

Demo: Calculating the Sample Size for a One-Sample t Test

In this video, you learn how to calculate the sample size for a one-sample t test. To do this, we select Sample Size and Power from the DOE menu under Design Diagnostics.

Sample size and power calculations are available for many situations. We'll select One Sample Mean.

In this scenario, the process characteristic is the diameter of metal parts, in mm. The target for the process is 16 mm. We'd like to determine the sample size required to detect a difference of 0.02 mm with a power of 0.9.

We'll use a significance level for the test, alpha, of 0.05.

We'll enter a conservative estimate of the population standard deviation, 0.045

mm. We'll enter the difference to detect, 0.02, and the power, 0.90, and click Continue.

The sample size required to detect this difference, with a power of 0.90, is 56.

What if we needed higher power? For example, what if we wanted a probability of 0.95 of detecting a difference of at least 0.02 mm?

We clear the Sample Size field, change the power to 0.95, and click Continue.

We'd need to measure a random sample of 68 parts.

If we leave two of the three fields blank, JMP produces a graph to explore the values of the other two fields.

Let's explore the relationship between power and sample size, for a difference of 0.02 mm.

We clear the Sample Size and Power fields and click Continue.

You can see that the power curve levels off somewhat above a sample size of 50. That is, you don't see much of an increase in power if you have more than 55 or 60 observations.

Let's go back and change the difference to detect to a smaller value, 0.01

mm. If you want to detect a much smaller difference, you'd need substantially more data to have sufficient power.

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