

Defects Per Million Opportunities (DPMO) =
(Total Defects / Total Opportunities) * 1,000,000

Defects (%) =
(Total Defects / Total Opportunities) * 100%

Yield (%) =
100 - %Defects

Process Sigma (type this formula into Excel):
=NORMSINV(1-(total defects / total opportunities))+1.5

Be sure to include the Equals (=) sign. This will give you your process sigma (or sigma capability) assuming the 1.5 sigma shift.

For example if you type this into Excel,
=NORMSINV(1-100/1000000)+1.5
you will get 5.22 for your Process Sigma.

2 defects per 1000 (two customers of 1000 walk out mad) has a DPMO of 1,000,000/1,000 = 1000
→ 1000 * 2 = 2000 defects per million or (2/1000 * 1000000)

2/1000 = probability of defect of .002 1 - .002 = .998 one sided table gives a Z of 2.88

If we assume that those results are caused by the mean having shifted 1.5 standard deviations, then the x sigma process would be 2.88 + 1.5 = 4.38 However, that may well be over inflated, as there may not be a shift.

Note that DPMO differs from reporting defective parts per million (PPM) in that it comprehends the possibility that a unit under inspection may be found to have multiple defects of the same type or may have multiple types of defects. Identifying specific opportunities for defects (and therefore how to count and categorize defects) is an art, but generally organizations consider the following when defining the number of opportunities per unit:

- Knowledge of the process under study
- Industry standards
- When studying multiple types of defects, knowledge of the relative importance of each defect type in determining customer satisfaction
- The time, effort, and cost to count and categorize defects in process output