

## Descriptive Statistics

---

A quality control engineer needs to ensure that the caps on shampoo bottles are fastened correctly. If the caps are fastened too loosely, they may fall off during shipping. If they are fastened too tightly, they may be too difficult to remove. The target torque value for fastening the caps is 18. The engineer collects a random sample of 68 bottles and tests the amount of torque that is needed to remove the caps.

As part of the initial investigation, the engineer analyzes the descriptive statistics of the torque measurements to evaluate the distribution of the data from each machine.

1. Open the sample data, [CapTorque.MTW](#).
2. Open the Descriptive Statistics dialog box.
  - Mac: **Statistics > Summary Statistics > Descriptive Statistics**
  - PC: **STATISTICS > Descriptive Statistics**
3. In **Variable**, enter *Torque*.
4. In **Group variable**, enter *Machine*.
5. Click the **Display** tab, and then select **Histogram**.
6. Click **OK**.

### Interpreting the results

The mean torque value for Machine 1 is closer to the target of 18 than the mean torque value for Machine 2. The mean torque required to remove caps from Machine 1 is 18.6667, and the mean torque required to remove caps from Machine 2 is 24.188. The distribution of data from Machine 1 also is less variable. The standard deviation is 4.3948 for Machine 1 and is 7.119 for Machine 2.

The graphs also show that there is a difference in the mean torque values for the two machines. To determine whether a significant difference in population means exists, the engineer could perform a 2-sample t-test.

## Statistics

Variable	Machine	N	N*	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Torque	1	36	0	18.6667	0.7325	4.3948	10.0000	15.2500	17.0000	21.7500	30.0000
	2	32	0	24.188	1.258	7.119	14.000	17.500	24.000	31.000	37.000

