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Practice: Conducting a Capability Analysis with Nonnormal Data

Open the File **PartFlatness.jmp**.

In this scenario, you are studying the flatness of metal parts. Flatness is measured as the deviation from a horizontal plane, measured in microns. The upper specification for the process is 30 microns. You have measured the flatness of 122 parts.

1. Use the Distribution platform to create a histogram and summary statistics. It is fairly clear that the distribution is nonnormal.
2. Select **Continuous Fit**, **Fit All** from the red triangle for **Deviation from Flat**.
    a. Which distribution is selected as the best fit?

    a. The best fitting distribution is the Weibull, which is right skewed.

3. Conduct a long-term capability analysis for the selected distribution. Use an upper spec of 30. There is no lower spec or target.
    a. A P_p value is not computed. Why?
    b. What is P_{pk}?
    c. Would you consider this process to be capable?
    d. What percent of parts will be nonconforming?

    a. A P_p is not computed because we don't have a lower spec. P_p compares the width of the spec limits to the process spread.
    b. The P_{pk} is 0.821
    c. If we consider that a barely capable process has a P_{pk} =1.0, then, no, the process is not capable.
    d. The estimated percent beyond the upper spec is 0.4588, and the ppm (parts per million) nonconforming is 4588.

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