

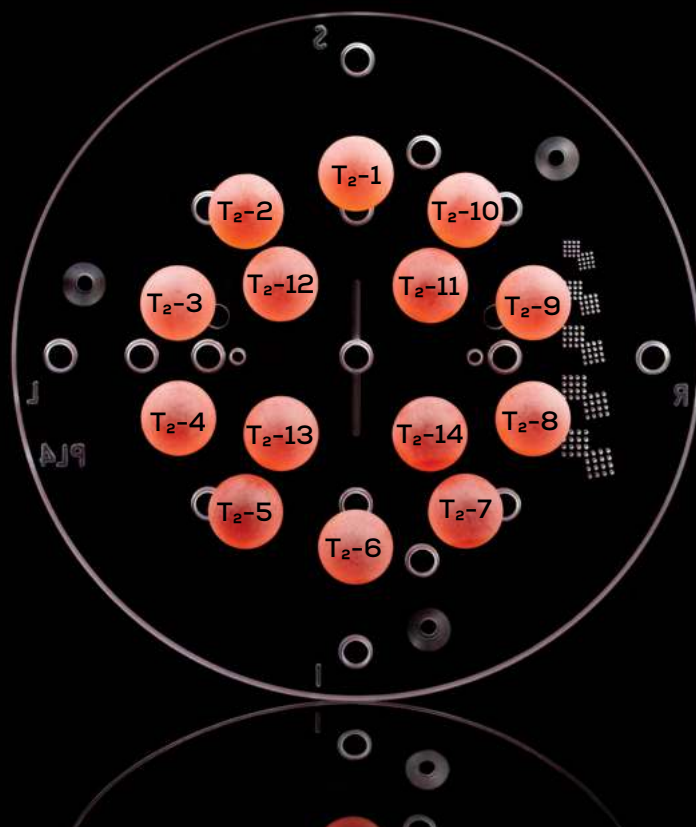
T_2 3.0 T measurements, performed at NIST

T_2 contrast spheres values at 3.0 T.

Batch #2 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	3025.17	75.63	1928.33	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	1510.76	37.77	166.90	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



**T_2 contrast spheres values at 3.0 T.
Batch #2 used. Measured at 16°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	2669.83	66.75	1705.84	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	1307.88	32.70	154.07	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

**T_2 contrast spheres values at 3.0 T.
Batch #2 used. Measured at 18°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	2862.34	71.56	1823.56	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	1417.53	35.44	159.77	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

T₂ contrast spheres values at 3.0 T.
Batch #2 used. Measured at 22°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	3191.54	79.79	2023.15	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	1589.88	39.75	172.51	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

T₂ contrast spheres values at 3.0 T.
Batch #2 used. Measured at 24°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	3365.05	84.13	2139.79	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	1687.39	42.18	180.80	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

T_2 contrast spheres values at 3.0 T.

Batch #2 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	3536.79	88.42	2205.31	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	1774.24	44.36	188.16	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