

Dimensionierung von Erdwärmesonden
Zusammenhang zwischen Kälteleistung, Tiefe und Abstand der EWS

Erdwärmesystemtechnik
Dipl.-Ing. Gangolf Frost VDI

Randbedingungen	
Normleistung	55 W/m
Durchsch. Jahrestemp.	8 °C
Standort Höhe	213 m.ü.Meer
Erdreichtemp. bei 10 m	9,5 °C
Min. Vorlauftemp. WP	-3 °C
Tiefenstufung	2,5 Meter
Temperaturgradient	32,5 m/°C
Temperaturpreizung	3 K

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Basis : 1800 Betriebsstunden, ohne Warmwasser, Freistaat Sachsen
Anwendung des Programmes auf eigenes Risiko

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Tiefe Meter	Temperatur °C	Abstand 5 m Linienanordnung						Abstand 7.5 m Linienanordnung						Abstand 10 m Linienanordnung						Leistung W		
		1		2		3		2		3		4		2		3		4			6	
		Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W		Leistung W	Leistung W
2.5	9.2	118	270	379	482	680	872	295	424	541	774	1.008	297	432	557	808	1.065					
5.0	9.3	237	524	736	937	1.322	1.696	568	816	1.041	1.491	1.940	572	831	1.073	1.556	2.052					
7.5	9.4	357	774	1.087	1.384	1.952	2.504	833	1.198	1.528	2.187	2.847	840	1.221	1.575	2.285	3.012					
10.0	9.5	477	1022	1.435	1.826	2.576	3.305	1.095	1.574	2.007	2.874	3.740	1.103	1.604	2.070	3.003	3.959					
12.5	9.5	599	1268	1.781	2.266	3.197	4.101	1.353	1.945	2.481	3.553	4.624	1.365	1.984	2.560	3.714	4.896					
15.0	9.6	721	1513	2.125	2.705	3.815	4.894	1.610	2.315	2.952	4.227	5.502	1.624	2.361	3.047	4.420	5.827					
17.5	9.7	844	1758	2.469	3.142	4.433	5.686	1.866	2.682	3.421	4.898	6.375	1.882	2.736	3.532	5.123	6.753					
20.0	9.8	968	2003	2.813	3.580	5.050	6.478	2.121	3.049	3.888	5.567	7.246	2.140	3.111	4.015	5.824	7.677					
22.5	9.8	1.093	2248	3.157	4.017	5.668	7.270	2.375	3.414	4.354	6.235	8.115	2.397	3.484	4.497	6.524	8.599					
25.0	9.9	1.218	2493	3.501	4.456	6.286	8.063	2.629	3.780	4.820	6.902	8.983	2.654	3.858	4.979	7.223	9.521					
27.5	10.0	1.345	2739	3.846	4.894	6.905	8.857	2.883	4.145	5.286	7.568	9.851	2.911	4.231	5.461	7.921	10.442					
30.0	10.1	1.472	2985	4.191	5.334	7.525	9.652	3.137	4.510	5.751	8.235	10.718	3.167	4.604	5.943	8.620	11.363					
32.5	10.2	1.601	3231	4.537	5.775	8.147	10.450	3.391	4.875	6.217	8.902	11.587	3.424	4.978	6.425	9.320	12.285					
35.0	10.2	1.730	3478	4.884	6.216	8.770	11.249	3.646	5.241	6.684	9.570	12.456	3.682	5.352	6.908	10.020	13.208					
37.5	10.3	1.859	3726	5.233	6.659	9.395	12.051	3.900	5.607	7.151	10.239	13.326	3.939	5.726	7.391	10.721	14.133					
40.0	10.4	1.990	3975	5.582	7.104	10.022	12.855	4.156	5.974	7.618	10.908	14.198	4.197	6.102	7.876	11.424	15.059					
42.5	10.5	2.122	4224	5.932	7.550	10.651	13.661	4.411	6.341	8.087	11.579	15.072	4.456	6.478	8.361	12.128	15.987					
45.0	10.5	2.254	4475	6.283	7.997	11.282	14.471	4.667	6.709	8.557	12.252	15.947	4.715	6.854	8.848	12.834	16.917					
47.5	10.6	2.387	4726	6.636	8.446	11.915	15.283	4.924	7.079	9.028	12.926	16.824	4.975	7.232	9.335	13.541	17.850					
50.0	10.7	2.522	4978	6.990	8.896	12.550	16.098	5.182	7.449	9.500	13.602	17.704	5.236	7.611	9.824	14.250	18.784					
52.5	10.8	2.657	5231	7.345	9.348	13.188	16.916	5.440	7.820	9.973	14.279	18.586	5.497	7.991	10.314	14.961	19.722					
55.0	10.8	2.792	5485	7.702	9.802	13.828	17.737	5.699	8.192	10.447	14.959	19.470	5.759	8.372	10.806	15.674	20.662					
57.5	10.9	2.929	5739	8.060	10.258	14.471	18.562	5.958	8.565	10.923	15.640	20.357	6.022	8.754	11.299	16.389	21.604					
60.0	11.0	3.066	5995	8.419	10.715	15.116	19.389	6.218	8.939	11.400	16.323	21.246	6.285	9.137	11.793	17.107	22.550					
62.5	11.1	3.205	6252	8.780	11.174	15.764	20.220	6.480	9.314	11.879	17.009	22.138	6.550	9.521	12.290	17.826	23.499					
65.0	11.2	3.344	6510	9.142	11.635	16.414	21.054	6.742	9.691	12.359	17.697	23.033	6.815	9.907	12.787	18.548	24.450					
67.5	11.2	3.484	6769	9.506	12.098	17.067	21.892	7.004	10.069	12.841	18.386	23.931	7.081	10.294	13.287	19.273	25.405					
70.0	11.3	3.625	7029	9.871	12.563	17.723	22.733	7.268	10.448	13.325	19.079	24.832	7.348	10.682	13.788	19.999	26.363					
72.5	11.4	3.767	7290	10.238	13.029	18.381	23.577	7.533	10.828	13.810	19.773	25.736	7.616	11.071	14.291	20.729	27.324					
75.0	11.5	3.909	7553	10.606	13.498	19.042	24.425	7.798	11.210	14.296	20.470	26.643	7.885	11.462	14.795	21.461	28.289					
77.5	11.5	4.053	7816	10.975	13.968	19.706	25.276	8.064	11.593	14.785	21.169	27.553	8.155	11.854	15.301	22.195	29.257					
80.0	11.6	4.197	8080	11.347	14.441	20.372	26.132	8.332	11.977	15.275	21.871	28.466	8.426	12.248	15.809	22.932	30.229					
82.5	11.7	4.342	8346	11.720	14.916	21.042	26.990	8.600	12.363	15.766	22.575	29.383	8.698	12.643	16.319	23.672	31.204					
85.0	11.8	4.488	8612	12.094	15.392	21.714	27.853	8.869	12.750	16.260	23.282	30.303	8.970	13.039	16.831	24.414	32.182					
87.5	11.8	4.635	8880	12.470	15.871	22.389	28.718	9.139	13.138	16.755	23.991	31.226	9.244	13.437	17.345	25.159	33.164					
90.0	11.9	4.782	9149	12.848	16.351	23.067	29.588	9.411	13.528	17.252	24.703	32.152	9.519	13.837	17.860	25.907	34.150					
92.5	12.0	4.931	9419	13.227	16.834	23.748	30.462	9.683	13.919	17.751	25.417	33.082	9.795	14.238	18.378	26.657	35.140					

Erdwärmesonden Leistung nach EWST Wildt Werdau

Tiefe Meter	Abstand 5 m Linienanordnung								Abstand 7.5 m Linienanordnung								Abstand 10 m Linienanordnung								Leistung W
	Anzahl		1		2		3		4		6		8		2		3		4		6		8		
	Temperatur °C	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W		
95.0	12.1	5.080	9690	13.608	17.319	24.432	31.339	9.956	14.312	18.252	26.134	34.015	10.071	14.640	18.897	27.411	36.133								
97.5	12.2	5.231	9963	13.990	17.805	25.119	32.219	10.230	14.706	18.755	26.854	34.952	10.349	15.044	19.418	28.167	37.129								
100.0	12.2	5.382	10236	14.374	18.294	25.808	33.104	10.505	15.101	19.259	27.576	35.892	10.628	15.449	19.942	28.926	38.130								
102.5	12.3	5.533	10511	14.760	18.785	26.501	33.992	10.781	15.498	19.766	28.301	36.836	10.908	15.856	20.467	29.688	39.134								
105.0	12.4	5.686	10787	15.148	19.278	27.196	34.885	11.059	15.897	20.274	29.029	37.783	11.189	16.265	20.994	30.453	40.143								
107.5	12.5	5.840	11064	15.537	19.773	27.895	35.781	11.337	16.297	20.784	29.759	38.734	11.471	16.675	21.524	31.221	41.155								
110.0	12.5	5.994	11342	15.927	20.271	28.597	36.681	11.616	16.699	21.296	30.493	39.689	11.754	17.086	22.055	31.991	42.170								
112.5	12.6	6.149	11622	16.320	20.770	29.301	37.584	11.897	17.102	21.810	31.229	40.647	12.039	17.500	22.588	32.765	43.190								
115.0	12.7	6.306	11902	16.714	21.272	30.009	38.492	12.178	17.506	22.326	31.968	41.608	12.324	17.914	23.124	33.541	44.214								
117.5	12.8	6.463	12184	17.110	21.775	30.719	39.403	12.461	17.912	22.844	32.709	42.573	12.610	18.331	23.661	34.321	45.241								
120.0	12.8	6.620	12467	17.507	22.281	31.433	40.319	12.744	18.320	23.364	33.454	43.542	12.898	18.749	24.200	35.103	46.273								
122.5	12.9	6.779	12751	17.906	22.789	32.150	41.238	13.029	18.729	23.886	34.201	44.515	13.187	19.168	24.742	35.889	47.308								
125.0	13.0	6.938	13037	18.307	23.299	32.869	42.161	13.315	19.140	24.410	34.951	45.491	13.476	19.589	25.286	36.678	48.348								
127.5	13.1	7.099	13324	18.710	23.812	33.592	43.088	13.602	19.552	24.936	35.704	46.471	13.767	20.012	25.831	37.469	49.391								
130.0	13.2	7.260	13611	19.114	24.326	34.318	44.020	13.889	19.966	25.464	36.460	47.455	14.059	20.437	26.379	38.264	50.439								
132.5	13.2	7.422	13901	19.520	24.843	35.047	44.955	14.178	20.382	25.993	37.218	48.443	14.352	20.863	26.929	39.061	51.490								
135.0	13.3	7.585	14191	19.928	25.362	35.779	45.893	14.469	20.799	26.525	37.980	49.434	14.646	21.290	27.481	39.862	52.546								
137.5	13.4	7.749	14482	20.337	25.883	36.514	46.836	14.760	21.217	27.059	38.744	50.429	14.942	21.720	28.035	40.666	53.605								
140.0	13.5	7.913	14775	20.748	26.406	37.252	47.783	15.052	21.638	27.595	39.512	51.428	15.238	22.151	28.592	41.473	54.669								
142.5	13.5	8.079	15069	21.161	26.932	37.994	48.734	15.346	22.059	28.133	40.282	52.430	15.536	22.583	29.150	42.283	55.737								
145.0	13.6	8.245	15364	21.576	27.459	38.738	49.689	15.640	22.483	28.673	41.055	53.437	15.835	23.017	29.711	43.096	56.809								
147.5	13.7	8.412	15661	21.992	27.989	39.486	50.648	15.936	22.908	29.215	41.831	54.447	16.135	23.453	30.273	43.912	57.884								
150.0	13.8	8.580	15959	22.410	28.521	40.236	51.611	16.233	23.334	29.759	42.610	55.461	16.436	23.891	30.838	44.731	58.964								
152.5	13.8	8.749	16258	22.830	29.056	40.990	52.578	16.531	23.763	30.305	43.392	56.479	16.738	24.330	31.405	45.554	60.049								
155.0	13.9	8.918	16558	23.252	29.592	41.747	53.548	16.830	24.193	30.854	44.177	57.500	17.041	24.771	31.974	46.379	61.137								
157.5	14.0	9.089	16859	23.675	30.131	42.507	54.523	17.130	24.624	31.404	44.965	58.526	17.346	25.214	32.545	47.208	62.229								
160.0	14.1	9.260	17162	24.100	30.672	43.270	55.502	17.431	25.057	31.956	45.756	59.555	17.651	25.658	33.119	48.040	63.326								
162.5	14.2	9.433	17466	24.527	31.215	44.036	56.485	17.733	25.492	32.511	46.550	60.588	17.958	26.104	33.695	48.875	64.426								
165.0	14.2	9.606	17771	24.955	31.761	44.806	57.472	18.037	25.928	33.067	47.347	61.626	18.266	26.552	34.272	49.713	65.531								
167.5	14.3	9.779	18078	25.386	32.308	45.578	58.463	18.342	26.366	33.626	48.147	62.667	18.575	27.001	34.852	50.554	66.640								
170.0	14.4	9.954	18385	25.818	32.858	46.354	59.458	18.647	26.806	34.186	48.949	63.711	18.885	27.452	35.435	51.399	67.753								
172.5	14.5	10.130	18694	26.252	33.410	47.133	60.457	18.954	27.247	34.749	49.755	64.760	19.197	27.905	36.019	52.247	68.871								
175.0	14.5	10.306	19004	26.687	33.965	47.915	61.460	19.263	27.690	35.314	50.564	65.813	19.509	28.359	36.606	53.097	69.992								
177.5	14.6	10.483	19316	27.124	34.521	48.700	62.468	19.572	28.135	35.881	51.376	66.870	19.823	28.815	37.194	53.951	71.118								
180.0	14.7	10.662	19628	27.564	35.080	49.489	63.479	19.882	28.581	36.450	52.191	67.930	20.138	29.273	37.785	54.809	72.248								
182.5	14.8	10.841	19942	28.004	35.641	50.280	64.494	20.194	29.029	37.021	53.008	68.994	20.454	29.733	38.378	55.669	73.382								
185.0	14.8	11.020	20258	28.447	36.204	51.075	65.513	20.506	29.478	37.594	53.829	70.063	20.772	30.194	38.974	56.533	74.521								
187.5	14.9	11.201	20574	28.891	36.770	51.873	66.537	20.820	29.929	38.170	54.653	71.135	21.090	30.657	39.571	57.399	75.663								
190.0	15.0	11.382	20892	29.338	37.338	52.674	67.564	21.135	30.382	38.747	55.480	72.211	21.410	31.122	40.171	58.269	76.810								
192.5	15.1	11.565	21211	29.786	37.908	53.478	68.596	21.451	30.837	39.327	56.310	73.291	21.731	31.588	40.773	59.143	77.961								
195.0	15.2	11.748	21531	30.235	38.480	54.286	69.632	21.769	31.293	39.909	57.143	74.376	22.053	32.056	41.377	60.019	79.117								
197.5	15.2	11.932	21853	30.687	39.055	55.096	70.672	22.087	31.751	40.492	57.979	75.464	22.376	32.526	41.984	60.899	80.276								
200.0	15.3	12.117	22175	31.140	39.632	55.910	71.715	22.407	32.210	41.078	58.818	76.556	22.700	32.997	42.593	61.782	81.440								
202.5	15.4	12.303	22499	31.595	40.211	56.727	72.763	22.728	32.671	41.666	59.660	77.652	23.026	33.471	43.203	62.668	82.608								
205.0	15.5	12.489	22825	32.052	40.792	57.547	73.815	23.050	33.134	42.257	60.505	78.752	23.353	33.946	43.816	63.557	83.780								
207.5	15.5	12.677	23151	32.510	41.376	58.371	74.871	23.373	33.598	42.849	61.353	79.855	23.681	34.422	44.432	64.450	84.957								
210.0	15.6	12.865	23479	32.971	41.962	59.197	75.932	23.697	34.064	43.443	62.204	80.963	24.010	34.901	45.049	65.345	86.138								
212.5	15.7	13.054	23808	33.433	42.550	60.027	76.996	24.022	34.532	44.040	63.058	82.075	24.340	35.381	45.669	66.244	87.323								
215.0	15.8	13.244	24139	33.897	43.140	60.860	78.064	24.349	35.002	44.639	63.916	83.191	24.671	35.863	46.291	67.147	88.512								
217.5	15.8	13.435	24470	34.363	43.733	61.696	79.137	24.677	35.473	45.240	64.776	84.311	25.004	36.346	46.915	68.052	89.706								
220.0	15.9	13.626	24803	34.830	44.328	62.535	80.214	25.006	35.946	45.843	65.639	85.435	25.338	36.832	47.542	68.961	90.903								

Erdwärmesonden Leistung nach EWST Wildt Werdau

Tiefe Meter	Abstand 5 m Linienanordnung							Abstand 7.5 m Linienanordnung							Abstand 10 m Linienanordnung						Leistung W					
	Abstand	1		2		3		4		5		6		7		8		2		3		4		6		
	Anzahl	Temperatur °C	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W	Leistung W		Leistung W	Leistung W	Leistung W	Leistung W	Leistung W
222.5	16.0	13.819	25137	35.299	44.925	63.378	81.294	25.336	36.420	46.448	66.506	86.562	25.673	37.319	48.171	69.873	92.106									
225.0	16.1	14.012	25473	35.770	45.525	64.224	82.379	25.667	36.896	47.055	67.375	87.694	26.009	37.808	48.802	70.788	93.312									
227.5	16.2	14.207	25809	36.243	46.127	65.073	83.468	25.999	37.374	47.664	68.248	88.830	26.347	38.298	49.435	71.706	94.523									
230.0	16.2	14.402	26147	36.718	46.731	65.925	84.561	26.333	37.854	48.276	69.123	89.969	26.686	38.790	50.070	72.628	95.738									
232.5	16.3	14.597	26487	37.194	47.337	66.780	85.658	26.668	38.335	48.890	70.002	91.113	27.025	39.285	50.708	73.553	96.957									
235.0	16.4	14.794	26827	37.672	47.946	67.639	86.760	27.004	38.818	49.506	70.884	92.261	27.366	39.780	51.348	74.481	98.180									
237.5	16.5	14.992	27169	38.152	48.556	68.500	87.865	27.341	39.302	50.123	71.769	93.413	27.709	40.278	51.990	75.413	99.408									
240.0	16.5	15.190	27512	38.634	49.170	69.365	88.974	27.679	39.789	50.744	72.657	94.568	28.052	40.777	52.634	76.348	100.640									
242.5	16.6	15.389	27856	39.118	49.785	70.234	90.088	28.018	40.276	51.366	73.548	95.728	28.397	41.278	53.281	77.285	101.877									
245.0	16.7	15.590	28202	39.603	50.403	71.105	91.206	28.359	40.766	51.990	74.442	96.892	28.743	41.781	53.930	78.227	103.118									
247.5	16.8	15.791	28549	40.090	51.023	71.980	92.328	28.701	41.257	52.617	75.339	98.059	29.090	42.285	54.581	79.171	104.363									
250.0	16.8	15.992	28897	40.579	51.645	72.858	93.454	29.044	41.750	53.246	76.239	99.231	29.438	42.791	55.234	80.119	105.612									
252.5	16.9	16.195	29247	41.070	52.270	73.739	94.584	29.388	42.245	53.877	77.142	100.407	29.787	43.299	55.890	81.070	106.866									
255.0	17.0	16.398	29597	41.562	52.896	74.623	95.718	29.733	42.741	54.510	78.049	101.587	30.138	43.809	56.548	82.024	108.124									
257.5	17.1	16.603	29949	42.057	53.525	75.510	96.856	30.080	43.240	55.145	78.958	102.770	30.490	44.320	57.208	82.982	109.386									
260.0	17.2	16.808	30303	42.553	54.157	76.401	97.999	30.427	43.739	55.782	79.871	103.958	30.843	44.834	57.871	83.943	110.652									
262.5	17.2	17.014	30657	43.051	54.790	77.295	99.146	30.776	44.241	56.422	80.787	105.150	31.197	45.349	58.535	84.907	111.923									
265.0	17.3	17.221	31013	43.550	55.426	78.192	100.296	31.126	44.744	57.063	81.705	106.346	31.553	45.865	59.202	85.874	113.199									
267.5	17.4	17.429	31370	44.052	56.065	79.092	101.451	31.477	45.249	57.707	82.627	107.546	31.909	46.384	59.871	86.845	114.478									
270.0	17.5	17.637	31728	44.555	56.705	79.996	102.610	31.830	45.755	58.353	83.552	108.750	32.267	46.904	60.543	87.819	115.762									
272.5	17.5	17.847	32088	45.060	57.348	80.903	103.773	32.183	46.263	59.001	84.480	109.957	32.626	47.426	61.216	88.796	117.050									
275.0	17.6	18.057	32449	45.567	57.993	81.813	104.941	32.538	46.773	59.651	85.411	111.169	32.986	47.949	61.892	89.776	118.342									
277.5	17.7	18.268	32811	46.076	58.640	82.726	106.112	32.894	47.285	60.304	86.345	112.385	33.348	48.475	62.571	90.760	119.639									
280.0	17.8	18.480	33175	46.586	59.290	83.643	107.288	33.251	47.798	60.958	87.283	113.605	33.710	49.002	63.251	91.747	120.940									
282.5	17.8	18.693	33539	47.098	59.942	84.562	108.467	33.609	48.313	61.615	88.223	114.829	34.074	49.531	63.934	92.738	122.246									
285.0	17.9	18.906	33906	47.612	60.596	85.485	109.651	33.968	48.830	62.274	89.167	116.057	34.439	50.062	64.619	93.731	123.555									
287.5	18.0	19.121	34273	48.128	61.253	86.411	110.839	34.329	49.348	62.935	90.113	117.289	34.806	50.594	65.306	94.728	124.869									
290.0	18.1	19.336	34641	48.646	61.911	87.341	112.031	34.691	49.868	63.598	91.063	118.525	35.173	51.128	65.995	95.728	126.188									
292.5	18.2	19.553	35011	49.165	62.572	88.273	113.227	35.054	50.390	64.264	92.016	119.765	35.542	51.664	66.687	96.731	127.510									
295.0	18.2	19.770	35382	49.686	63.236	89.209	114.428	35.418	50.913	64.931	92.971	121.009	35.912	52.202	67.381	97.738	128.837									
297.5	18.3	19.987	35755	50.209	63.901	90.148	115.632	35.783	51.439	65.601	93.930	122.258	36.283	52.741	68.077	98.748	130.169									
300.0	18.4	20.206	36129	50.734	64.569	91.090	116.841	36.150	51.965	66.273	94.892	123.510	36.655	53.282	68.776	99.761	131.504									
302.5	18.5	20.426	36504	51.261	65.239	92.036	118.053	36.517	52.494	66.947	95.858	124.766	37.029	53.825	69.477	100.778	132.844									
305.0	18.5	20.646	36880	51.789	65.912	92.984	119.270	36.886	53.024	67.623	96.826	126.026	37.403	54.370	70.180	101.798	134.189									
307.5	18.6	20.867	37258	52.319	66.587	93.936	120.491	37.256	53.556	68.302	97.797	127.290	37.779	54.916	70.885	102.821	135.537									
310.0	18.7	21.090	37636	52.851	67.264	94.892	121.717	37.627	54.090	68.982	98.772	128.559	38.156	55.464	71.593	103.847	136.890									
312.5	18.8	21.313	38016	53.385	67.943	95.850	122.946	38.000	54.625	69.665	99.749	129.831	38.535	56.014	72.303	104.877	138.248									
315.0	18.8	21.536	38398	53.921	68.625	96.812	124.179	38.373	55.162	70.350	100.730	131.107	38.914	56.566	73.015	105.910	139.609									
317.5	18.9	21.761	38781	54.458	69.309	97.776	125.417	38.748	55.701	71.037	101.713	132.388	39.295	57.120	73.729	106.946	140.975									
320.0	19.0	21.986	39164	54.997	69.995	98.744	126.659	39.124	56.241	71.726	102.700	133.672	39.677	57.675	74.446	107.986	142.345									
322.5	19.1	22.213	39550	55.538	70.683	99.716	127.905	39.501	56.783	72.418	103.690	134.961	40.060	58.232	75.165	109.028	143.720									
325.0	19.2	22.440	39936	56.081	71.374	100.690	129.155	39.880	57.327	73.111	104.683	136.253	40.444	58.790	75.886	110.074	145.099									
327.5	19.2	22.668	40324	56.626	72.067	101.668	130.409	40.259	57.873	73.807	105.679	137.550	40.830	59.351	76.609	111.124	146.482									
330.0	19.3	22.897	40713	57.172	72.763	102.649	131.667	40.640	58.420	74.505	106.679	138.850	41.217	59.913	77.335	112.176	147.870									

