

Thermoluminescence Dosimetry for Gamma Rays

Table 11. Sample ground distance and sample-specific calculated dose values for this work: Nagasaki

Lab	Place name	Sample ID#	RERF list No.	DS02 GR (m)	Building gamma		Total dose to quartz	
					DS86	DS02	DS86	DS02
JNIRS	Yamazoto-cho House			87	8.361	6.91	292	331
NUE	Matsuyama cho	N-1		77		6.30		258
NUE	Oka machi	N-2		217		4.79		196
NUE	Oka machi	N-2'		217		4.79		1956
NUE	Yamazoto cho	N-3		307		3.24		151
NUE	Yamazoto cho	N-3'		307		3.24		151
NUE	Yamazoto cho	N-3''		307		3.24		151
NUE	Shiroyama Elementary School	N-4		490		1.07		73.8
NUE	Shiroyama cho	N-5		490				
JNIRS	Urakami		N4	517	0.691	0.609	62.7	67.7
JNIRS	Urakami			517		0.940		68.1
JNIRS	Urakami Church			517	1.11	1.02	62.6	53.9
NUE	Shiroyama cho	N-6		623		0.408		45.6
JNIRS	Gokoku jinja (?) house ^a							
NUE	Ueno cho	N-7		634		0.389		38.1
JNIRS	Nagasaki University Hospital			655		0.352		39.2
JNIRS	Nagasaki University Hospital			655		0.352		41.0
JNIRS	Nagasaki University Hospital			655		0.352		41.0
NUE	Shiroyama cho	N-8		760		0.149		20.5
NUE	Sakamoto cho	N-9		763		0.141		19.9
JNIRS	Hachiman jinja nearby house			861	0.092	0.088	12.9	14.47
JNIRS	Hachiman jinja			896	0.077	0.069	11.6	12.41
JNIRS	Sakamoto cho Gaijin Cemetery			1040	0.056	0.025	9.62	6.75
NUE	Urakami cho	N-10		967		0.031		7.74
JNIRS	Sakamoto-cho Gaijin Cemetery			1068	0.042	0.020	8.08	5.94
JNIRS	Sakamoto Cemetery			1040		0.019		6.91
JNIRS	Sakamoto Cemetery			1040		0.019		6.91
JNIRS	Sakamoto Cemetery			1040		0.019		6.91
JNIRS	Sakamoto Cemetery			1040		0.019		6.91
JNIRS	Sakamoto		N-6	1068	0.015	0.013	5.94	6.38
JNIRS	Sakamoto			1068		0.016		6.43
DUR	Ieno wall	NAIEO5	N-2-1	1421	0.001	0.001	1.09	1.26
DUR	Ieno wall	NAIEO5	N-2-1	1421	0.001	0.001	0.854	0.987
DUR	Ieno wall	NAIEO5	N-2-1	1421	0.001	0.001	0.758	0.876
DUR	Ieno wall	NAIEO5	N-2-1	1421	0.001	0.001	1.09	1.26
DUR	Ieno wall	NAIEO5	N-2-1	1421	0.001	0.001	0.854	0.987
DUR	Ieno wall	NAIEO5	N-2-1	1421	0.001	0.001	0.758	0.876
JNIRS	Ieno	A	N-2-2	1421	0.001	0.001	1.06	1.23
JNIRS	Ieno	B	N-2-2	1421	0.001	0.001	1.05	1.23
NUE	Ieno wall	A	N-2-1	1421	0.001	0.001	1.06	1.22
NUE	Ieno wall	B	N-2-1	1421	0.001	0.001	0.900	1.04
NUE	Ieno wall	C	N-2-1	1421	0.001	0.001	1.75	0.868

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Table 11. Continued

Lab	Place name	Sample ID#	RERF list No.	DS02 GR (m)	Building gamma		Total dose to quartz	
					DS86	DS02	DS86	DS02
OXF	Ieno wall	NAIEO5	N-2-1	1421	0.001	0.001	1.09	1.26
OXF	Ieno wall	NAIEO5	N-2-1	1421	0.001	0.001	0.854	0.987
OXF	Ieno wall	NAIEO5	N-2-1	1421	0.001	0.001	0.758	0.876
U of U	Ieno wall	NAIEO6	N-2-1	1421	0.001	0.001	1.05	1.22
U of U	Ieno wall	NAIEO6	N-2-1	1421	0.001	0.001	0.874	1.01
U of U	Ieno wall	NAIEO6	N-2-1	1421	0.001	0.001	0.791	0.915
JNIRS	Nagasaki University Charnel			1452		0.001		1.13
JNIRS	Nagasaki University Charnel			1452		0.001		1.13
JNIRS	Nagasaki University Charnel			1452		0.001		1.13
JNIRS	Zenza		N-7	1428	0.001	0.001	1.19	1.30
JNIRS	Zenza			1428		0.001		1.30
JNIRS	Inasa	A	N-3	2050	0.000	0.000	0.099	0.106
JNIRS	Inasa A			2050		0.000		0.106
JNIRS	Yamada Oil Storehouse			2045		0.000		0.109
JNIRS	Yamada Oil Storehouse			2045		0.000		0.109
JNIRS	Yamada Oil Storehouse			2045		0.000		0.109
JNIRS	Yamada Oil Storehouse			2045		0.000		0.109
JNIRS	Yamada Oil Storehouse			2045		0.000		0.109
JNIRS	Yamada Oil Storehouse			2045		0.000		0.109
JNIRS	Yamada Oil Storehouse			2045		0.000		0.109
JNIRS	Chikugo		N-8	2329	0.000	0.000	0.036	0.039

^aCould not be analyzed due to conflicting map information.

Thermoluminescence Dosimetry for Gamma Rays

Table 12. Measured values and measured/calculated ratios: Hiroshima

Lab	Place name	Sample ID#	RERF list No.	<i>In situ</i> measured tissue dose		Free-in-air @1 m-equivalent tissue dose		Measured to calculated ratio
				Gy	±	Gy	±	
JNIRS	A-bomb Dome			83.8	16.8	99.5	19.9	0.90
JNIRS	Togiya-cho Shojun-ji			70.6	14.1	93.0	18.7	1.43
JNIRS	Nenryo Kaikan (Fuel Authority Bldg)			62.7	12.6	118	23.6	1.12
NUE	Zaimoku cho, Dempuku ji	H-1		56.1	11.2	86.5	17.3	1.70
NUE	Zaimoku cho, Seigan ji	H-2		32.6	6.5	50.2	10.0	0.96
NUE	Zaimoku cho, Seigan ji	H-2'		29.7	5.95	45.8	9.16	0.87
JNIRS	Fukuro-machi East Orthopedic Surgical Hospital			32.2	6.48	44.1	8.85	0.90
NUE	Zaimoku cho,	H-3		34.4	6.87	53.1	10.6	1.10
JNIRS	Naka Telephone Office	3	1-01	27.6	2.47	26.2	2.35	0.80
JNIRS	Naka Telephone Office	2	1-19	30.3	1.56	36.6	1.88	1.19
NUE	Naka Telephone Office	203-3	1-04	27.2	2.47	27.2	2.47	0.89
NUE	Naka Telephone Office	204-2	1-04	26.0	3.15	25.9	3.14	0.85
NUE	Naka Telephone Office	204-3	1-04	25.6	3.75	25.5	3.74	0.83
JNIRS	Tate-machi Sanin Godo Bank			12.9	2.61	16.3	3.29	0.76
JNIRS	Sanin Bank		12-02	17.8	1.56	19.5	1.71	0.93
JNIRS	Chugoku Elec Co		2_01	7.14	1.01	13.6	1.92	0.77
JNIRS	Chugoku Elec Co	2	2-03	9.43	1.56	15.5	2.56	0.98
NUE	Chugoku Electric Co.	3-1-3	2-03	11.2	1.33	19.1	2.26	1.20
NUE	Chugoku Electric Co.	3-1-3	2-03	9.48	0.746	16.2	1.27	1.02
NUE	Chugoku Electric Co.	3-2-2	2-03	9.61	0.638	16.4	1.09	1.03
NUE	Chugoku Electric Co.	3-2-2	2-03	9.90	0.677	16.9	1.15	1.07
NUE	Chugoku Electric Co.	3-2-3	2-03	9.29	0.882	15.8	1.50	1.00
JNIRS	Nobori-machi Elementary School			8.54	1.74	10.6	2.16	0.73
NUE	Hiroshima Castle, ninomaru	H-4		8.25	1.65	8.50	1.70	0.65
NUE	Hiroshima Castle, ninomaru	H-4'		8.69	1.74	8.95	1.79	0.69
NUE	Nishishin machi ^a	H-5		7.60	1.52			
NUE	Nishitera machi, koen ji	H-6		5.16	1.03	5.49	1.10	1.18
NUE	Hiroshima Castle, honmaru	H-8		4.07	0.815	4.35	0.870	1.03
NUE	Hiroshima Castle, honmaru	H-8'		2.25	0.449	2.34	0.480	0.57
NUE	Hiroshima Castle, honmaru	H-8''		2.27	0.432	2.31	0.461	0.55
JNIRS	City Hall			2.16	0.572	3.35	0.712	0.76
NUE	Nishitera machi, Shozen ji	H-7		4.12	0.823	4.40	0.880	1.13
NUE	Japanese House (Nobori-cho)		145	1.52	0.088	1.56	0.091	0.68
NUE	H.U.P.S. (Hiro. Univ.)	H-1	4-08	1.30	0.07	1.41	0.076	1.09
NUE	HUFS "I" Bldg	H1	4-08	1.37	0.10	1.48	0.108	1.15
NUE	HUFS "I"	"HP1"		1.39	0.090	1.51	0.097	1.17
NUE	H.U.P.S. (Hiro. Univ.)	H-2	4-07	1.34	0.13	1.43	0.139	1.15
NUE	H.U.P.S. (Hiro. Univ.)	H-3	4-09	1.31	0.19	1.41	0.205	1.21
NUE	H.U.P.S. (Hiro. Univ.)	H-4	4-01	1.02	0.21	1.09	0.225	1.01
NUE	H.U.P.S. (Hiro. Univ.)	H-5	4-03	0.91	0.14	1.01	0.155	1.02
NUE	H.U.P.S. (Hiro. Univ.)	H-5B	4-03 horizontal vertical	0.730	0.14	0.902	0.173	0.91

Thermoluminescence Dosimetry for Gamma Rays

Table 12. Continued

Lab	Place name	Sample ID#	RERF list No.	<i>In situ</i> measured tissue dose		Free-in-air @1 m-equivalent tissue dose		Measured to calculated ratio
				Gy	±	Gy	±	
NUE	H.U.P.S. (Hiro. Univ.)	H-5B	4-03	0.890	0.14	1.10	0.173	1.11
			vertical					
NUE	H.U.P.S. (Hiro. Univ.)	H-5B	4-03	0.800	0.14	0.989	0.173	1.00
			vertical					
NUE	HUFS "I"	"HP2"		0.905	0.092	1.12	0.115	1.13
JNIRS	H.U.F.S. (Hiro. Univ.)	7	3-07	0.900	0.07	0.970	0.075	1.15
NUE	HUFS "E" Bldg	HPI	3-08	0.620	0.11	0.677	0.120	0.81
NUE	HUFS "E"	"HP3"		0.644	0.092	0.714	0.103	0.86
JNIRS	H.U.F.S. (Hiro. Univ.)	10	3-10	1.010	0.18	1.13	0.201	1.40
NUE	H.U.F.S. (Hiro. Univ.)	H-6-1	3-20	0.77	0.15	0.922	0.180	1.15
NUE	H.U.F.S. (Hiro. Univ.)	H-6-2	3-20	0.75	0.04	0.898	0.048	1.12
NUE	H.U.F.S. (Hiro. Univ.)	H-6-3	3-20	0.84	0.05	1.01	0.060	1.25
NUE	HUFS "E" Bldg	HP2	3-11	0.84	0.07	0.935	0.078	1.17
NUE	HUFS "E" Bldg	HP3	(3-11)	0.87	0.05	0.967	0.056	1.21
NUE	HUFS "E"	"HP4"		0.883	0.092	0.996	0.104	1.24
NUE	HUFS "E"	"HP5"		0.873	0.073	0.942	0.078	1.20
U of U	H.U.F.S. (Hiro. Univ.)	UHFSO3	3-23	0.990	0.04	1.07	0.043	1.36
NUE	H.U.F.S. (Hiro. Univ.)	H-7	3-36	0.690	0.10	0.764	0.111	0.97
U of U	H.U.F.S. (Hiro. Univ.)	UHFSO2	3-22	1.03	0.08	1.140	0.089	1.47
NUE	H.U.F.S. (Hiro. Univ.)	H-8	3-18	0.64	0.05	0.767	0.060	1.10
JNIRS	H.U.F.S. (Hiro. Univ.)	I	3-29	0.940	0.12	1.04	0.132	1.50
JNIRS	H.U.F.S. (Hiro. Univ.)	IV	3-31	0.70	0.05	0.789	0.056	1.15
NUE	H.U.F.S. (Hiro. Univ.)	H- 9	3-17	0.57	0.05	0.703	0.062	1.03
JNIRS	Red Cross Hospital		5-01	0.53	0.09	0.615	0.104	0.98
NUE	Red Cross Hospital	"HP6"		0.560	0.101	0.654	0.118	1.04
JNIRS	Red Cross Hospital			0.669	0.128	0.777	0.149	1.24
JNIRS	Red Cross Hospital			0.751	0.137	0.873	0.160	1.39
JNIRS	Red Cross Hospital			0.687	0.110	0.799	0.128	1.27
JNIRS	Red Cross Hospital			0.724	0.110	0.841	0.128	1.34
JNIRS	Red Cross Hospital			0.678	0.119	0.788	0.138	1.26
NUE	Red Cross Hospital	HP4	5_01	0.550	0.077	0.613	0.086	0.98
JNIRS	H.U.F.S. (Hiro. Univ.)	R1	3-35	0.970	0.16	1.167	0.193	1.87
DUR	H.U.F.S. (Hiro. Univ.)	UHFSFT02	3-35	0.680	0.12	0.815	0.144	1.31
DUR	H.U.F.S. (Hiro. Univ.)	UHFSFT02	3-35	0.690	0.12	0.827	0.144	1.32
OXF	H.U.F.S. (Hiro. Univ.)	UHFSFT03	3-35	0.730	0.13	0.875	0.156	1.40
OXF	H.U.F.S. (Hiro. Univ.)	UHFSFT03	3-35	0.760	0.12	0.911	0.144	1.46
OXF	H.U.F.S. (Hiro. Univ.)	UHFSFT03	3-35	0.760	0.11	0.911	0.132	1.46
U of U	H.U.F.S. (Hiro. Univ.)	UHFSFT02	3-35	0.710	0.08	0.851	0.096	1.36
U of U	H.U.F.S. (Hiro. Univ.)	UHFSFT03	3-35	0.660	0.11	0.791	0.132	1.27
NUE	H.U.F.S. (Hiro. Univ.)	H-10-1	3-15	0.70	0.11	0.828	0.130	1.33
NUE	H.U.F.S. (Hiro. Univ.)	H-10-2	3-15	0.66	0.06	0.780	0.071	1.26
NUE	H.U.F.S. (Hiro. Univ.)	H-10-3	3-15	0.60	0.09	0.709	0.106	1.14
NUE	H.U.F.S. (Hiro. Univ.)	H-10-4	3-15	0.66	0.06	0.780	0.071	1.26
U of U	H.U.F.S. (Hiro. Univ.)	UHFS04	3-24	0.730	0.05	0.812	0.056	1.34
U of U	H.U.F.S. (Hiro. Univ.)	UHFS07	3-27	0.550	0.08	0.621	0.090	1.03
NUE	H.U.F.S. (Hiro. Univ.)	H-11	3-16	0.44	0.05	0.569	0.065	0.96
JNIRS	Hiroshima University Radioisotope Facility			0.641	0.192	0.855	0.257	1.45

Thermoluminescence Dosimetry for Gamma Rays

Table 12. Continued

Lab	Place name	Sample ID#	RERF list No.	<i>In situ</i> measured tissue dose		Free-in-air @1 m-equivalent tissue dose		Measured to calculated ratio
				Gy	±	Gy	±	
JNIRS	Hiroshima University Radioisotope Facility			0.623	0.266	0.832	0.355	1.44
JNIRS	Hiroshima University Radioisotope Facility			0.513	0.211	0.686	0.282	1.19
JNIRS	Red Cross Hospital			0.669	0.128	0.788	0.151	1.50
JNIRS	Red Cross Hospital			0.559	0.119	0.658	0.140	1.25
JNIRS	Red Cross Hospital			0.641	0.101	0.755	0.119	1.44
JNIRS	Red Cross Hospital			0.678	0.137	0.798	0.162	1.52
JNIRS	Red Cross Hospital			0.605	0.101	0.712	0.119	1.35
NUE	Postal Savings (Chokin Kyoku)	A		0.405	0.019	0.475	0.022	1.32
NUE	Chokin-Kyoku (Postal Savings)		6-04	0.36	0.05	0.581	0.081	1.70
NUE	Postal Savings (Chokin Kyoku)	B		0.352	0.017	0.382	0.019	1.11
JNIRS	Chokin-Kyoku		6-00	0.30	0.06	0.369	0.074	1.07
NUE	Postal Savings (Chokin Kyoku)	D		0.334	0.055	0.394	0.065	1.20
NUE	Postal Savings (Chokin Kyoku)	E		0.283	0.021	0.335	0.024	1.10
NUE	JEMIC	HP7		0.183	0.077	0.197	0.083	1.14
NUE	Myosen-ji "oni-gawara" top	Me-1		0.17	0.036	0.228	0.048	2.20
NUE	Myosen-ji "oni-gawara" bottom	Me-2		0.16	0.035	0.214	0.047	2.07
NUE	Myosen-ji "oni-gawara" top	A-1		0.195	0.070	0.261	0.094	2.52
NUE	Myosen-ji "oni-gawara" bottom	A-2		0.186	0.073	0.249	0.097	2.40
NUE	HUFE clay wall tile	C-1		0.067	0.048	0.075	0.054	1.15
NUE	HUFE clay wall tile	C-2		0.085	0.039	0.095	0.044	1.46
NUE	HUFE clay wall tile	C-3		0.076	0.074	0.085	0.082	1.30
NUE	HUFE	HP5	8-01	0.049	0.032	0.054	0.036	0.86
NUE	HUFE	HP8		0.053	0.054	0.059	0.060	0.92
NUE	Hiramoto "oni-gawara" bottom	Hr-1		0.05	0.010	0.067	0.013	1.12
NUE	Hiramoto "Oni-gawara"	B		0.088	0.040	0.118	0.054	1.97
NUE	Hiramoto Oni-gawara	A1-1		0.113	0.038	0.152	0.051	2.53
NUE	Hiramoto Oni-gawara	A1-2		0.107	0.023	0.144	0.031	2.39
NUE	Hiramoto Oni-gawara	A1-3		0.121	0.055	0.163	0.074	2.71
NUE	Hiramoto Oni-gawara	A2		0.118	0.020	0.159	0.027	2.65
NUE	Hiramoto Oni-gawara	A3		0.085	0.024	0.115	0.033	1.91
NUE	Hiramoto Oni-gawara	A4-1		0.097	0.036	0.130	0.048	2.17
NUE	Hiramoto Oni-gawara	A4-2		0.148	0.058	0.199	0.078	3.32
NUE	Hiramoto Oni-gawara	A5		0.136	0.031	0.183	0.041	3.06

^aCould not be analyzed due to conflicting map information.