

Warp Factor Equivalency Tables

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Anyone familiar with *Star Trek* or *Star Trek: The Roleplaying Game* knows that starships travel interstellar distances at high velocities called "warp factors." Warp factors are measured as an exponent of the value (i.e., the resulting warp speed is the warp factor multiplied by itself a certain number of times, with the value then expressed as a multiple of the speed of light). For example, assuming the value is raised to the third power, Warp Factor 1 would be 1 times 1 times 1, or 1 times the speed of light. Warp Factor 2 would be 2 times 2 times 2, or 8 times the speed of light. Warp Factor 3 would be 27 times the speed of light, and so forth. Starships existing during the time of *Star Trek: The Roleplaying Game* use an exponent of three to calculate all warp speeds.

The remarkable engines of the Star Trek universe propel ships according to specific equations. Calculation of speed and distance travelled can be tedious—these tables should help referees and players alike.

Star Trek's future starships would be capable of even greater speeds. One possibility briefly mentioned in the *Star Trek Spaceflight Chronology* is the so-called SuperWarp, in which all velocities are raised to the fourth power. However, in less than 100 years from the time of *Star Trek: The Roleplaying Game*, an even greater leap in technology will permit starships to travel at velocities raised to the fifth power. By this time, Warp Factor 2 becomes 32 times the speed of light, Warp Factor 3 equals 243 times the speed of light, and so forth. The fact that starships can reach these speeds is directly implied by notes contained in the *Writers'/Directors' Guide for Star Trek: The Next Generation*, written by Gene Roddenberry.

In the Warp Speed Table which follows, the first columns give the warp factor as raised to the third, fourth, and fifth powers, respectively. The fifth column shows the equivalent third-power warp speed based on the fifth-power speed. For example, using warp-to-the-fifth, Warp Factor 2 is 32 times the speed of light. To travel 32 times the speed of light using warp-to-the-third, the starship would have to attain Warp Factor 3.175. Thus, the "new" Warp Factor 5 is faster than the "old" Warp 14! All values in this table are rounded up to the nearest significant digit.

In the Warp Distance Table which follows, the distances travelled—as measured in light years—during a single year, day, and hour have been determined, based on warp-to-the-fifth. (For these calculations, a year consists of 365.25 standard days, with 24 hours to a standard day, of course.) Values are again rounded up to the nearest significant digit, except where values

closely approach zero (such as light-years-per-day at very low Warp Factors).

WARP SPEED TABLE

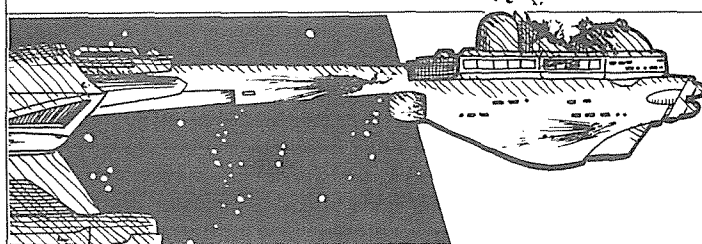
Multiples of Speed of Light

Warp	Warp ³ "Old"	Warp ⁴ "SW"	Warp ⁵ "New"	Warp ³ Equiv.
1.0	1.000	1.000	1.000	1.000
1.1	1.331	1.464	1.611	1.172
1.2	1.728	2.074	2.488	1.355
1.3	2.197	2.856	3.713	1.548
1.4	2.744	3.842	5.378	1.752
1.5	3.375	5.063	7.594	1.966
1.6	4.096	6.554	10.486	2.189
1.7	4.913	8.352	14.199	2.421
1.8	5.832	10.498	18.896	2.664
1.9	6.859	13.032	24.761	2.915
2.0	8.000	16.000	32.000	3.175
2.1	9.261	19.448	40.841	3.444
2.2	10.648	23.426	51.536	3.721
2.3	12.167	27.984	64.363	4.008
2.4	13.824	33.178	79.626	4.302
2.5	15.625	39.062	97.656	4.605
2.6	17.576	45.698	118.814	4.916
2.7	19.683	53.144	143.489	5.235
2.8	21.952	61.466	172.104	5.562
2.9	24.389	70.728	205.111	5.897
3.0	27.000	81.000	243.000	6.240
3.1	29.791	92.352	286.291	6.591
3.2	32.768	104.857	335.544	6.949
3.3	35.937	118.592	391.353	7.315
3.4	39.304	133.633	454.354	7.688
3.5	42.875	150.062	525.218	8.068
3.6	46.656	167.961	604.661	8.456
3.7	50.653	187.416	693.438	8.815
3.8	54.872	208.513	792.351	9.253
3.9	59.319	231.344	902.241	9.663
4.0	64.000	256.000	1024.000	10.079
4.1	68.921	282.576	1158.560	10.503
4.2	74.088	311.169	1306.910	10.933
4.3	79.507	341.880	1470.080	11.370
4.4	85.184	374.809	1649.160	11.815
4.5	91.125	410.062	1845.280	12.266
4.6	97.336	447.745	2059.620	12.723
4.7	103.823	487.967	2293.450	13.187
4.8	110.592	530.841	2548.030	13.658
4.9	117.649	576.479	2824.750	14.136
5.0	125.000	625.000	3125.000	14.620
5.1	132.651	676.519	3450.240	15.111
5.2	140.608	731.160	3820.030	15.608
5.3	148.877	789.046	4181.940	16.111
5.4	157.464	850.304	4591.630	16.621
5.5	166.375	915.061	5032.830	17.137
5.6	175.616	983.447	5507.310	17.660
5.7	185.193	1055.600	6016.900	18.188
5.8	195.112	1131.650	6563.550	18.723
5.9	205.379	1211.730	7149.220	19.264

Warp	Warp ³ "Old"	Warp ⁴ "SW"	Warp ⁵ "New"	Warp ³ Equiv.	Warp Factor	Ly/Year	Ly/Day	Ly/Hour
6.0	216.000	1296.000	7776.000	19.811	2.4	79.626	0.218	0.009
6.1	226.981	1384.580	8445.940	20.365	2.5	97.656	0.267	0.011
6.2	238.328	1477.630	9161.310	20.924	2.6	118.814	0.325	0.014
6.3	250.046	1575.290	9924.340	21.490	2.7	143.489	0.393	0.016
6.4	262.144	1677.720	10,737.400	22.061	2.8	172.104	0.471	0.020
6.5	274.625	1785.060	11,602.900	22.639	2.9	205.111	0.562	0.023
6.6	287.496	1897.470	12,523.300	23.222	3.0	243.000	0.665	0.028
6.7	300.763	2015.110	13,501.200	23.812	3.1	286.291	0.784	0.033
6.8	314.432	2138.130	14,539.300	24.407	3.2	335.544	0.919	0.038
6.9	328.508	2266.710	15,640.300	25.008	3.3	391.353	1.071	0.045
7.0	343.000	2401.000	16,807.000	25.615	3.4	454.354	1.244	0.052
7.1	357.910	2541.160	18,042.200	26.228	3.5	525.218	1.438	0.060
7.2	373.247	2687.380	19,349.100	26.846	3.6	604.661	1.655	0.069
7.3	389.016	2839.820	20,730.700	27.471	3.7	693.438	1.899	0.079
7.4	405.223	2998.650	22,190.000	28.101	3.8	792.351	2.169	0.090
7.5	421.874	3164.050	23,730.400	28.736	3.9	902.241	2.470	0.103
7.6	438.975	3336.210	25,355.200	29.378	4.0	1024.000	2.804	0.117
7.7	456.532	3515.300	27,067.800	30.025	4.1	1158.560	3.172	0.132
7.8	474.551	3701.490	28,871.600	30.678	4.2	1306.910	3.578	0.149
7.9	493.038	3895.000	30,770.500	31.336	4.3	1470.080	4.025	0.168
8.0	512.000	4096.000	32,768.000	32.000	4.4	1649.160	4.515	0.188
8.1	531.439	4304.660	34,867.700	32.669	4.5	1845.280	5.052	0.211
8.2	551.367	4521.200	37,073.800	33.344	4.6	2059.620	5.639	0.235
8.3	571.786	4745.820	39,390.300	34.024	4.7	2293.450	6.279	0.262
8.4	592.703	4978.710	41,821.100	34.711	4.8	2548.030	6.976	0.291
8.5	614.124	5220.050	44,370.400	35.402	4.9	2824.750	7.734	0.332
8.6	636.055	5470.070	47,042.600	36.099	5.0	3125.000	8.556	0.356
8.7	658.502	5728.970	49,842.000	36.801	5.1	3450.240	9.446	0.394
8.8	681.472	5996.950	52,773.100	37.509	5.2	3802.030	10.409	0.434
8.9	704.968	6274.220	55,840.500	38.222	5.3	4181.940	11.450	0.477
9.0	729.000	6561.000	59,049.000	38.941	5.4	4591.630	12.571	0.524
9.1	753.571	6857.490	62,403.100	39.664	5.5	5032.830	13.779	0.574
9.2	778.688	7163.930	65,908.200	40.393	5.6	5507.310	15.078	0.628
9.3	804.357	7480.520	69,568.800	41.128	5.7	6016.900	16.473	0.686
9.4	830.584	7870.490	73,390.300	41.868	5.8	6563.550	17.970	0.749
9.5	857.375	8145.060	77,378.100	42.613	5.9	7149.220	19.573	0.816
9.6	884.736	8493.460	81,537.300	43.363	6.0	7776.000	21.189	0.887
9.7	912.673	8852.930	85,873.500	44.118	6.1	8445.940	23.124	0.963
9.8	941.192	9223.680	90,392.100	44.879	6.2	9161.310	25.082	1.045
9.9	970.300	9605.970	95,099.100	45.645	6.3	9924.340	27.171	1.132
WARP DISTANCE TABLE Warp to the Fifth Power					6.4	10,737.400	29.397	1.225
					6.5	11,602.900	31.767	1.324
					6.6	12,523.300	34.287	1.429
					6.7	13,501.200	36.964	1.540
					6.8	14,539.300	39.806	1.659
					6.9	15,640.300	42.821	1.784
					7.0	16,807.000	46.015	1.917
					7.1	18,042.200	49.397	2.058
					7.2	19,349.100	52.975	2.207
					7.3	20,730.700	56.757	2.365
					7.4	22,190.000	60.753	2.531
					7.5	23,730.400	64.970	2.707
					7.6	25,355.200	69.419	2.892
					7.7	27,067.800	74.107	3.088
					7.8	28,871.600	79.046	3.294
					7.9	30,770.500	84.245	3.510
					8.0	32,768.000	89.714	3.738
					8.1	34,867.700	95.463	3.978
					Continued on page 74			

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Warp Factor	Ly/Year	Ly/Day	Ly/Hour
8.2	37,073.800	101.503	4.229
8.3	39,390.300	107.845	4.494
8.4	41,821.100	114.500	4.771
8.5	44,370.400	121.480	5.062
8.6	47,042.600	128.796	5.366
8.7	49,842.000	136.460	5.686
8.8	52,773.100	144.485	6.020
8.9	55,840.500	152.883	6.370
9.0	59,049.000	161.667	6.736
9.1	62,403.100	170.850	7.119
9.2	65,908.200	180.447	7.519
9.3	69,568.800	190.469	7.936
9.4	73,390.300	200.932	8.372
9.5	77,378.100	211.850	8.827
9.6	81,537.300	223.237	9.302
9.7	85,873.500	235.109	9.796
9.8	90,392.100	247.480	10.312
9.9	95,099.100	260.367	10.849 Ω

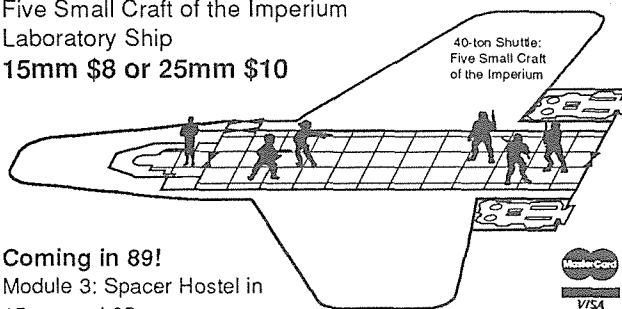


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