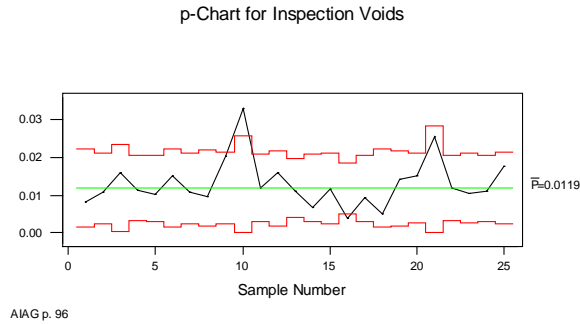


Brief Explanation of t-Charts

On page 96 of the AIAG SPC Manual is a set of data for p-chart of voids found on inspection. The value of n and of np varies a lot. The p-chart looks like this:



The upper and lower control limits change because the sample size n is changing.

Consider the first point where $n = 968$ and $np = 8$. The value of $p_1 = 8/968 = 0.083$. The value of the mean, \bar{p} is 0.0119. If one measures the distance of p_1 from \bar{p} in terms of standard deviations or σ one can then plot the values of t. These plots have a center line of 0 (zero), an upper control limit (UCL) of 3 and a lower control limit (LCL) of -3. The plot points bear the same relationship as in the original data plot of the p-chart.

The computation is as follows:

$$t = \frac{(p_i - \bar{p})}{\sqrt{\bar{p}(1-\bar{p})/n_i}} = \frac{(8/968 - 0.01193)}{\sqrt{0.01192(1 - 0.01192)/968}} = -1.05$$

Computing all 25 values and plotting them gives this chart:

