

1. ANEXOS

APPENDIX A **Attributes Sampling** **Tables for Computing Sample Size** **and One-sided Upper Precision Limits**

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Five Percent Risk of Assessing Control Risk Too Low
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Ten Percent Risk of Assessing Control Risk Too Low
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Upper Limits at Ten Percent Risk of Assessing Control Risk Too Low

Table A-1
Statistical Sample Sizes for Test of Controls
Five Percent Risk of Assessing Control Risk Too Low
(number of expected errors in parentheses)

Expected Population Deviation Rate (%)	Note: This table assumes a large population.										
	Tolerable Deviation Rate										
	2 %	3 %	4 %	5 %	6 %	7 %	8 %	9 %	10 %	15 %	20 %
0.00	149(0)	99(0)	74(0)	59(0)	49(0)	42(0)	36(0)	32(0)	29(0)	19(0)	14(0)
0.25	236(1)	157(1)	117(1)	93(1)	78(1)	66(1)	58(1)	51(1)	46(1)	30(1)	22(1)
0.50	*	157(1)	117(1)	93(1)	78(1)	66(1)	58(1)	51(1)	46(1)	30(1)	22(1)
0.75	*	208(2)	117(1)	93(1)	78(1)	66(1)	58(1)	51(1)	46(1)	30(1)	22(1)
1.00	*	*	156(2)	93(1)	78(1)	66(1)	58(1)	51(1)	46(1)	30(1)	22(1)
1.25	*	*	156(2)	124(2)	78(1)	66(1)	58(1)	51(1)	46(1)	30(1)	22(1)
1.50	*	*	192(3)	124(2)	103(2)	66(1)	58(1)	51(1)	46(1)	30(1)	22(1)
1.75	*	*	227(4)	153(3)	103(2)	88(2)	77(2)	51(1)	46(1)	30(1)	22(1)
2.00	*	*	*	181(4)	127(3)	88(2)	77(2)	68(2)	46(1)	30(1)	22(1)
2.25	*	*	*	208(5)	127(3)	88(2)	77(2)	68(2)	61(2)	30(1)	22(1)
2.50	*	*	*	*	150(4)	109(3)	77(2)	68(2)	61(2)	30(1)	22(1)
2.75	*	*	*	*	173(5)	109(3)	95(3)	68(2)	61(2)	30(1)	22(1)
3.00	*	*	*	*	195(6)	129(4)	95(3)	84(3)	61(2)	30(1)	22(1)
3.25	*	*	*	*	*	148(5)	112(4)	84(3)	61(2)	30(1)	22(1)
3.50	*	*	*	*	*	167(6)	112(4)	84(3)	76(3)	40(2)	22(1)
3.75	*	*	*	*	*	185(7)	129(5)	100(4)	76(3)	40(2)	22(1)
4.00	*	*	*	*	*	*	146(6)	100(4)	89(4)	40(2)	22(1)
5.00	*	*	*	*	*	*	*	158(8)	116(6)	40(2)	30(2)
6.00	*	*	*	*	*	*	*	*	179(11)	50(3)	30(2)
7.00	*	*	*	*	*	*	*	*	*	68(5)	37(3)

*Sample size is too large to be cost-effective for most audit applications

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Table A-2
Statistical Sample Sizes for Test of Controls
Ten Percent Risk of Assessing Control Risk Too Low
(with number of expected errors in parentheses)

Expected Population Deviation Rate (%)	Note: This table assumes a large population.										
	Tolerable Deviation Rate										
	2 %	3 %	4 %	5 %	6 %	7 %	8 %	9 %	10 %	15 %	20 %
0.00	114(0)	76(0)	57(0)	45(0)	38(0)	32(0)	28(0)	25(0)	22(0)	15(0)	11(0)
0.25	194(1)	129(1)	96(1)	77(1)	64(1)	55(1)	48(1)	42(1)	38(1)	25(1)	18(1)
0.50	194(1)	129(1)	96(1)	77(1)	64(1)	55(1)	48(1)	42(1)	38(1)	25(1)	18(1)
0.75	265(2)	129(1)	96(1)	77(1)	64(1)	55(1)	48(1)	42(1)	38(1)	25(1)	18(1)
1.00	*	176(2)	96(1)	77(1)	64(1)	55(1)	48(1)	42(1)	38(1)	25(1)	18(1)
1.25	*	221(3)	132(2)	77(1)	64(1)	55(1)	48(1)	42(1)	38(1)	25(1)	18(1)
1.50	*	*	132(2)	105(2)	64(1)	55(1)	48(1)	42(1)	38(1)	25(1)	18(1)
1.75	*	*	166(3)	105(2)	88(2)	55(1)	48(1)	42(1)	38(1)	25(1)	18(1)
2.00	*	*	198(4)	132(3)	88(2)	75(2)	48(1)	42(1)	38(1)	25(1)	18(1)
2.25	*	*	*	132(3)	88(2)	75(2)	65(2)	42(1)	38(2)	25(1)	18(1)
2.50	*	*	*	158(4)	110(3)	75(2)	65(2)	58(2)	38(2)	25(1)	18(1)
2.75	*	*	*	209(6)	132(4)	94(3)	65(2)	58(2)	52(2)	25(1)	18(1)
3.00	*	*	*	*	132(4)	94(3)	65(2)	58(2)	52(2)	25(1)	18(1)
3.25	*	*	*	*	153(5)	113(4)	82(3)	58(2)	52(2)	25(1)	18(1)
3.50	*	*	*	*	194(7)	113(4)	82(3)	73(3)	52(2)	25(1)	18(1)
3.75	*	*	*	*	*	131(5)	98(4)	73(3)	52(2)	25(1)	18(1)
4.00	*	*	*	*	*	149(6)	98(4)	73(3)	65(3)	25(1)	18(1)
5.00	*	*	*	*	*	*	160(8)	115(6)	78(4)	34(2)	18(1)
6.00	*	*	*	*	*	*	*	182(11)	116(7)	43(3)	25(2)
7.00	*	*	*	*	*	*	*	*	199(14)	52(4)	25(2)

*Sample size is too large to be cost-effective for most audit applications

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Table A-3
Statistical Sampling Results Evaluation Table for Tests of Controls
Upper Limits at Five Percent Risk of Assessing Control Risk Too Low

Sample Size	Actual Number of Deviations Found										
	0	1	2	3	4	5	6	7	8	9	10
25	11.3	17.6	*	*	*	*	*	*	*	*	*
30	9.5	14.9	19.6	*	*	*	*	*	*	*	*
35	8.3	12.9	17.0	*	*	*	*	*	*	*	*
40	7.3	11.4	15.0	18.3	*	*	*	*	*	*	*
45	6.5	10.2	13.4	16.4	19.2	*	*	*	*	*	*
50	5.9	9.2	12.1	14.8	17.4	19.9	*	*	*	*	*
55	5.4	8.4	11.1	13.5	15.9	18.2	*	*	*	*	*
60	4.9	7.7	10.2	12.5	14.7	16.8	18.8	*	*	*	*
65	4.6	7.1	9.4	11.5	13.6	15.5	17.4	19.3	*	*	*
70	4.2	6.6	8.8	10.8	12.6	14.5	16.3	18.0	19.7	*	*
75	4.0	6.2	8.2	10.1	11.8	13.6	15.2	16.9	18.5	20.0	*
80	3.7	5.8	7.7	9.5	11.1	12.7	14.3	15.9	17.4	18.9	*
90	3.3	5.2	6.9	8.4	9.9	11.4	12.8	14.2	15.5	16.8	18.2
100	3.0	4.7	6.2	7.6	9.0	10.3	11.5	12.8	14.0	15.2	16.4
125	2.4	3.8	5.0	6.1	7.2	8.3	9.3	10.3	11.3	12.3	13.2
150	2.0	3.2	4.2	5.1	6.0	6.9	7.8	8.6	9.5	10.3	11.1
200	1.5	2.4	3.2	3.9	4.6	5.2	5.9	6.5	7.2	7.8	8.4

*Over 20 percent

Notes: This table (a) presents upper limits as percentages and (b) assumes a large population.

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Table A-4
Statistical Sampling Results Evaluation Table for Tests of Controls
Upper Limits at Ten Percent Risk of Assessing Control Risk Too Low

Sample Size	Actual Number of Deviations Found										
	0	1	2	3	4	5	6	7	8	9	10
20	10.9	18.1	*	*	*	*	*	*	*	*	*
25	8.8	14.7	19.9	*	*	*	*	*	*	*	*
30	7.4	12.4	16.8	*	*	*	*	*	*	*	*
35	6.4	10.7	14.5	18.1	*	*	*	*	*	*	*
40	5.6	9.4	12.8	16.0	19.0	*	*	*	*	*	*
45	5.0	8.4	11.4	14.3	17.0	19.7	*	*	*	*	*
50	4.6	7.6	10.3	12.9	15.4	17.8	*	*	*	*	*
55	4.1	6.9	9.4	11.8	14.1	16.3	18.4	*	*	*	*
60	3.8	6.4	8.7	10.8	12.9	15.0	16.9	18.9	*	*	*
70	3.3	5.5	7.5	9.3	11.1	12.9	14.6	16.3	17.9	19.6	*
80	2.9	4.8	6.6	8.2	9.8	11.3	12.8	14.3	15.8	17.2	18.6
90	2.6	4.3	5.9	7.3	8.7	10.1	11.5	12.8	14.1	15.4	16.6
100	2.3	3.9	5.3	6.6	7.9	9.1	10.3	11.5	12.7	13.9	15.0
120	2.0	3.3	4.4	5.5	6.6	7.6	8.7	9.7	10.7	11.6	12.6
160	1.5	2.5	3.3	4.2	5.0	5.8	6.5	7.3	8.0	8.8	9.5
200	1.2	2.0	2.7	3.4	4.0	4.6	5.3	5.9	6.5	7.1	7.6

*Over 20 percent

Notes: This table (a) presents upper limits as percentages and (b) assumes a large population.

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APPENDIX B

Sequential Attributes Sampling

Tables for Computing Sample Size and Evaluating Results

Table B-1: Sample Size Tables

Table B-2: Sample Results Evaluation Table

Table B-1
Sequential Attributes Sampling
Sample Size Tables

Alpha risk = 5%

Beta risk	Tolerable Deviation Rate						
	.04	.05	.06	.07	.08	.09	.10
.01	128	99	81	68	59	51	46
.02	109	84	69	58	50	44	39
.03	98	76	61	52	45	39	35
.04	90	69	56	47	41	36	32
.05	83	65	53	44	38	33	30
.06	78	61	49	41	36	31	28
.07	74	57	47	39	34	30	26
.08	70	54	44	37	32	28	25
.09	67	52	42	35	31	27	24
.10	64	50	40	34	29	26	23
Incremental Sample Size	59	51	45	40	36	33	31

Alpha risk = 10%

Beta risk	.05	.06	.07	.08	.09	.10
.01			73	63	55	48
.02		75	62	53	46	41
.03		67	60	48	41	37
.04	78	62	51	44	38	34
.05	72	58	48	41	35	31
.06	68	54	45	38	33	29
.07	64	51	42	36	31	28
.08	61	49	40	34	30	26
.09	58	46	38	33	28	25
.10	56	44	37	31	27	24
Incremental Sample Size	40	36	32	29	27	25

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Table B-2
Sequential Attributes Sampling
Sample Results Evaluation Table

Block	Sample Size		Number of Cumulative Deviations		
	Increment	Cumulative	Stop	Continue	Abandon
1	n	n	0	1-3	4
2	Δn	$n + \Delta n$	1	2-3	4
3	Δn	$n + 2\Delta n$	2	3	4
4	Δn	$n + 3\Delta n$	3	NA	4

n=initial sample

Δ =additional sample

NA= not applicable

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APPENDIX C
Attributes Sampling
Tables for Computing Sample Size and
Two-sided Precision Intervals

- Table C-1:** Statistical Sample Sizes for Attributes Sampling
Two-sided Precision Intervals
90% Confidence Level
- Table C-2:** Statistical Sample Sizes for Attributes Sampling
Two-sided Precision Intervals
95% Confidence Level
- Table C-3:** Statistical Sample Evaluation for Attributes Sampling
Upper Precision Limits (%) for Two-sided Precision Intervals
Sample Deviation Rate = 0%
- Table C-4:** Statistical Sample Evaluation for Attributes Sampling
Two-sided Precision Intervals
Sample Deviation Rate = 2%
- Table C-5:** Statistical Sample Evaluation for Attributes Sampling
Two-sided Precision Intervals
Sample Deviation Rate = 3%
- Table C-6:** Statistical Sample Evaluation for Attributes Sampling
Two-sided Precision Intervals
Sample Deviation Rate = 5%
- Table C-7:** Statistical Sample Evaluation for Attributes Sampling
Two-sided Precision Intervals
Sample Deviation Rate = 10%

These tables were adapted from *Sampling for Modern Auditors* published by The Institute of Internal Auditors, Altamonte Springs, Florida ©1977.

Table C-1
Statistical Sample Sizes for Attributes Sampling
Two-sided Precision Intervals
90% Confidence Level

a. Expected Population Deviation Rate Not Over 2%

Population	Precision Percentage \pm						
	.50	.75	1.00	1.25	1.50	1.75	2.00
1,000	679	485	346	253	190	147	117
2,000	1029	640	419	290	210	159	124
5,000	1489	793	479	317	225	167	129
10,000	1750	861	503	328	230	170	130
50,000+	2035	925	524	337	234	172	132

b. Expected Population Deviation Rate Not Over 3%

Population	Precision Percentage \pm						
	.50	1.00	1.50	2.00	2.50	2.75	3.00
1,000	759	440	259	164	111	94	80
2,000	1223	564	297	179	118	98	83
5,000	1932	680	327	189	122	102	85
10,000	2395	729	338	193	124	103	86
50,000+	2963	775	347	196	125	103	87

c. Expected Population Deviation Rate Not Over 5%

Population	Precision Percentage \pm						
	1.00	1.50	2.00	2.50	3.00	3.50	4.00
1,000	562	363	243	170	124	94	74
2,000	782	444	276	186	133	99	77
5,000	1022	512	301	197	138	102	79
10,000	1138	540	311	201	140	103	79
50,000+	1253	564	319	204	142	104	80

Table C-2
Statistical Sample Sizes for Attributes Sampling
Two-sided Precision Intervals
95% Confidence Level

a. Expected Population Deviation Rate Not Over 2%

Population	Precision Percentage \pm						
	.50	.75	1.00	1.25	1.50	1.75	2.00
1,000	750	572	429	325	250	197	158
2,000	1201	801	547	388	286	218	172
5,000	1879	1055	654	439	313	234	181
10,000	2314	1180	700	459	323	239	184
50,000+	2840	1303	741	477	332	244	187

b. Expected Population Deviation Rate Not Over 3%

Population	Precision Percentage \pm						
	.50	1.00	1.50	2.00	2.50	2.75	3.00
1,000	817	527	331	218	151	128	110
2,000	1381	717	397	245	164	137	116
5,000	2360	913	451	264	172	143	121
10,000	3089	1005	473	271	175	145	122
50,000+	4104	1093	491	277	178	147	123

c. Expected Population Deviation Rate Not Over 5%

Population	Precision Percentage \pm						
	1.00	1.50	2.00	2.50	3.00	3.50	4.00
1,000	645	447	313	225	168	129	102
2,000	954	577	371	254	184	138	107
5,000	1336	697	418	275	194	144	111
10,000	1543	750	436	283	198	146	112
50,000+	1760	798	452	290	201	148	113

Table C-3
Statistical Sample Evaluation for Attributes Sampling
Upper Precision Limits (%) for Two-sided Precision Intervals
Sample Deviation Rate = 0%

90% Confidence Level

Sample size	Population			
	1,000	2,000	10,000	50,000+
30	7.3	7.3	7.4	7.4
40	5.5	5.5	5.6	5.6
50	4.4	4.4	4.5	4.5
60	3.7	3.7	3.8	3.8
70	3.1	3.2	3.2	3.2
80	2.7	2.8	2.8	2.8
90	2.4	2.5	2.5	2.5
100	2.2	2.2	2.3	2.3
150	1.4	1.5	1.5	1.5
200	1.0	1.1	1.1	1.1
300	.6	.7	.7	.8
400	.4	.5	.6	.6
500	.3	.4	.5	.5
1,000		.2	.2	.2

95% Confidence Level

Sample size	Population			
	1,000	2,000	10,000	50,000+
30	9.4	9.4	9.5	9.5
40	7.1	7.1	7.2	7.2
50	5.7	5.7	5.8	5.8
60	4.7	4.8	4.9	4.9
70	4.0	4.1	4.2	4.2
80	3.5	3.6	3.7	3.7
90	3.1	3.2	3.3	3.3
100	2.8	2.9	2.9	3.0
150	1.8	1.9	2.0	2.0
200	1.3	1.4	1.5	1.5
300	.8	.9	1.0	1.0
400	.6	.7	.7	.7
500		.5	.6	.6
1,000			.3	.3

Note: Lower precision limit = zero when sample deviation rate is 0%