

# Tolerance Factors for Normal Distribution

$1-\alpha$  = confidence

$1-\tau$  = proportion of population

## Two-Sided Intervals

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$n$	$\alpha = 0.05$			$\alpha = 0.01$			$n$	$\alpha = 0.05$			$\alpha = 0.01$		
	$1-\tau$			$1-\tau$				$1-\tau$			$1-\tau$		
	0.90	0.95	0.99	0.90	0.95	0.99		0.90	0.95	0.99	0.90	0.95	0.99
2	32.02	37.67	48.43	160.2	188.5	242.3	2	20.58	26.26	37.09	103.0	131.4	185.6
3	8.380	9.916	12.86	18.93	22.40	29.1	3	6.156	7.656	10.55	14.00	17.17	23.90
4	5.369	6.370	8.299	9.398	11.15	14.5	4	4.162	5.144	7.042	7.380	9.083	12.39
5	4.275	5.079	6.634	6.612	7.855	10.3	5	3.407	4.203	5.741	5.362	6.578	8.939
6	3.712	4.414	5.775	5.337	6.345	8.301	6	3.006	3.708	5.062	4.411	5.406	7.335
7	3.369	4.007	5.248	4.613	5.488	7.187	7	2.756	3.400	4.642	3.859	4.728	6.412
8	3.136	3.732	4.891	4.125	4.936	6.468	8	2.582	3.187	4.354	3.497	4.285	5.812
9	2.967	3.532	4.631	3.822	4.550	5.966	9	2.454	3.031	4.143	3.241	3.972	5.389
10	2.839	3.379	4.433	3.582	4.265	5.594	10	2.355	2.911	3.981	3.048	3.738	5.074
11	2.737	3.259	4.277	3.397	4.045	5.308	11	2.275	2.815	3.852	2.898	3.556	4.829
12	2.655	3.162	4.150	3.250	3.870	5.079	12	2.210	2.736	3.747	2.777	3.410	4.633
13	2.587	3.081	4.044	3.130	3.727	4.893	13	2.155	2.671	3.659	2.677	3.290	4.472
14	2.529	3.012	3.955	3.029	3.608	4.737	14	2.109	2.615	3.585	2.593	1.189	4.337
15	2.480	2.954	3.878	2.945	3.507	4.605	15	2.068	2.566	3.520	2.522	3.102	4.222
16	2.437	2.903	3.812	2.872	3.421	4.492	16	2.033	2.524	3.464	2.460	3.028	4.123
17	2.400	2.858	3.754	2.837	3.345	4.393	17	2.002	2.486	3.414	2.405	2.963	4.037
18	2.366	2.819	3.702	2.753	3.279	4.307	18	1.974	2.453	3.370	2.357	2.905	3.960
19	2.337	2.784	3.656	2.703	3.221	4.230	19	1.949	2.423	3.331	2.314	2.854	3.892
20	2.310	2.752	3.615	2.659	3.168	4.161	20	1.926	2.396	3.295	2.276	2.808	1.832
25	2.208	2.631	3.457	2.494	2.972	3.904	25	1.838	2.292	3.158	2.129	2.633	3.001
30	2.140	2.549	3.350	2.385	2.841	3.733	30	1.777	2.220	3.064	2.030	2.516	3.447
35	2.090	2.490	3.272	2.306	2.748	3.611	35	1.732	2.167	2.995	1.957	2.430	3.334
40	2.052	2.445	3.213	2.247	2.677	3.518	40	1.697	2.126	2.941	1.902	2.364	3.249
45	2.021	2.408	3.165	2.200	2.621	3.444	45	1.669	2.092	2.898	1.857	2.312	3.180
50	1.996	2.379	3.126	2.162	2.576	3.385	50	1.646	2.065	2.863	1.821	2.269	3.125
60	1.958	2.333	3.066	2.103	2.506	3.293	60	1.609	2.022	2.807	1.764	2.202	3.038
70	1.929	2.299	3.021	2.060	2.454	3.225	70	1.581	1.990	2.765	1.722	2.153	2.974
80	1.907	2.272	2.986	2.026	2.414	3.173	80	1.559	1.965	2.733	1.688	2.114	2.924
90	1.889	2.251	2.958	1.999	2.382	3.130	90	1.542	1.944	2.706	1.661	2.082	2.883
100	1.874	2.233	2.934	1.977	2.355	3.096	100	1.527	1.927	2.684	1.639	2.056	2.850
150	1.825	2.175	2.859	1.905	2.270	2.983	150	1.478	1.870	2.611	1.566	1.971	2.741
200	1.798	2.143	2.816	1.865	2.222	2.921	200	1.450	1.837	2.570	1.524	1.923	2.679
250	1.780	2.121	2.788	1.839	2.191	2.880	250	1.431	1.815	2.542	1.496	1.891	2.638
300	1.767	2.106	2.767	1.820	2.169	2.850	300	1.417	1.800	2.522	1.476	1.868	2.608
999	1.645	1.960	2.576	1.645	1.960	2.576	999	1.282	1.645	2.326	1.282	1.645	2.326