

Sample Allocation using Neyman allocation Methodology ⁱ

After the strata boundaries, the number of items per strata, and the standard deviation for each of the strata that will be sampled have been determined, we are ready to determine the total sample size and allocate sample sizes to the individual strata.

The determination to eliminate all items under \$100 and to review in detail all items \$10,000 and greater leaves 6 strata that will need to be statistically sampled. While statistical formulas exist to determine optimum sample sizes that will meet specific objectives such as precision and confidence levels, auditors usually do not know how many errors exist within the population they are sampling. The expected number of errors is a key piece of the formula used to calculate optimum sample sizes. An estimate of the number of errors occurring within the population is normally determined through the use of pre-samples, which can be as large as the sample sizes New York State auditors use as their final sample sizes. It is for this reason that the department has chosen not to pre-sample, but rather evaluate the sample results to ensure that they meet pre-defined limits. Sample sizes are instead set judgmentally using between 250 - 350 items times the number of strata to be sampled. The immediate example will use 250 items as the average number for the 6 sampled strata, resulting in 1499 (**n**) items being allocated among the 6 strata.

- Step 1 For each sampled strata, calculate the product (**C**) of the number of items in the strata (**A**) and the standard deviation for that strata (**B**).
- Step 2 Sum these products (**D**) for the 6 strata.
- Step 3 Calculate what percentage (**E**) each individual stratum's product is of the sum.
- Step 4 Multiply the computed percentage by the total sample size for the 6 sampled strata (**n**), 1499 in this case. This result is the number of items to be sampled for each of the strata (**F**). If any stratum has fewer than 100 items to be sampled, we will increase the sample size to equal 100.

Stratum	Population (A)	Standard deviation (B)	Product of population & standard deviation (C) = (A × B)	Sample allocation % (E) = (C/D)	Sample size (F) = (E × n)
1	20,090	-	-	-	0
2	21,472	109.89	2,359,558	.168746623	253
3	8,850	144.67	1,280,330	.091564298	137
4	8,776	431.59	3,787,634	.270877172	406
5	4,491	411.27	1,847,014	.132091388	198
6	3,049	715.53	2,181,651	.156023383	234
7	2,501	1,010.26	2,526,660	.180697136	271
8	234	-	-	-	234
Total	69,463		13,982,846 (D)		1,733

ⁱ Taken from the New York State Department of Taxation and Finance's publication 132; *Computer-Assisted Audits – Guidelines and Procedures for Sales Tax Audits*.