

T_2 3.0 T measurements, performed at NIST

T_2 1.5 T measurements performed at CMRI

Table 8. T_2 contrast spheres values at 3.0 T.

Batches #2 and 2.5 used. Measured at 20°C at NIST Boulder.

	Nominal Concentration, MnCl_2 ($\pm 5\%$ mM)	T_1 (ms)	T_1 Standard Deviation, SD_{3R} (ms)	T_2 (ms)	T_2 Standard Deviation, SD_{3R} (ms)
T_2 -1	0.0113	2478.19	75.63	552.73	18.13
T_2 -2	0.0181	2185.54	54.64	379.48	3.57
T_2 -3	0.0282	1901.28	47.53	267.29	2.51
T_2 -4	0.0434	1549.98	38.75	175.05	1.65
T_2 -5	0.0673	1197.57	37.77	112.66	1.57
T_2 -6	0.0934	1026.43	25.66	88.89	0.84
T_2 -7	0.1353	805.10	20.13	63.42	0.60
T_2 -8	0.193	599.96	15.00	44.24	0.42
T_2 -9	0.2768	431.22	10.78	29.88	0.28
T_2 -10	0.4276	292.87	7.32	19.40	0.18
T_2 -11	0.5555	226.53	5.66	14.74	0.14
T_2 -12	0.7902	158.17	3.95	10.52	0.10
T_2 -13	1.1274	116.70	2.92	7.27	0.070
T_2 -14	1.5996	87.08	2.18	5.28	0.050

Contrast sphere numbering is as appears when the phantom is viewed inferiorly

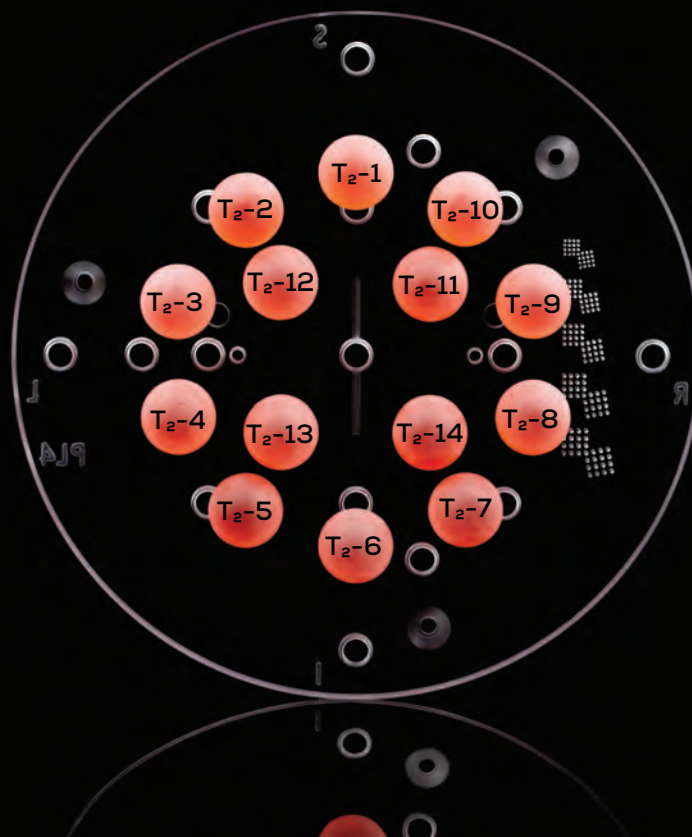


Table 9. T_2 contrast spheres values at 3.0 T.
Batch #2 and 2.5 used. Measured at 16°C at NIST Boulder.

	Nominal Concentration, MnCl ₂ (± 5% mM)	T_1 (ms)	T_1 Standard Deviation, SD _{3R} (ms)	T_2 (ms)	T_2 Standard Deviation, SD _{3R} (ms)
T_2 -1	0.0113	2127.95	66.75	506.65	16.03
T_2 -2	0.0181	1874.96	46.87	357.4	3.36
T_2 -3	0.0282	1657.68	41.44	247.93	2.33
T_2 -4	0.0434	1341.07	33.53	161.07	1.51
T_2 -5	0.0673	1056.33	32.70	105.31	1.45
T_2 -6	0.0934	892.29	22.31	81.86	0.77
T_2 -7	0.1353	711.11	17.78	59.45	0.56
T_2 -8	0.193	531.6	13.29	41.53	0.39
T_2 -9	0.2768	384.99	9.62	28.04	0.26
T_2 -10	0.4276	262.14	6.55	18.22	0.17
T_2 -11	0.5555	203.53	5.09	13.94	0.13
T_2 -12	0.7902	141.21	3.53	9.88	0.090
T_2 -13	1.1274	104.57	2.61	6.83	0.060
T_2 -14	1.5996	73.65	1.84	4.79	0.050

Table 10. T_2 contrast spheres values at 3.0 T.
Batch #2 and 2.5 used. Measured at 18°C at NIST Boulder.

	Nominal Concentration, MnCl ₂ (± 5% mM)	T_1 (ms)	T_1 Standard Deviation, SD _{3R} (ms)	T_2 (ms)	T_2 Standard Deviation, SD _{3R} (ms)
T_2 -1	0.0113	2322.54	71.56	526.24	17.14
T_2 -2	0.0181	2073.94	51.85	370.54	3.48
T_2 -3	0.0282	1783.21	44.58	257.47	2.42
T_2 -4	0.0434	1466.78	36.67	169.02	1.59
T_2 -5	0.0673	1125.81	35.44	108.76	1.50
T_2 -6	0.0934	972.48	24.31	85.92	0.81
T_2 -7	0.1353	757.34	18.93	61.31	0.58
T_2 -8	0.193	563.86	14.1	42.63	0.40
T_2 -9	0.2768	408.05	10.2	28.93	0.27
T_2 -10	0.4276	277.38	6.93	18.78	0.18
T_2 -11	0.5555	214.8	5.37	14.28	0.13
T_2 -12	0.7902	149.28	3.73	10.17	0.10
T_2 -13	1.1274	110.49	2.76	7.04	0.070
T_2 -14	1.5996	77.93	1.95	4.93	0.050

**Table 11. T_2 contrast spheres values at 3.0 T.
Batch #2 and 2.5 used. Measured at 22°C at NIST Boulder.**

	Nominal Concentration, MnCl_2 ($\pm 5\%$ mM)	T_1 (ms)	T_1 Standard Deviation, SD_{3R} (ms)	T_2 (ms)	T_2 Standard Deviation, SD_{3R} (ms)
T_2 -1	0.0113	2623.59	79.79	578.48	19.02
T_2 -2	0.0181	2302.78	57.57	392.49	3.69
T_2 -3	0.0282	2009.05	50.23	276.98	2.60
T_2 -4	0.0434	1626.53	40.66	181.48	1.71
T_2 -5	0.0673	1267.08	39.75	116.82	1.62
T_2 -6	0.0934	1083.42	27.09	92.3	0.87
T_2 -7	0.1353	848.64	21.22	65.65	0.62
T_2 -8	0.193	634.59	15.86	45.86	0.43
T_2 -9	0.2768	454.82	11.37	30.92	0.29
T_2 -10	0.4276	308.92	7.72	20.07	0.19
T_2 -11	0.5555	238.33	5.96	15.24	0.14
T_2 -12	0.7902	166.64	4.17	10.88	0.10
T_2 -13	1.1274	123.22	3.08	7.49	0.07
T_2 -14	1.5996	87.08	2.18	5.28	0.05

**Table 12. T_2 contrast spheres values at 3.0 T.
Batch #2 and 2.5 used. Measured at 24°C at NIST Boulder.**

	Nominal Concentration, MnCl_2 ($\pm 5\%$ mM)	T_1 (ms)	T_1 Standard Deviation, SD_{3R} (ms)	T_2 (ms)	T_2 Standard Deviation, SD_{3R} (ms)
T_2 -1	0.0113	2775.52	84.13	610.51	20.11
T_2 -2	0.0181	2424.62	60.62	406.02	3.82
T_2 -3	0.0282	2119.34	52.98	287.48	2.7
T_2 -4	0.0434	1715.06	42.88	187.21	1.76
T_2 -5	0.0673	1340.89	42.18	121.21	1.70
T_2 -6	0.0934	1141.5	28.54	95.97	0.90
T_2 -7	0.1353	892.41	22.31	67.82	0.64
T_2 -8	0.193	669.56	16.74	47.66	0.45
T_2 -9	0.2768	478.81	11.97	32.06	0.30
T_2 -10	0.4276	325.23	8.13	20.78	0.20
T_2 -11	0.5555	250.61	6.27	15.8	0.15
T_2 -12	0.7902	175.31	4.38	11.25	0.11
T_2 -13	1.1274	129.67	3.24	7.76	0.070
T_2 -14	1.5996	91.82	2.3	5.48	0.050

Table 13. T_2 contrast spheres values at 3.0 T.
Batch #2 and 2.5 used. Measured at 26°C at NIST Boulder.

	Nominal Concentration, MnCl_2 ($\pm 5\%$ mM)	T_1 (ms)	T_1 Standard Deviation, SD_{3R} (ms)	T_2 (ms)	T_2 Standard Deviation, SD_{3R} (ms)
T_2 -1	0.0113	2917.74	88.42	636.24	20.73
T_2 -2	0.0181	2546.04	63.65	420.75	3.96
T_2 -3	0.0282	2232.44	55.81	299.08	2.81
T_2 -4	0.0434	1801.61	45.04	192.23	1.81
T_2 -5	0.0673	1410.82	44.36	126.30	1.77
T_2 -6	0.0934	1202.4	30.06	99.89	0.94
T_2 -7	0.1353	937.12	23.43	70.57	0.66
T_2 -8	0.193	703.51	17.59	49.26	0.46
T_2 -9	0.2768	503.3	12.58	33.25	0.31
T_2 -10	0.4276	341.74	8.54	21.56	0.20
T_2 -11	0.5555	263.09	6.58	16.39	0.15
T_2 -12	0.7902	184.07	4.6	11.67	0.11
T_2 -13	1.1274	136.34	3.41	8.06	0.080
T_2 -14	1.5996	96.54	2.41	5.69	0.050

Table 14. T_2 contrast spheres values at 1.5 T.
Batch #2 and 2.5 used. Measured at ~20°C at CMRI Headquarters.

	Nominal Concentration, NiCl_2 ($\pm 5\%$ mM)	T_1 (ms)	T_2 (ms)
T_2 -1	0.29	2211.97	853.22
T_2 -2	0.60	2114.16	692.08
T_2 -3	1.04	1868.11	478.91
T_2 -4	1.64	1614.27	322.54
T_2 -5	2.52	1237.85	194.22
T_2 -6	3.68	1141.36	167.06
T_2 -7	5.43	897.75	116.45
T_2 -8	7.74	675.07	82.25
T_2 -9	11.3	457.31	53.02
T_2 -10	16.5	322.01	34.33
T_2 -11	23.3	240.22	26.07
T_2 -12	32.7	173.47	17.94
T_2 -13	46.0	122.37	12.77
T_2 -14	65.3	86.93	8.75