A variety of industrial multiphase processes are dependent on particle sizes, yet the mean particle size, or particle size distribution, cannot be easily determined experimentally. Furthermore, reported mean particle sizes do not have high confidence intervals since only a small number of particles are included in the analysis and large skews typically present in natural particle size distribution are often ignored. Ignoring the skew in size distributions leads to significant bias in predictions and consequently inaccurate results and models. The goal of this research is to determine the necessary sample size for a specific confidence interval and to show the difference that sampling and analysis bias has on sample mean determination. Moreover, our research focused on analyzing the effect of particle size distribution types and to what extent normalizing any size distribution deters from getting close to the true mean. With further understanding of this statistical analysis, the results of this research should aid in determining the sample size needed in particle processing for particles with a given confidence interval and population size. The determination of this sample size should increase efficiency by saving time that would be necessary to conduct the large number of samples that are now necessary to determine a sample size, while still decreasing error and bias that exist in many particle processes. The following graphs show some of our results: