
| 4.0s | Puff 1 | 4.32 | 2024-10-29 16:51:29.910-16:51:33.336 | 3426.2 | 0.8938 | 04:51:34:65 – 04:51:38:74 | 4.09 |
| Puff 2 | 4.18 | 2024-10-29 16:51:57.609-16:52:02.113 | 4503.4 | -0.3234 | 04:52:03:55 – 04:52:07:79 | 4.24 |
| Puff 3 | 4.19 | 2024-10-29 16:52:26.605-16:52:31.111 | 4505.2 | -0.3152 | 04:52:32:47 – 04:52:36:68 | 4.21 |
| Puff 4 | 3.97 | 2024-10-29 16:52:58.279-16:53:02.332 | 4053.3 | -0.0833 | 04:53:03:94 – 04:53:08:08 | 4.14 |
| Puff 5 | 4.02 | 2024-10-29 16:53:29.188-16:53:33.253 | 4064.8 | -0.0448 | 04:53:34:67 – 04:53:38:91 | 4.24 |
| Puff 6 | 4.12 | 2024-10-29 16:54:00.278-16:54:04.416 | 4137.8 | -0.0178 | 04:54:05:75 – 04:54:10:16 | 4.41 |

Calculation for **Afternoon** Data:

Here,

**a :** Puffing Duration recorded from vape display

**b:** Puffing duration collected from GUI

**(Sum(a-b) / Sum(a))\*100 :** Percentage of missing / extra puffing duration

|  |  |  |  |
| --- | --- | --- | --- |
| **Intended Puffing Duration** | **Sum(a)** | **Sum(a-b)** | **(Sum(a-b) / Sum(a))\*100** |
| 2.0 | 13.69 | 0.3115 | 2.29% (Missing) |
| 3.0 | 19.31 | -0.3112 | 1.61% (Extra) |
| 4.0 | 24.80 | 0.1093 | 0.44% (Missing) |
| **Total** | **57.80** | **0.1096** |  |

**Total percentage of Missing Duration: (0.1096/ 57.80)\*100 = 0.189%**

**Important Note:** The time discrepancy between the human-readable time processed by the GUI and the real-time recorded time is approximately 6 seconds across all samples. Refer to the yellow-highlighted areas in Table 3 for details.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 4** | | | | | | | | |
|  | Intended puffing duration | Puff count | Actual puffing duration (s) from display **(a)** | From software | | Duration Difference  **(a-b)** | From website | |
| Recorded puffing start to end time | Recorded duration (ms) **(b)** | Recorded puffing start to end time | Duration (s) |
| Night | 2.0s | Puff 1 | 2.11 | 2024-10-29 21:02:25.419-21:02:27.509 | 2089.6 | 0.0204 | 09:02:32:09 – 09:02:34:24 | 2.15 |
| Puff 2 | 2.32 | 2024-10-29 21:02:55.327-21:02:57.574 | 2246.2 | 0.0738 | 09:03:01:91 – 09:03:04:28 | 2.37 |
| Puff 3 | 2.17 | 2024-10-29 21:03:26.492-21:03:28.606 | 2113.7 | 0.0563 | 09:03:33:16 – 09:03:35:38 | 2.22 |
| Puff 4 | 2.32 | 2024-10-29 21:03:57.192-21:03:59.438 | 2245.7 | 0.0743 | 09:04:03:79 – 09:04:06:14 | 2.35 |
| Puff 5 | 2.41 | 2024-10-29 21:04:25.166-21:04:27.332 | 2166.0 | 0.2440 | 09:04:31:45 – 09:04:33:92 | 2.47 |
| Puff 6 | 1.52 | 2024-10-29 21:13:44.442-21:13:46.168 | 1726.8 | -0.2068 | 09:13:51:17 – 09:13:53:00 | 1.83 |
|  |  |  |  |  |  |  |  |
| 3.0s | Puff 1 | 3.14 | 2024-10-29 21:14:25.197-21:14:28.337 | 3140.1 | -0.0001 | 09:14:31:81 – 09:14:35:04 | 3.23 |
| Puff 2 | 3.00 | 2024-10-29 21:14:54.507-21:14:57.592 | 3084.7 | -0.0847 | 09:15:01:41 – 09:15:04:37 | 2.96 |
| Puff 3 | 3.26 | 2024-10-29 21:15:26.592-21:15:30.117 | 3524.4 | -0.2644 | 09:15:33:34 – 09:15:36:65 | 3.31 |
| Puff 4 | 3.21 | 2024-10-29 21:15:55.516-21:15:59.267 | 3751.8 | -0.5418 | 09:16:02:38 – 09:16:05:53 | 3.15 |
| Puff 5 | 3.30 | 2024-10-29 21:16:26.257-21:16:29.502 | 3245.0 | 0.0550 | 09:16:32:94 – 09:16:36:24 | 3.30 |
| Puff 6 | 3.16 | 2024-10-29 21:16:55.260-21:16:58.413 | 3153.6 | 0.0064 | 09:17:01:90 – 09:17:04:99 | 3.09 |
|  |  |  |  |  |  |  |  |
| 4.0s | Puff 1 | 4.10 | 2024-10-29 21:17:56.908-21:18:00.248 | 3339.8 | 0.7602 | 09:18:02:65 – 09:18:06:88 | 4.23 |
| Puff 2 | 4.34 | 2024-10-29 21:18:26.580-21:18:31.179 | 4598.2 | -0.2582 | 09:18:33:34 – 09:18:37:71 | 4.37 |
| Puff 3 | 4.18 | 2024-10-29 21:19:01.240-21:19:05.116 | 3876.6 | 0.3034 | 09:19:07:55 – 09:19:11:67 | 4.12 |
| Puff 4 | 4.34 | 2024-10-29 21:19:35.574-21:19:40.173 | 4598.5 | -0.2585 | 09:19:42:47 – 09:19:46:67 | 4.20 |
| Puff 5 | 4.20 | 2024-10-29 21:20:06.430-21:20:10.605 | 4174.9 | 0.0251 | 09:20:13:21 – 09:20:17:41 | 4.20 |
| Puff 6 | 4.19 | 2024-10-29 21:20:38.447-21:20:42.610 | 4163.0 | 0.0270 | 09:20:45:24 – 09:20:49:48 | 4.24 |

Calculation for **Night** Data:

Here,

**a :** Puffing Duration recorded from vape display

**b:** Puffing duration collected from GUI

**(Sum(a-b) / Sum(a))\*100 :** Percentage of missing / extra puffing duration

|  |  |  |  |
| --- | --- | --- | --- |
| **Intended Puffing Duration** | **Sum(a)** | **Sum(a-b)** | **(Sum(a-b) / Sum(a))\*100** |
| 2.0 | 12.85 | 0.2620 | 20.39% (Missing) |
| 3.0 | 19.07 | -0.8296 | 4.35% (Extra) |
| 4.0 | 25.35 | 0.5990 | 2.36% (Missing) |
| **Total** | **57.27** | **0.0314** |  |

**Total percentage of Missing Duration: (0.0314/ 57.27)\*100 = 0.054%**

**Important Note:** The time discrepancy between the human-readable time processed by the GUI and the real-time recorded time is approximately 7 seconds across all samples. Refer to the yellow-highlighted areas in Table 4 for details.

**From Graph:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Total number of puffs** | **89** | **Total duration of puffs** | **232.0596s** |
| **Total number of puffs > 1.0s** | **72** | **Total duration of puffs > 0.1s** | **230.7591s** |
| **Number of False Positive Puffs** | **17** | **Total Duration of FP puffs** | **1.3005s** |
|  |  | **Average Duration of FP puffs** | **1.3005s / 17 = 0.0765s** |

**Total number of created puffs (With video recordings) = 4\*18=72**