System Prerequisite

- 64-bit Windows

Installation

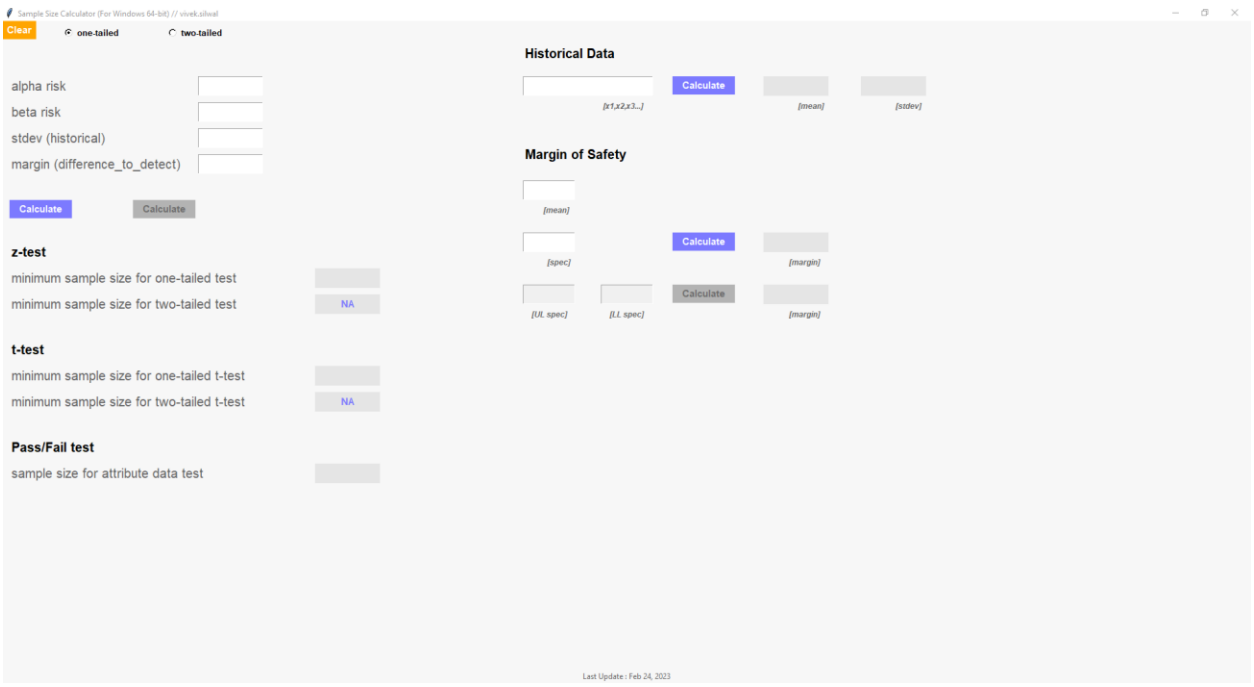
- Install the executable file ***Sample_Size_Calc.exe in your system***. **Ignore/approve any warning messages during the installation process.**

Definitions

- **Alpha Risk:** the probability that a good design is falsely rejected as bad. May also be referred to as Significance, Type I Error, or Producer Risk.
- **Beta Risk:** the probability that a bad design is falsely accepted as good. May also be referred to as Type II Error or Consumer Risk.

Sample Size Calculation Steps

- Start the tool. Steps to be done for sample size calculation are provided below in sequential order.



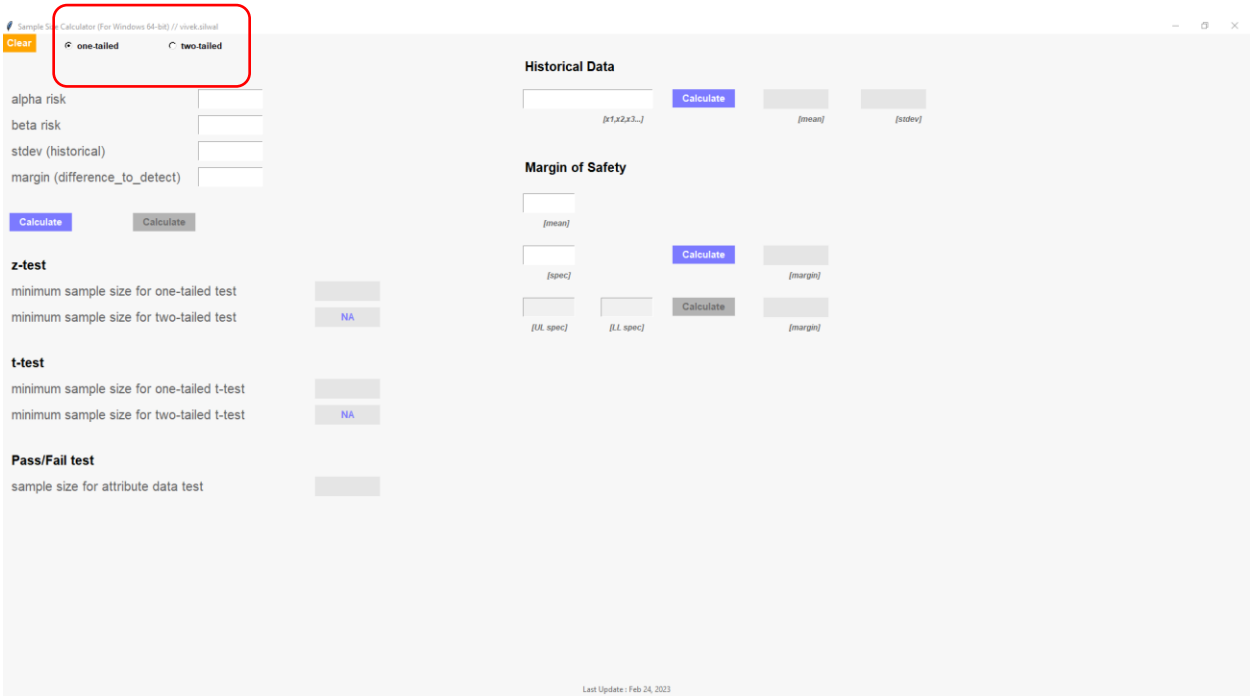
- Select 1-tailed or 2-tailed test.

  1-tailed example

Sound Level
Historical sample test data: 54 dBA, 49 dBA, 51 dBA etc.
Requirement Spec: 54 dBA

2-tailed example

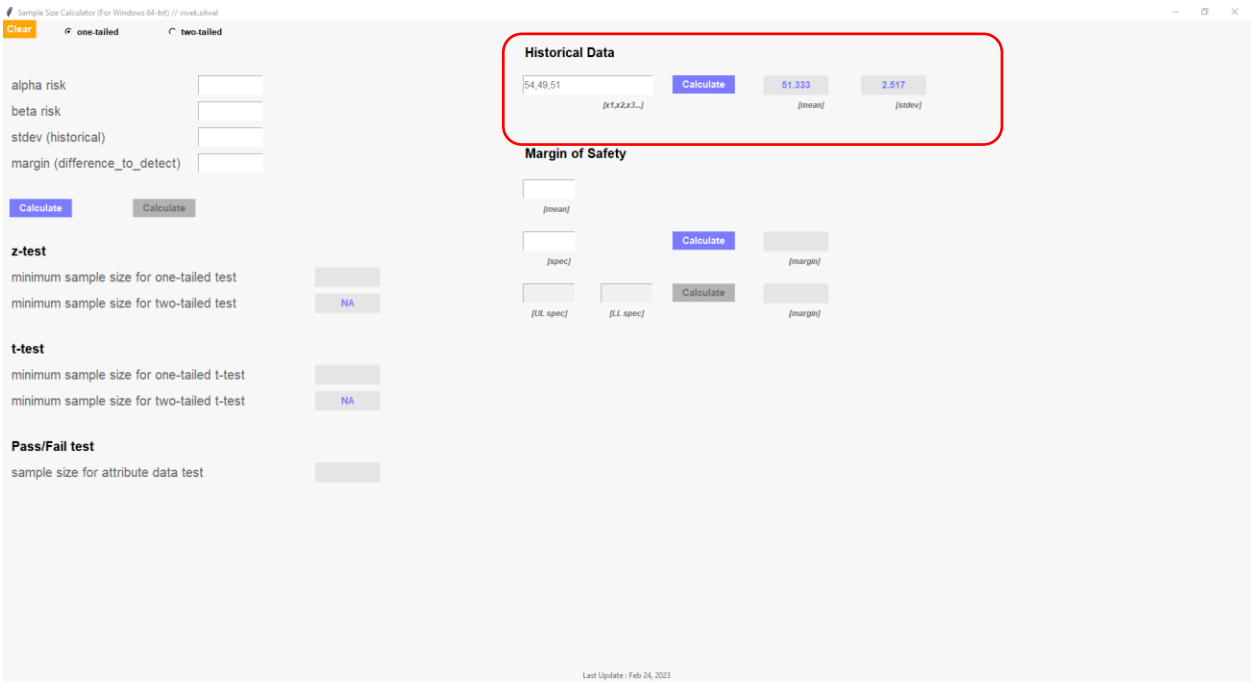
Average Cabinet Temperature
Historical sample test data: 5.2C, 4.7C, 4.9C etc.
Requirement Spec: 4.5C to 5.5C range (i.e ±0.5C of setpoint of 5C)



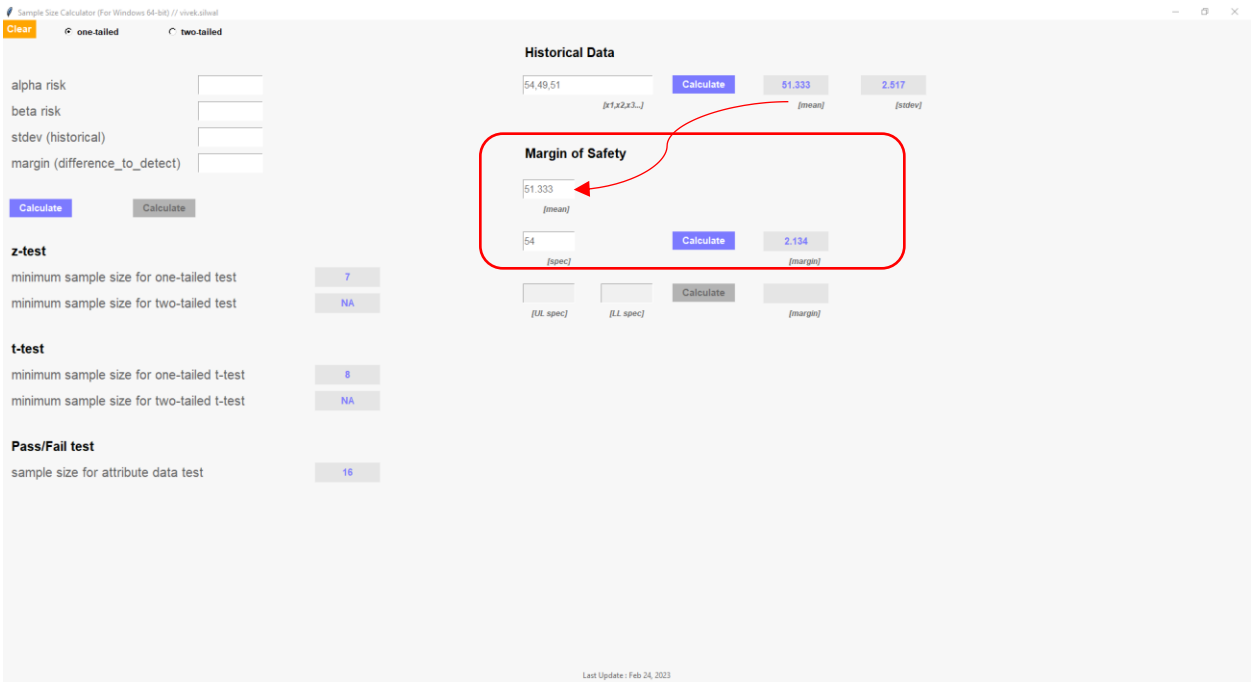
- Calculate the historical mean and historical standard deviation for the test results from Prototype or Alpha evaluation.

  For E.g.

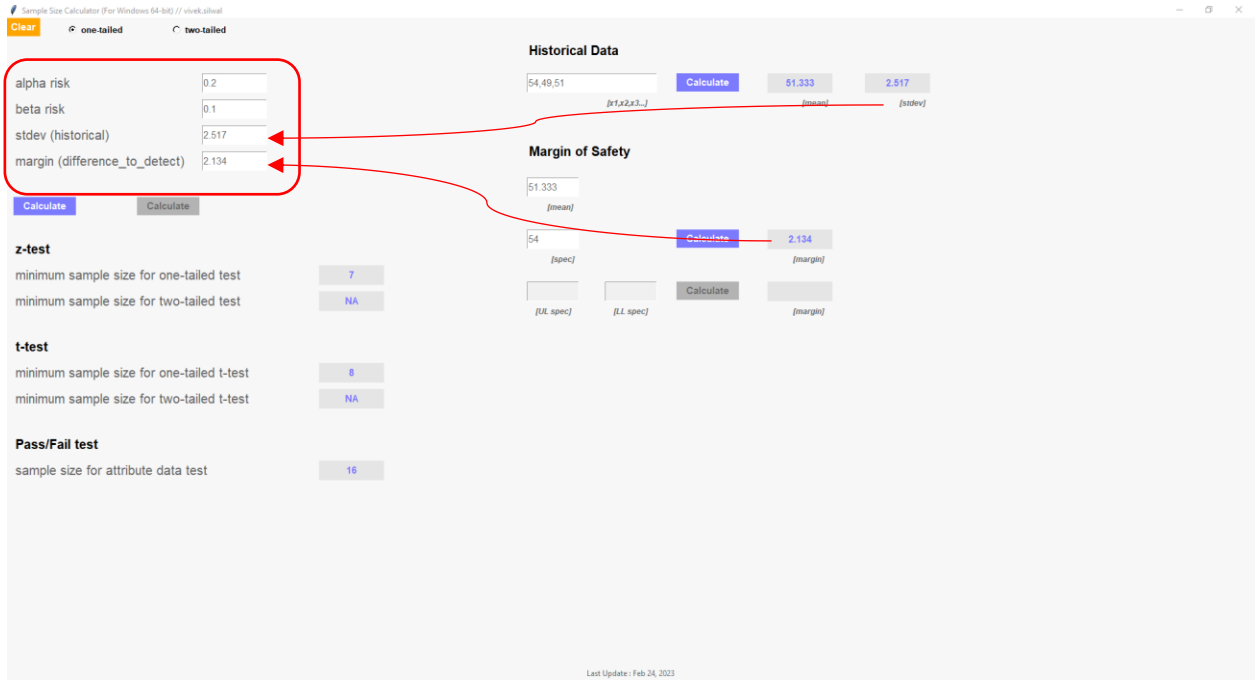
  Historical data for 3 samples tested for “sound level” provided results as 54 dBA, 49 dBA, 51 dBA against the requirement spec of 52 dBA. *(1-tailed test)*



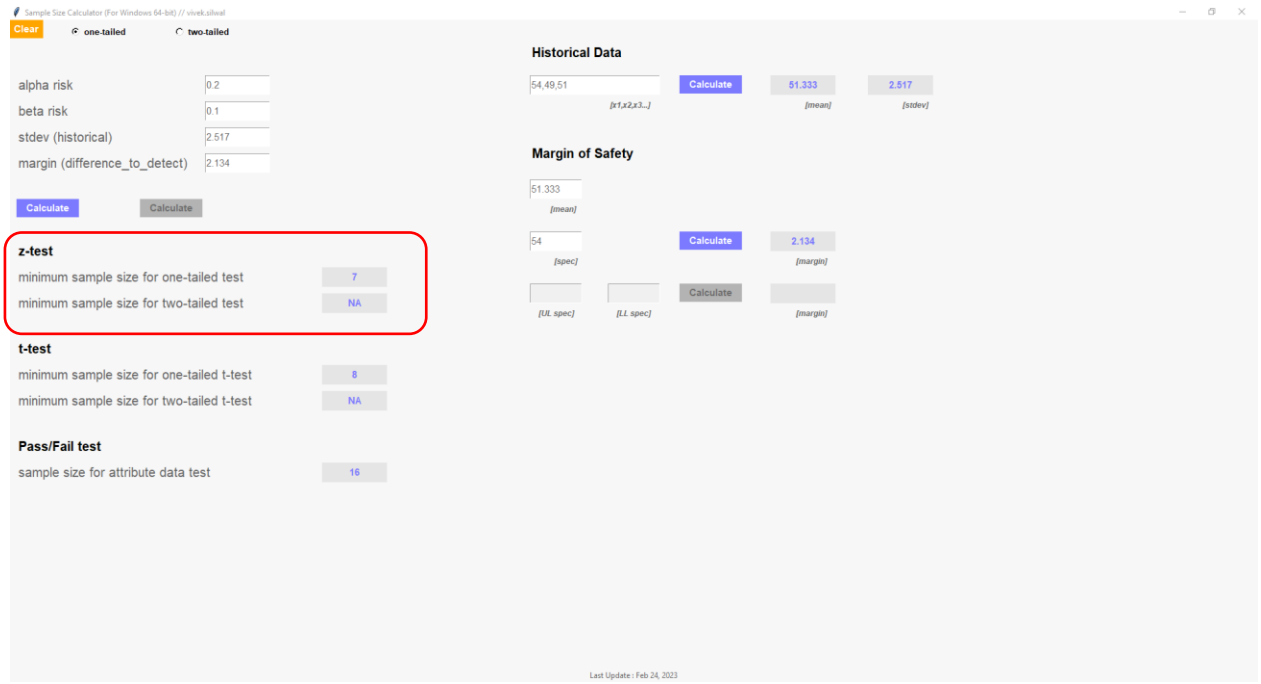
- Use the calculated historical mean data to find the margin of safety. Below image shows the margin of safety calculation for 1-tailed test. For 2-tailed test case, Upper Spec/limit (UL) and Lower Spec/Limit (LL) would need to be entered for margin of safety calculation.



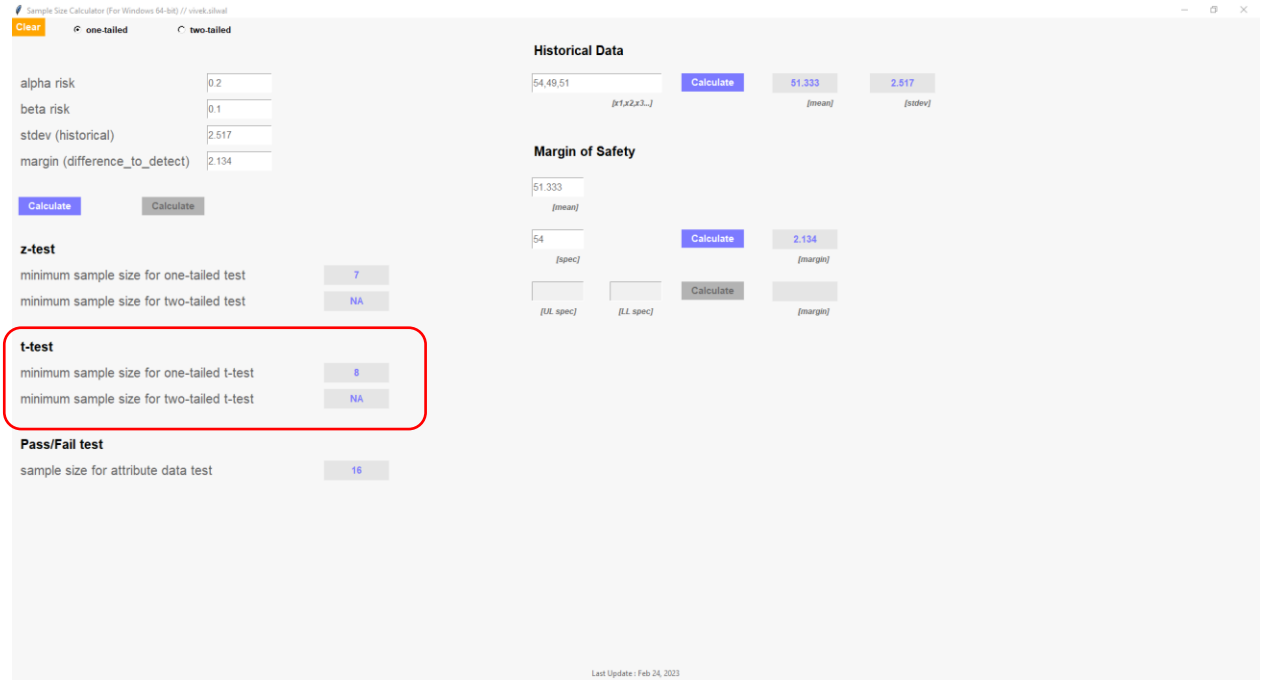
- The final step would be calculating the sample size for a predefined alpha and beta risk associated with that test (For E.g. For Sound Level, the risk of harm would be Level 1. Hence the values of Alpha, Beta are 0.2 and 0.1 to be used for this test.



- Sample size data is calculated as per Z-test.



- For more conservative Sample size, results as per t-test could also be used.



- Pass/Fail test results is only used for the attribute results tests (such as External Condensation), which uses zero failure reliability and confidence into consideration for Sample Size calculation.
  For E.g. With 0.2 as Alpha (i.e., 80% Confidence) and 0.1 as Beta (i.e., 90% Reliability), the sample size tested for zero failures would be 16.