

12 ANEXO 1 - PARÁMETROS TERMALES

Unidad	Tipo suelo	Saturación
Acuífero superior	50% Grava gruesa + 40% Arena + 10% Limo	Seco

Día	Hora	Medición	Tipo Sonda	Conductividad termal	Capacidad calórica	Difusividad térmica	Resistividad termal	Temperatura °C
				Kt (W/m·k)	C (MJ/m ³ ·k)	D _t (mm ² /s)	rho (°C·cm/W)	
20/03/2014	11,34	201	large single-needle 1	0,417			240	28,47
20/03/2014	11:40	202	dual-needle	0,391	1,607	0,243	255,7	28,59
20/03/2014	11,48	203	large single-needle 2	0,398			251,3	28,5
20/03/2014	12:00	204	large single-needle 1	0,419			238,9	28,6
20/03/2014	12:04	205	dual-needle	0,394	1,607	0,245	254	28,68
20/03/2014	12:10	206	large single-needle 2	0,398			251,1	28,64
20/03/2014	12:18	207	large single-needle 1	0,418			239,1	28,76
20/03/2014	12:23	208	dual-needle	0,393	1,603	0,245	254,2	28,75
20/03/2014	12:31	209	large single-needle 2	0,397			251,7	28,75
20/03/2014	14:36	218	large single-needle 1	0,372			268,5	28,85
20/03/2014	12:53	210	dual-needle	0,409	2,003	0,204	244,4	28,86
20/03/2014	13:03	211	large single-needle 2	0,395			250	28,85
20/03/2014	13:44	212	large single-needle 1	0,375			267	28,85
20/03/2014	13:49	213	dual-needle	0,411	2,01	0,204	243,5	28,86
20/03/2014	14:00	214	large single-needle 2	0,398			251,4	28,92
20/03/2014	14:15	215	large single-needle 1	0,373			267,9	28,9
20/03/2014	14:26	216	dual-needle	0,41	2,009	0,204	243,7	28,82
20/03/2014	14:32	217	large single-needle 2	0,399			250,8	28,87
20/03/2014	15:12	219	large single-needle 1	0,366			273,1	28,84
20/03/2014	15:20	220	dual-needle	0,36	1,744	0,207	277,5	28,76
20/03/2014	15:27	221	large single-needle 2	0,379			264,1	28,77
20/03/2014	15:36	222	large single-needle 1	0,367			272,4	28,85
20/03/2014	15:50	224	dual-needle	0,357	1,747	0,204	280,1	28,75

20/03/2014	15:43	223	large single-needle 2	0,371			269,8	28,99
20/03/2014	16:04	225	large single-needle 1	0,368			272	28,85
20/03/2014	16:08	226	dual-needle	0,363	1,713	0,212	275,7	28,8
20/03/2014	16:17	227	large single-needle 2	0,382			261,4	28,76

promedio	0,38814815	1,78255556	0,21866667	258,122222	28,7737037
Desviación	0,01914259	0,17785957	0,01942936	12,8050871	0,12475046
Desviación (%)	0,04931774	0,09977786	0,08885378	0,04960862	0,00433557

Unidad
Acuífero inferior

Tipo suelo
50% Grava fina + 40% Arena + 10% Arcilla

Saturación
Seco

Día	Hora	Medición	Tipo Sonda	Conductividad termal	Capacidad calórica	Difusividad térmica	Resistividad termal	Temperatura
				Kt (W/m·k)	C (MJ/m ³ ·k)	D _t (mm ² /s)	rho (°C·cm/W)	°C
18/03/2014	17:40	166	large single-needle 1	0,416			240,2	28,65
18/03/2014	17:50	167	dual-needle	0,347	1,635	0,212	288,4	28,66
18/03/2014	18:00	168	large single-needle 2	0,383			261,2	28,85
18/03/2014	18:10	169	large single-needle 1	0,416			240,5	28,95
18/03/2014	18:20	170	dual-needle	0,354	1,637	0,216	282,7	28,88
18/03/2014	18:28	171	large single-needle 2	0,377			265,2	29,12
18/03/2014	18:34	172	large single-needle 1	0,415			241	29,12
18/03/2014	18:40	173	dual-needle	0,339	1,589	0,214	294,7	28,99
18/03/2014	18:50	174	large single-needle 2	0,378			264,2	29,23
19/03/2014	12:12	179	large single-needle 2	0,395			253,2	28,13
19/03/2014	12:46	181	dual-needle	0,505	2,525	0,2	198	28,2
19/03/2014	12:56	182	large single-needle 2	0,392			252,3	28,24
19/03/2014	13:11	183	large single-needle 1	0,435			230,1	28,25
19/03/2014	13:15	184	dual-needle	0,508	2,543	0,2	196,8	28,24
19/03/2014	13:22	185	large single-needle 2	0,396			252,4	28,33
19/03/2014	13:38	186	large single-needle 1	0,435			229,8	28,33
19/03/2014	13:44	187	dual-needle	0,509	2,549	0,2	196,4	28,3
19/03/2014	16:09	188	large single-needle 1	0,436			229,4	28,19
19/03/2014	16:15	189	dual-needle	0,511	2,544	0,201	195,9	28,11
19/03/2014	16:40	190	large single-needle 2	0,407			245,4	28,15
19/03/2014	16:54	191	large single-needle 1	0,385			259,6	28,23
19/03/2014	18:03	192	dual-needle	0,396	1,438	0,275	252,4	28,15
19/03/2014	18:10	193	dual-needle	0,433	1,922	0,225	231,1	28,15
19/03/2014	18:20	194	dual-needle	0,395	1,428	0,277	253	28,15
19/03/2014	18:30	196	dual-needle	0,425	1,849	0,23	253,5	28,67

19/03/2014	18:43	197	dual-needle	0,47	1,924	0,244	212,8	28,49
19/03/2014	18:49	198	dual-needle	0,4	1,485	0,269	250,3	28,08

promedio	0,416962963	1,7451	0,2363	243,3518519	28,47555556
Desviación	0,048272848	0,337148978	0,02827661	26,77483564	0,371176232
Desviación (%)	0,115772507	0,193197512	0,119664028	0,110025198	0,013034907

Unidad
Acuífero superior

Tipo suelo
50% Grava gruesa + 40% Arena + 10% Limo

Saturación
Saturado

Día	Hora	Medición	Tipo Sonda	Conductividad termal	Capacidad calórica	Difusividad térmica	Resistividad termal	Temperatura
				Kt (W/m·k)	C (MJ/m ³ ·k)	D _t (mm ² /s)	rho (°C·cm/W)	°C
31/03/2014	12:18	282	large single-needle 1	1,485			67,34	25,23
31/03/2014	12:26	284	dual-needle	1,623	2,703	0,6	61,61	24,78
31/03/2014	12:36	285	large single-needle 2	1,622			61,11	25,11
31/03/2014	12:42	286	large single-needle 1	1,487			67,26	25,1
31/03/2014	12:50	287	dual-needle	1,626	2,709	0,6	61,49	24,66
31/03/2014	13:05	288	dual-needle	1,536	2,1	0,73	65,09	24,61
31/03/2014	13:21	289	large single-needle 2	1,627			61,46	24,9
31/03/2014	13:27	290	large single-needle 1	1,483			67,43	24,93
31/03/2014	13:42	291	dual-needle	1,625	2,722	0,597	61,54	24,5
31/03/2014	13:50	292	dual-needle	1,53	2,101	0,728	65,38	24,49
31/03/2014	13:58	293	large single-needle 2	1,622			61,65	24,81
31/03/2014	16:59	294	large single-needle 1	1,6			62,51	25,09
31/03/2014	17:11	296	dual-needle	1,431	2,407	0,595	69,86	24,86
31/03/2014	17:18	297	large single-needle 2	1,494			66,94	25,15
31/03/2014	17:28	298	large single-needle 1	1,602			62,44	25,26
31/03/2014	17:49	300	dual-needle	1,43	2,4	0,594	69,95	25,04
31/03/2014	18:13	301	large single-needle 2	1,489			67,15	25,36
31/03/2014	18:20	302	large single-needle 1	1,602			62,42	25,45
31/03/2014	18:35	304	dual-needle	1,432	2,389	0,6	69,81	25,21
31/03/2014	18:27	303	large single-needle 2	1,481			67,54	25,49

promedio	1,54135	2,441375	0,6305	64,999	25,0015
Desviación	0,074980892	0,255468722	0,060841715	3,218503902	0,298051126
Desviación (%)	4,864624667	10,46413279	9,649756544	4,951620644	1,192132976

Unidad
Acuífero inferior

tipo suelo
50% Grava fina + 40% Arena + 10% Arcilla

Agua
Saturado

Día	Hora	Medición	Tipo Sonda	Conductividad termal	Capacidad calórica	Difusividad térmica	Resistividad termal	Temperatura
				Kt (W/m*k)	C (MJ/m3*k)	Dt (mm3/s)	rho (oC*cm/W)	oC
21/03/2014	12:16	230	large single-needle 1	1,473			67,88	27,56
21/03/2014	12:26	231	dual-needle	1,498	2,696	0,556	66,76	27,21
21/03/2014	12:35	232	large single-needle 2	1,485			67,34	27,51
21/03/2014	12:45	233	large single-needle 1	1,483			67,4	27,34
21/03/2014	13:00	234	dual-needle	1,497	2,695	0,555	66,81	26,94
21/03/2014	13:10	235	large single-needle 2	1,484			67,38	27,33
21/03/2014	13:19	236	large single-needle 1	1,487			67,25	27,15
21/03/2014	13:23	237	dual-needle	1,496	2,696	0,555	66,84	26,78
21/03/2014	13:31	238	large single-needle 2	1,488			67,22	27,25
21/03/2014	13:39	239	large single-needle 1	1,511			66,2	27,09
21/03/2014	14:41	240	dual-needle	1,497	2,697	0,555	66,81	26,73
21/03/2014	14:49	241	large single-needle 2	1,495			66,89	27,12
21/03/2014	15:29	242	large single-needle 1	1,539			64,96	27,05
21/03/2014	15:43	243	dual-needle	1,505	2,953	0,51	66,44	27,03
21/03/2014	15:54	244	large single-needle 2	1,588			62,97	27,26
21/03/2014	16:08	245	large single-needle 1	1,538			65,02	26,97
21/03/2014	16:20	246	dual-needle	1,506	2,959	0,509	66,39	26,81
21/03/2014	16:31	247	large single-needle 2	1,588			62,96	27,21
21/03/2014	16:40	248	large single-needle 1	1,536			65,11	26,97
21/03/2014	16:45	249	dual-needle	1,498	2,918	0,513	66,77	26,75
21/03/2014	16:56	250	large single-needle 2	1,59			62,89	27,2

promedio	1,513428571	2,802	0,536142857	66,10904762	27,10761905
Desviación	0,036140796	0,132823191	0,0238637	1,537699271	0,233128822
Desviación (%)	2,388008049	4,740299456	4,450996586	2,326004271	0,860012167