

# Report of Calibration

Fluke Corporation, Hart Scientific Division  
799 E Utah Valley Dr.  
American Fork, UT 84003

Report No: JN200706495-005  
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Model: 5610-6 Serial: A753116 Description: 10 kohm Thermistor	Customer: Fluke Corporation, Hart Scientific 799 E Utah Valley Dr. American Fork, UT 84003
Calibration Range: Full Received Condition: New Current: 10 uA Procedure: HSC-108	

This thermistor probe was calibrated by comparison to an SPRT over the range shown in the calibration data table. This calibration is traceable to NIST or natural physical constants and is in compliance with ISO/IEC 17025 and ANSI/NCSL Z540-1-1994. The total uncertainty of this calibration is estimated not to exceed 0.010 °C (k=2).

The calibration data were fitted by the method of least squares to obtain coefficients for the accepted third order functions of the form shown below:

Where: R = resistance in ohms, T = temperature in Kelvin  
Equation 1 T(R):  $1/T = A + B \cdot \ln(R) + C \cdot \ln(R)^2 + D \cdot \ln(R)^3$   
Equation 2 R(T):  $\ln(R) = a + b/T + c/T^2 + d/T^3$

The attached interpolation table was generated from the coefficients listed below. The table is given in terms of temperature versus resistance.

Self-heating should be considered when using this instrument. For example, in oil at 0°C, the temperature indicated by the thermistor may change as much as 0.003°C when the excitation current is changed from 0.010 mA to 0.005 mA. To reduce self-heating errors, use the same excitation current that was used in calibration.

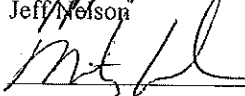
The error due to self-heating is included in the stated uncertainties, which apply to the conditions of the calibration. In applications of poor heat transfer, such as measurement in air, additional self-heating analysis should be performed.

Calibration Date: 6/14/2007  
Recall Date: 6/13/2008  
Temperature: 24.0C  
Humidity: 40%  
Customer Order: Factory

Technician:

  
Jeff Nelson

Approved By:



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Actual Value (Reference) (C)	UUT (Test Sensor) (Ohms)	Residuals (mC)	Method of Realization
0.00313	27661.352	0.05	COMP
24.98850	9253.6412	-0.28	COMP
50.00607	3586.9092	0.62	COMP
74.98575	1571.6176	-0.59	COMP
100.00045	760.24481	0.20	COMP

Thermistor Polynomial Coefficients:

T(R) Coefficients

A = 1.0074425 E-03

B = 2.4491844 E-04

C = 4.6659291 E-07

D = 9.3208158 E-08

R(T) Coefficients

a = -4.3483187 E00

b = 4.3532450 E03

c = -7.8156875 E04

d = -6.3873638 E06

### Test Equipment

Manufacturer	Model	Description	Serial Number	Recall Date
Hart Scientific	1590	Super Thermometer II	A5B310	10/18/2007
Hart Scientific	5681	SPRT, 25 ohm	1490	8/29/2009
Hart Scientific	7030	Bath, Special Range	87043	NCR

C	Resistance	dr/dT	C	Resistance	dr/dT	C	Resistance	dr/dT
0.00	27665.386	-1306.7403	5.80	21137.862	-963.43689	11.60	16302.416	-717.37332
0.10	27535.061	-1299.7793	5.90	21041.767	-958.47169	11.70	16230.858	-713.79481
0.20	27405.429	-1292.8594	6.00	20946.167	-953.53488	11.80	16159.657	-710.23614
0.30	27276.487	-1285.9803	6.10	20851.059	-948.62627	11.90	16088.810	-706.69719
0.40	27148.232	-1279.1417	6.20	20756.441	-943.74569	12.00	16018.316	-703.17783
0.50	27020.658	-1272.3433	6.30	20662.309	-938.89297	12.10	15948.174	-699.67795
0.60	26893.762	-1265.5850	6.40	20568.661	-934.06794	12.20	15878.380	-696.19743
0.70	26767.539	-1258.8664	6.50	20475.494	-929.27041	12.30	15808.934	-692.73615
0.80	26641.987	-1252.1874	6.60	20382.806	-924.50022	12.40	15739.832	-689.29400
0.90	26517.101	-1245.5475	6.70	20290.593	-919.75720	12.50	15671.074	-685.87086
1.00	26392.876	-1238.9467	6.80	20198.854	-915.04117	12.60	15602.658	-682.46661
1.10	26269.310	-1232.3846	6.90	20107.584	-910.35198	12.70	15534.580	-679.08115
1.20	26146.398	-1225.8610	7.00	20016.782	-905.68945	12.80	15466.841	-675.71435
1.30	26024.137	-1219.3757	7.10	19926.445	-901.05342	12.90	15399.437	-672.36611
1.40	25902.522	-1212.9283	7.20	19836.571	-896.44372	13.00	15332.367	-669.03631
1.50	25781.550	-1206.5188	7.30	19747.156	-891.86019	13.10	15265.629	-665.72484
1.60	25661.217	-1200.1467	7.40	19658.198	-887.30267	13.20	15199.221	-662.43159
1.70	25541.519	-1193.8119	7.50	19569.694	-882.77100	13.30	15133.142	-659.15646
1.80	25422.453	-1187.5142	7.60	19481.643	-878.26501	13.40	15067.389	-655.89933
1.90	25304.015	-1181.2533	7.70	19394.041	-873.78455	13.50	15001.962	-652.66009
2.00	25186.201	-1175.0289	7.80	19306.885	-869.32945	13.60	14936.857	-649.43864
2.10	25069.008	-1168.8409	7.90	19220.174	-864.89957	13.70	14872.073	-646.23486
2.20	24952.432	-1162.6890	8.00	19133.904	-860.49474	13.80	14807.609	-643.04866
2.30	24836.469	-1156.5730	8.10	19048.074	-856.11481	13.90	14743.463	-639.87993
2.40	24721.116	-1150.4926	8.20	18962.681	-851.75963	14.00	14679.633	-636.72856
2.50	24606.369	-1144.4476	8.30	18877.721	-847.42904	14.10	14616.117	-633.59445
2.60	24492.225	-1138.4378	8.40	18793.194	-843.12290	14.20	14552.913	-630.47750
2.70	24378.681	-1132.4630	8.50	18709.096	-838.84104	14.30	14490.021	-627.37759
2.80	24265.732	-1126.5230	8.60	18625.425	-834.58333	14.40	14427.437	-624.29464
2.90	24153.375	-1120.6174	8.70	18542.178	-830.34961	14.50	14365.161	-621.22854
3.00	24041.607	-1114.7462	8.80	18459.354	-826.13973	14.60	14303.191	-618.17918
3.10	23930.424	-1108.9091	8.90	18376.950	-821.95355	14.70	14241.525	-615.14647
3.20	23819.824	-1103.1058	9.00	18294.963	-817.79091	14.80	14180.161	-612.13031
3.30	23709.802	-1097.3362	9.10	18213.391	-813.65169	14.90	14119.098	-609.13060
3.40	23600.356	-1091.6001	9.20	18132.232	-809.53573	15.00	14058.334	-606.14723
3.50	23491.481	-1085.8972	9.30	18051.483	-805.44289	15.10	13997.868	-603.18012
3.60	23383.175	-1080.2273	9.40	17971.142	-801.37302	15.20	13937.698	-600.22917
3.70	23275.434	-1074.5902	9.50	17891.207	-797.32599	15.30	13877.822	-597.29428
3.80	23168.256	-1068.9857	9.60	17811.676	-793.30166	15.40	13818.238	-594.37535
3.90	23061.636	-1063.4137	9.70	17732.546	-789.29988	15.50	13758.946	-591.47229
4.00	22955.572	-1057.8738	9.80	17653.816	-785.32053	15.60	13699.943	-588.58501
4.10	22850.060	-1052.3660	9.90	17575.482	-781.36345	15.70	13641.229	-585.71340
4.20	22745.098	-1046.8899	10.00	17497.542	-777.42852	15.80	13582.800	-582.85739
4.30	22640.681	-1041.4454	10.10	17419.995	-773.51560	15.90	13524.657	-580.01686
4.40	22536.808	-1036.0323	10.20	17342.838	-769.62455	16.00	13466.796	-577.19174
4.50	22433.474	-1030.6504	10.30	17266.069	-765.75524	16.10	13409.218	-574.38193
4.60	22330.677	-1025.2995	10.40	17189.687	-761.90754	16.20	13351.919	-571.58734
4.70	22228.413	-1019.9794	10.50	17113.687	-758.08131	16.30	13294.900	-568.80788
4.80	22126.680	-1014.6899	10.60	17038.070	-754.27643	16.40	13238.157	-566.04346
4.90	22025.474	-1009.4308	10.70	16962.831	-750.49276	16.50	13181.691	-563.29399
5.00	21924.793	-1004.2020	10.80	16887.970	-746.73018	16.60	13125.498	-560.55939
5.10	21824.633	-999.00320	10.90	16813.485	-742.98856	16.70	13069.578	-557.83955
5.20	21724.991	-993.83424	11.00	16739.372	-739.26776	16.80	13013.930	-555.13441
5.30	21625.865	-988.69494	11.10	16665.630	-735.56766	16.90	12958.551	-552.44386
5.40	21527.251	-983.58512	11.20	16592.258	-731.88814	17.00	12903.440	-549.76782
5.50	21429.147	-978.50458	11.30	16519.252	-728.22907	17.10	12848.597	-547.10622
5.60	21331.549	-973.45316	11.40	16446.611	-724.59032	17.20	12794.019	-544.45896
5.70	21234.455	-968.43065	11.50	16374.333	-720.97178	17.30	12739.705	-541.82595

C	Resistance	dr/dT	C	Resistance	dr/dT	C	Resistance	dr/dT
17.40	12685.653	-539.20712	23.20	9955.3903	-408.94595	29.00	7876.1452	-312.82250
17.50	12631.863	-536.60237	23.30	9914.5915	-407.03198	29.10	7844.9340	-311.40334
17.60	12578.332	-534.01164	23.40	9873.9835	-405.12800	29.20	7813.8643	-309.99137
17.70	12525.060	-531.43482	23.50	9833.5655	-403.23396	29.30	7782.9355	-308.58656
17.80	12472.045	-528.87185	23.60	9793.3364	-401.34978	29.40	7752.1467	-307.18886
17.90	12419.285	-526.32265	23.70	9753.2952	-399.47543	29.50	7721.4975	-305.79822
18.00	12366.780	-523.78712	23.80	9713.4410	-397.61083	29.60	7690.9869	-304.41463
18.10	12314.527	-521.26519	23.90	9673.7728	-395.75595	29.70	7660.6143	-303.03802
18.20	12262.526	-518.75677	24.00	9634.2895	-393.91071	29.80	7630.3790	-301.66837
18.30	12210.775	-516.26180	24.10	9594.9903	-392.07507	29.90	7600.2804	-300.30564
18.40	12159.273	-513.78019	24.20	9555.8742	-390.24897	30.00	7570.3177	-298.94978
18.50	12108.019	-511.31186	24.30	9516.9402	-388.43236	30.10	7540.4902	-297.60076
18.60	12057.011	-508.85674	24.40	9478.1874	-386.62518	30.20	7510.7973	-296.25855
18.70	12006.247	-506.41474	24.50	9439.6148	-384.82738	30.30	7481.2383	-294.92310
18.80	11955.727	-503.98580	24.60	9401.2216	-383.03890	30.40	7451.8125	-293.59437
18.90	11905.449	-501.56982	24.70	9363.0067	-381.25970	30.50	7422.5192	-292.27234
19.00	11855.413	-499.16675	24.80	9324.9694	-379.48971	30.60	7393.3578	-290.95695
19.10	11805.616	-496.77650	24.90	9287.1085	-377.72889	30.70	7364.3276	-289.64819
19.20	11756.057	-494.39899	25.00	9249.4233	-375.97719	30.80	7335.4279	-288.34600
19.30	11706.735	-492.03416	25.10	9211.9128	-374.23455	30.90	7306.6581	-287.05035
19.40	11657.650	-489.68192	25.20	9174.5761	-372.50092	31.00	7278.0176	-285.76121
19.50	11608.799	-487.34221	25.30	9137.4123	-370.77625	31.10	7249.5057	-284.47854
19.60	11560.181	-485.01495	25.40	9100.4205	-369.06049	31.20	7221.1217	-283.20230
19.70	11511.795	-482.70007	25.50	9063.5999	-367.35359	31.30	7192.8650	-281.93247
19.80	11463.641	-480.39750	25.60	9026.9495	-365.65550	31.40	7164.7350	-280.66900
19.90	11415.715	-478.10716	25.70	8990.4685	-363.96617	31.50	7136.7310	-279.41185
20.00	11368.019	-475.82899	25.80	8954.1560	-362.28554	31.60	7108.8524	-278.16100
20.10	11320.549	-473.56291	25.90	8918.0111	-360.61358	31.70	7081.0986	-276.91641
20.20	11273.306	-471.30885	26.00	8882.0330	-358.95023	31.80	7053.4689	-275.67805
20.30	11226.287	-469.06675	26.10	8846.2208	-357.29544	31.90	7025.9628	-274.44588
20.40	11179.492	-466.83653	26.20	8810.5736	-355.64916	32.00	6998.5795	-273.21986
20.50	11132.919	-464.61812	26.30	8775.0906	-354.01135	32.10	6971.3186	-271.99996
20.60	11086.568	-462.41146	26.40	8739.7711	-352.38195	32.20	6944.1793	-270.78616
20.70	11040.437	-460.21647	26.50	8704.6140	-350.76093	32.30	6917.1612	-269.57841
20.80	10994.524	-458.03310	26.60	8669.6186	-349.14823	32.40	6890.2635	-268.37668
20.90	10948.830	-455.86126	26.70	8634.7841	-347.54381	32.50	6863.4856	-267.18094
21.00	10903.352	-453.70090	26.80	8600.1096	-345.94761	32.60	6836.8271	-265.99116
21.10	10858.089	-451.55196	26.90	8565.5943	-344.35960	32.70	6810.2872	-264.80731
21.20	10813.041	-449.41435	27.00	8531.2374	-342.77973	32.80	6783.8654	-263.62934
21.30	10768.206	-447.28802	27.10	8497.0380	-341.20794	32.90	6757.5611	-262.45723
21.40	10723.583	-445.17290	27.20	8462.9955	-339.64421	33.00	6731.3738	-261.29096
21.50	10679.171	-443.06893	27.30	8429.1089	-338.08847	33.10	6705.3028	-260.13047
21.60	10634.969	-440.97604	27.40	8395.3775	-336.54069	33.20	6679.3475	-258.97575
21.70	10590.975	-438.89417	27.50	8361.8005	-335.00082	33.30	6653.5074	-257.82677
21.80	10547.190	-436.82325	27.60	8328.3771	-333.46882	33.40	6627.7819	-256.68348
21.90	10503.610	-434.76323	27.70	8295.1065	-331.94463	33.50	6602.1705	-255.54586
22.00	10460.236	-432.71403	27.80	8261.9879	-330.42823	33.60	6576.6726	-254.41389
22.10	10417.067	-430.67560	27.90	8229.0206	-328.91956	33.70	6551.2876	-253.28752
22.20	10374.101	-428.64787	28.00	8196.2038	-327.41859	33.80	6526.0149	-252.16673
22.30	10331.337	-426.63079	28.10	8163.5366	-325.92526	33.90	6500.8540	-251.05148
22.40	10288.775	-424.62429	28.20	8131.0185	-324.43953	34.00	6475.8044	-249.94176
22.50	10246.412	-422.62830	28.30	8098.6485	-322.96137	34.10	6450.8655	-248.83752
22.60	10204.248	-420.64278	28.40	8066.4259	-321.49073	34.20	6426.0367	-247.73873
22.70	10162.283	-418.66766	28.50	8034.3501	-320.02757	34.30	6401.3176	-246.64538
22.80	10120.515	-416.70287	28.60	8002.4202	-318.57185	34.40	6376.7075	-245.55742
22.90	10078.942	-414.74837	28.70	7970.6355	-317.12352	34.50	6352.2059	-244.47483
23.00	10037.565	-412.80409	28.80	7938.9952	-315.68255	34.60	6327.8123	-243.39758
23.10	9996.3810	-410.86997	28.90	7907.4987	-314.24889	34.70	6303.5262	-242.32564

C	Resistance	dr/dT	C	Resistance	dr/dT	C	Resistance	dr/dT
34.80	6279.3470	-241.25899	40.60	5043.1909	-187.52685	46.40	4078.8725	-146.85460
34.90	6255.2742	-240.19758	40.70	5024.4783	-186.72642	46.50	4064.2175	-146.24618
35.00	6231.3073	-239.14140	40.80	5005.8455	-185.92982	46.60	4049.6232	-145.64059
35.10	6207.4458	-238.09042	40.90	4987.2922	-185.13703	46.70	4035.0893	-145.03781
35.20	6183.6891	-237.04461	41.00	4968.8180	-184.34803	46.80	4020.6155	-144.43784
35.30	6160.0367	-236.00393	41.10	4950.4225	-183.56279	46.90	4006.2016	-143.84065
35.40	6136.4881	-234.96837	41.20	4932.1053	-182.78131	47.00	3991.8473	-143.24624
35.50	6113.0428	-233.93789	41.30	4913.8661	-182.00355	47.10	3977.5523	-142.65458
35.60	6089.7004	-232.91247	41.40	4895.7045	-181.22951	47.20	3963.3163	-142.06567
35.70	6066.4602	-231.89209	41.50	4877.6200	-180.45915	47.30	3949.1391	-141.47948
35.80	6043.3218	-230.87670	41.60	4859.6125	-179.69247	47.40	3935.0203	-140.89602
35.90	6020.2847	-229.86629	41.70	4841.6814	-178.92944	47.50	3920.9598	-140.31525
36.00	5997.3484	-228.86083	41.80	4823.8265	-178.17003	47.60	3906.9572	-139.73717
36.10	5974.5124	-227.86029	41.90	4806.0473	-177.41425	47.70	3893.0122	-139.16177
36.20	5951.7761	-226.86464	42.00	4788.3435	-176.66205	47.80	3879.1247	-138.58903
36.30	5929.1393	-225.87387	42.10	4770.7148	-175.91343	47.90	3865.2944	-138.01893
36.40	5906.6012	-224.88794	42.20	4753.1607	-175.16837	48.00	3851.5209	-137.45147
36.50	5884.1615	-223.90682	42.30	4735.6810	-174.42685	48.10	3837.8040	-136.88663
36.60	5861.8197	-222.93050	42.40	4718.2752	-173.68885	48.20	3824.1434	-136.32439
36.70	5839.5753	-221.95894	42.50	4700.9431	-172.95434	48.30	3810.5390	-135.76475
36.80	5817.4277	-220.99213	42.60	4683.6842	-172.22332	48.40	3796.9904	-135.20769
36.90	5795.3767	-220.03002	42.70	4666.4983	-171.49577	48.50	3783.4974	-134.65319
37.00	5773.4216	-219.07261	42.80	4649.3850	-170.77166	48.60	3770.0597	-134.10125
37.10	5751.5620	-218.11986	42.90	4632.3439	-170.05098	48.70	3756.6770	-133.55185
37.20	5729.7975	-217.17175	43.00	4615.3747	-169.33371	48.80	3743.3492	-133.00498
37.30	5708.1275	-216.22825	43.10	4598.4770	-168.61984	48.90	3730.0760	-132.46063
37.40	5686.5516	-215.28935	43.20	4581.6506	-167.90933	49.00	3716.8570	-131.91878
37.50	5665.0695	-214.35500	43.30	4564.8950	-167.20219	49.10	3703.6921	-131.37941
37.60	5643.6805	-213.42520	43.40	4548.2100	-166.49839	49.20	3690.5811	-130.84253
37.70	5622.3843	-212.49992	43.50	4531.5952	-165.79791	49.30	3677.5235	-130.30811
37.80	5601.1804	-211.57912	43.60	4515.0503	-165.10073	49.40	3664.5194	-129.77614
37.90	5580.0683	-210.66280	43.70	4498.5750	-164.40684	49.50	3651.5682	-129.24661
38.00	5559.0477	-209.75092	43.80	4482.1689	-163.71623	49.60	3638.6699	-128.71951
38.10	5538.1180	-208.84345	43.90	4465.8316	-163.02887	49.70	3625.8243	-128.19482
38.20	5517.2788	-207.94039	44.00	4449.5630	-162.34474	49.80	3613.0309	-127.67254
38.30	5496.5298	-207.04170	44.10	4433.3626	-161.66384	49.90	3600.2897	-127.15265
38.40	5475.8703	-206.14736	44.20	4417.2301	-160.98614	50.00	3587.6003	-126.63513
38.50	5455.3001	-205.25734	44.30	4401.1652	-160.31162	50.10	3574.9626	-126.11999
38.60	5434.8187	-204.37163	44.40	4385.1677	-159.64028	50.20	3562.3762	-125.60720
38.70	5414.4257	-203.49020	44.50	4369.2371	-158.97209	50.30	3549.8410	-125.09675
38.80	5394.1205	-202.61303	44.60	4353.3732	-158.30704	50.40	3537.3568	-124.58863
38.90	5373.9029	-201.74009	44.70	4337.5756	-157.64511	50.50	3524.9232	-124.08283
39.00	5353.7724	-200.87137	44.80	4321.8440	-156.98629	50.60	3512.5401	-123.57934
39.10	5333.7285	-200.00683	44.90	4306.1782	-156.33055	50.70	3500.2073	-123.07815
39.20	5313.7709	-199.14647	45.00	4290.5778	-155.67789	50.80	3487.9244	-122.57924
39.30	5293.8991	-198.29025	45.10	4275.0425	-155.02829	50.90	3475.6914	-122.08260
39.40	5274.1127	-197.43815	45.20	4259.5721	-154.38172	51.00	3463.5078	-121.58822
39.50	5254.4113	-196.59016	45.30	4244.1661	-153.73819	51.10	3451.3737	-121.09610
39.60	5234.7945	-195.74625	45.40	4228.8243	-153.09766	51.20	3439.2886	-120.60621
39.70	5215.2619	-194.90639	45.50	4213.5465	-152.46013	51.30	3427.2523	-120.11855
39.80	5195.8131	-194.07058	45.60	4198.3322	-151.82558	51.40	3415.2648	-119.63311
39.90	5176.4477	-193.23878	45.70	4183.1812	-151.19399	51.50	3403.3256	-119.14987
40.00	5157.1652	-192.41097	45.80	4168.0933	-150.56535	51.60	3391.4347	-118.66883
40.10	5137.9653	-191.58714	45.90	4153.0681	-149.93965	51.70	3379.5918	-118.18997
40.20	5118.8477	-190.76726	46.00	4138.1053	-149.31686	51.80	3367.7967	-117.71328
40.30	5099.8118	-189.95131	46.10	4123.2046	-148.69697	51.90	3356.0491	-117.23876
40.40	5080.8573	-189.13927	46.20	4108.3658	-148.07998	52.00	3344.3488	-116.76638
40.50	5061.9838	-188.33112	46.30	4093.5885	-147.46586	52.10	3332.6957	-116.29614

C	Resistance	dr/dT	C	Resistance	dr/dT	C	Resistance	dr/dT
52.20	3321.0895	-115.82804	58.00	2721.4256	-91.983008	63.80	2243.6997	-73.526214
52.30	3309.5300	-115.36205	58.10	2712.2453	-91.623506	63.90	2236.3611	-73.246927
52.40	3298.0171	-114.89817	58.20	2703.1008	-91.265587	64.00	2229.0503	-72.968836
52.50	3286.5503	-114.43639	58.30	2693.9921	-90.909242	64.10	2221.7673	-72.691936
52.60	3275.1297	-113.97669	58.40	2684.9189	-90.554464	64.20	2214.5119	-72.416221
52.70	3263.7549	-113.51907	58.50	2675.8811	-90.201245	64.30	2207.2840	-72.141686
52.80	3252.4258	-113.06352	58.60	2666.8786	-89.849578	64.40	2200.0835	-71.868326
52.90	3241.1422	-112.61002	58.70	2657.9112	-89.499456	64.50	2192.9103	-71.596133
53.00	3229.9037	-112.15857	58.80	2648.9787	-89.150870	64.60	2185.7642	-71.325104
53.10	3218.7104	-111.70915	58.90	2640.0810	-88.803813	64.70	2178.6452	-71.055232
53.20	3207.5619	-111.26176	59.00	2631.2179	-88.458278	64.80	2171.5532	-70.786512
53.30	3196.4580	-110.81639	59.10	2622.3892	-88.114258	64.90	2164.4879	-70.518939
53.40	3185.3985	-110.37301	59.20	2613.5950	-87.771745	65.00	2157.4493	-70.252507
53.50	3174.3833	-109.93164	59.30	2604.8348	-87.430732	65.10	2150.4374	-69.987211
53.60	3163.4121	-109.49225	59.40	2596.1088	-87.091211	65.20	2143.4519	-69.723045
53.70	3152.4848	-109.05483	59.50	2587.4166	-86.753176	65.30	2136.4927	-69.460004
53.80	3141.6011	-108.61938	59.60	2578.7581	-86.416619	65.40	2129.5598	-69.198083
53.90	3130.7608	-108.18589	59.70	2570.1332	-86.081533	65.50	2122.6531	-68.937277
54.00	3119.9638	-107.75434	59.80	2561.5417	-85.747911	65.60	2115.7723	-68.677580
54.10	3109.2099	-107.32473	59.90	2552.9836	-85.415745	65.70	2108.9175	-68.418986
54.20	3098.4988	-106.89705	60.00	2544.4585	-85.085030	65.80	2102.0885	-68.161492
54.30	3087.8304	-106.47128	60.10	2535.9665	-84.755757	65.90	2095.2852	-67.905091
54.40	3077.2045	-106.04742	60.20	2527.5073	-84.427920	66.00	2088.5074	-67.649779
54.50	3066.6209	-105.62546	60.30	2519.0809	-84.101512	66.10	2081.7552	-67.395550
54.60	3056.0794	-105.20539	60.40	2510.6870	-83.776526	66.20	2075.0283	-67.142399
54.70	3045.5797	-104.78719	60.50	2502.3255	-83.452955	66.30	2068.3267	-66.890322
54.80	3035.1219	-104.37087	60.60	2493.9963	-83.130792	66.40	2061.6502	-66.639312
54.90	3024.7055	-103.95641	60.70	2485.6993	-82.810031	66.50	2054.9988	-66.389366
55.00	3014.3305	-103.54380	60.80	2477.4343	-82.490665	66.60	2048.3723	-66.140478
55.10	3003.9967	-103.13303	60.90	2469.2011	-82.172687	66.70	2041.7706	-65.892644
55.20	2993.7038	-102.72410	61.00	2460.9997	-81.856091	66.80	2035.1937	-65.645857
55.30	2983.4518	-102.31699	61.10	2452.8299	-81.540869	66.90	2028.6414	-65.400114
55.40	2973.2404	-101.91170	61.20	2444.6915	-81.227015	67.00	2022.1137	-65.155410
55.50	2963.0694	-101.50821	61.30	2436.5844	-80.914523	67.10	2015.6103	-64.911739
55.60	2952.9387	-101.10653	61.40	2428.5085	-80.603386	67.20	2009.1313	-64.669097
55.70	2942.8480	-100.70663	61.50	2420.4637	-80.293598	67.30	2002.6765	-64.427479
55.80	2932.7973	-100.30851	61.60	2412.4498	-79.985151	67.40	1996.2457	-64.186880
55.90	2922.7863	-99.912159	61.70	2404.4666	-79.678041	67.50	1989.8390	-63.947295
56.00	2912.8148	-99.517574	61.80	2396.5141	-79.372259	67.60	1983.4563	-63.708720
56.10	2902.8827	-99.124742	61.90	2388.5921	-79.067801	67.70	1977.0973	-63.471150
56.20	2892.9898	-98.733656	62.00	2380.7005	-78.764659	67.80	1970.7620	-63.234581
56.30	2883.1359	-98.344307	62.10	2372.8392	-78.462828	67.90	1964.4503	-62.999007
56.40	2873.3209	-97.956686	62.20	2365.0079	-78.162300	68.00	1958.1622	-62.764424
56.50	2863.5445	-97.570785	62.30	2357.2066	-77.863070	68.10	1951.8974	-62.530827
56.60	2853.8067	-97.186595	62.40	2349.4352	-77.565132	68.20	1945.6560	-62.298212
56.70	2844.1071	-96.804108	62.50	2341.6936	-77.268479	68.30	1939.4377	-62.066575
56.80	2834.4458	-96.423315	62.60	2333.9815	-76.973106	68.40	1933.2426	-61.835910
56.90	2824.8224	-96.044209	62.70	2326.2989	-76.679005	68.50	1927.0705	-61.606213
57.00	2815.2369	-95.666781	62.80	2318.6457	-76.386172	68.60	1920.9213	-61.377479
57.10	2805.6890	-95.291023	62.90	2311.0216	-76.094599	68.70	1914.7950	-61.149705
57.20	2796.1786	-94.916926	63.00	2303.4267	-75.804282	68.80	1908.6914	-60.922886
57.30	2786.7056	-94.544483	63.10	2295.8607	-75.515214	68.90	1902.6104	-60.697016
57.40	2777.2697	-94.173686	63.20	2288.3236	-75.227389	69.00	1896.5519	-60.472093
57.50	2767.8708	-93.804526	63.30	2280.8152	-74.940801	69.10	1890.5159	-60.248111
57.60	2758.5087	-93.436995	63.40	2273.3354	-74.655444	69.20	1884.5023	-60.025066
57.70	2749.1833	-93.071086	63.50	2265.8841	-74.371313	69.30	1878.5109	-59.802954
57.80	2739.8944	-92.706790	63.60	2258.4611	-74.088401	69.40	1872.5417	-59.581770
57.90	2730.6419	-92.344100	63.70	2251.0664	-73.806704	69.50	1866.5945	-59.361510

C	Resistance	dr/dT	C	Resistance	dr/dT	C	Resistance	dr/dT
69.60	1860.6693	-59.142171	75.40	1551.6723	-47.858488	81.20	1300.9282	-38.951085
69.70	1854.7660	-58.923746	75.50	1546.8951	-47.686565	81.30	1297.0400	-38.814929
69.80	1848.8845	-58.706233	75.60	1542.1350	-47.515342	81.40	1293.1652	-38.679313
69.90	1843.0248	-58.489628	75.70	1537.3920	-47.344814	81.50	1289.3041	-38.544234
70.00	1837.1866	-58.273925	75.80	1532.6660	-47.174978	81.60	1285.4564	-38.409690
70.10	1831.3699	-58.059120	75.90	1527.9570	-47.005832	81.70	1281.6221	-38.275678
70.20	1825.5747	-57.845211	76.00	1523.2648	-46.837372	81.80	1277.8012	-38.142196
70.30	1819.8009	-57.632192	76.10	1518.5895	-46.669596	81.90	1273.9937	-38.009241
70.40	1814.0483	-57.420059	76.20	1513.9309	-46.502499	82.00	1270.1994	-37.876812
70.50	1808.3168	-57.208809	76.30	1509.2889	-46.336080	82.10	1266.4183	-37.744905
70.60	1802.6065	-56.998436	76.40	1504.6636	-46.170334	82.20	1262.6504	-37.613519
70.70	1796.9171	-56.788938	76.50	1500.0549	-46.005260	82.30	1258.8956	-37.482652
70.80	1791.2487	-56.580310	76.60	1495.4626	-45.840853	82.40	1255.1538	-37.352301
70.90	1785.6010	-56.372549	76.70	1490.8867	-45.677112	82.50	1251.4251	-37.222463
71.00	1779.9741	-56.165649	76.80	1486.3271	-45.514032	82.60	1247.7093	-37.093137
71.10	1774.3679	-55.959607	76.90	1481.7838	-45.351612	82.70	1244.0064	-36.964321
71.20	1768.7822	-55.754420	77.00	1477.2568	-45.189848	82.80	1240.3164	-36.836012
71.30	1763.2169	-55.550083	77.10	1472.7458	-45.028736	82.90	1236.6392	-36.708207
71.40	1757.6721	-55.346593	77.20	1468.2510	-44.868275	83.00	1232.9748	-36.580906
71.50	1752.1476	-55.143944	77.30	1463.7722	-44.708461	83.10	1229.3230	-36.454104
71.60	1746.6433	-54.942135	77.40	1459.3093	-44.549292	83.20	1225.6839	-36.327801
71.70	1741.1591	-54.741160	77.50	1454.8623	-44.390764	83.30	1222.0574	-36.201995
71.80	1735.6950	-54.541017	77.60	1450.4311	-44.232874	83.40	1218.4435	-36.076682
71.90	1730.2509	-54.341700	77.70	1446.0157	-44.075621	83.50	1214.8421	-35.951861
72.00	1724.8267	-54.143207	77.80	1441.6160	-43.919000	83.60	1211.2531	-35.827530
72.10	1719.4222	-53.945533	77.90	1437.2319	-43.763010	83.70	1207.6766	-35.703686
72.20	1714.0375	-53.748676	78.00	1432.8633	-43.607646	83.80	1204.1124	-35.580327
72.30	1708.6725	-53.552630	78.10	1428.5103	-43.452907	83.90	1200.5605	-35.457452
72.40	1703.3270	-53.357393	78.20	1424.1727	-43.298790	84.00	1197.0209	-35.335059
72.50	1698.0010	-53.162960	78.30	1419.8505	-43.145292	84.10	1193.4935	-35.213144
72.60	1692.6944	-52.969329	78.40	1415.5437	-42.992410	84.20	1189.9782	-35.091706
72.70	1687.4071	-52.776495	78.50	1411.2520	-42.840141	84.30	1186.4751	-34.970743
72.80	1682.1390	-52.584454	78.60	1406.9756	-42.688484	84.40	1182.9841	-34.850253
72.90	1676.8902	-52.393204	78.70	1402.7143	-42.537434	84.50	1179.5050	-34.730234
73.00	1671.6604	-52.202740	78.80	1398.4681	-42.386989	84.60	1176.0380	-34.610684
73.10	1666.4496	-52.013059	78.90	1394.2369	-42.237147	84.70	1172.5829	-34.491600
73.20	1661.2577	-51.824157	79.00	1390.0207	-42.087905	84.80	1169.1397	-34.372982
73.30	1656.0847	-51.636031	79.10	1385.8193	-41.939260	84.90	1165.7083	-34.254825
73.40	1650.9305	-51.448678	79.20	1381.6328	-41.791209	85.00	1162.2887	-34.137130
73.50	1645.7950	-51.262093	79.30	1377.4610	-41.643751	85.10	1158.8808	-34.019893
73.60	1640.6781	-51.076273	79.40	1373.3040	-41.496881	85.20	1155.4847	-33.903113
73.70	1635.5797	-50.891215	79.50	1369.1616	-41.350599	85.30	1152.1002	-33.786788
73.80	1630.4998	-50.706916	79.60	1365.0339	-41.204900	85.40	1148.7273	-33.670915
73.90	1625.4383	-50.523371	79.70	1360.9206	-41.059783	85.50	1145.3660	-33.555494
74.00	1620.3951	-50.340578	79.80	1356.8219	-40.915245	85.60	1142.0162	-33.440521
74.10	1615.3701	-50.158532	79.90	1352.7376	-40.771284	85.70	1138.6779	-33.325995
74.20	1610.3634	-49.977231	80.00	1348.6676	-40.627896	85.80	1135.3510	-33.211914
74.30	1605.3747	-49.796672	80.10	1344.6120	-40.485079	85.90	1132.0355	-33.098276
74.40	1600.4040	-49.616850	80.20	1340.5706	-40.342831	86.00	1128.7313	-32.985079
74.50	1595.4513	-49.437763	80.30	1336.5434	-40.201149	86.10	1125.4384	-32.872322
74.60	1590.5164	-49.259407	80.40	1332.5303	-40.060031	86.20	1122.1568	-32.760001
74.70	1585.5994	-49.081779	80.50	1328.5314	-39.919475	86.30	1118.8864	-32.648117
74.80	1580.7000	-48.904875	80.60	1324.5464	-39.779477	86.40	1115.6272	-32.536665
74.90	1575.8184	-48.728693	80.70	1320.5755	-39.640035	86.50	1112.3791	-32.425646
75.00	1570.9543	-48.553229	80.80	1316.6184	-39.501147	86.60	1109.1421	-32.315056
75.10	1566.1077	-48.378479	80.90	1312.6752	-39.362810	86.70	1105.9161	-32.204895
75.20	1561.2786	-48.204441	81.00	1308.7458	-39.225023	86.80	1102.7011	-32.095160
75.30	1556.4668	-48.031112	81.10	1304.8302	-39.087782	86.90	1099.4970	-31.985848

C	Resistance	dr/dT	C	Resistance	dr/dT	C	Resistance	dr/dT
87.00	1096.3039	-31.876960	92.80	928.41008	-26.226129	98.60	789.93614	-21.687009
87.10	1093.1216	-31.768492	92.90	925.79182	-26.139227	98.70	787.77094	-21.617003
87.20	1089.9502	-31.660443	93.00	923.18222	-26.052652	98.80	785.61273	-21.547255
87.30	1086.7895	-31.552811	93.10	920.58127	-25.966402	98.90	783.46148	-21.477763
87.40	1083.6396	-31.445594	93.20	917.98893	-25.880478	99.00	781.31717	-21.408526
87.50	1080.5004	-31.338791	93.30	915.40517	-25.794876	99.10	779.17977	-21.339543
87.60	1077.3718	-31.232400	93.40	912.82995	-25.709597	99.20	777.04925	-21.270814
87.70	1074.2539	-31.126419	93.50	910.26324	-25.624638	99.30	774.92560	-21.202336
87.80	1071.1465	-31.020845	93.60	907.70501	-25.539998	99.40	772.80878	-21.134109
87.90	1068.0497	-30.915679	93.70	905.15523	-25.455675	99.50	770.69877	-21.066132
88.00	1064.9634	-30.810917	93.80	902.61386	-25.371670	99.60	768.59554	-20.998404
88.10	1061.8875	-30.706558	93.90	900.08088	-25.287979	99.70	766.49908	-20.930925
88.20	1058.8220	-30.602600	94.00	897.55626	-25.204603	99.80	764.40935	-20.863691
88.30	1055.7670	-30.499042	94.10	895.03995	-25.121539	99.90	762.32633	-20.796704
88.40	1052.7222	-30.395881	94.20	892.53194	-25.038786	100.00	760.25000	-20.729962
88.50	1049.6878	-30.293117	94.30	890.03218	-24.956343			
88.60	1046.6636	-30.190747	94.40	887.54066	-24.874209			
88.70	1043.6496	-30.088770	94.50	885.05733	-24.792382			
88.80	1040.6458	-29.987185	94.60	882.58217	-24.710861			
88.90	1037.6522	-29.885988	94.70	880.11515	-24.629645			
89.00	1034.6686	-29.785179	94.80	877.65623	-24.548733			
89.10	1031.6951	-29.684757	94.90	875.20539	-24.468123			
89.20	1028.7316	-29.584719	95.00	872.76260	-24.387814			
89.30	1025.7782	-29.485063	95.10	870.32782	-24.307804			
89.40	1022.8346	-29.385789	95.20	867.90103	-24.228093			
89.50	1019.9010	-29.286895	95.30	865.48219	-24.148680			
89.60	1016.9772	-29.188378	95.40	863.07128	-24.069562			
89.70	1014.0633	-29.090238	95.50	860.66827	-23.990740			
89.80	1011.1592	-28.992472	95.60	858.27313	-23.912210			
89.90	1008.2648	-28.895080	95.70	855.88582	-23.833974			
90.00	1005.3801	-28.798059	95.80	853.50632	-23.756028			
90.10	1002.5052	-28.701409	95.90	851.13460	-23.678372			
90.20	999.63984	-28.605126	96.00	848.77064	-23.601006			
90.30	996.78413	-28.509211	96.10	846.41439	-23.523926			
90.40	993.93799	-28.413661	96.20	844.06584	-23.447133			
90.50	991.10139	-28.318474	96.30	841.72496	-23.370626			
90.60	988.27428	-28.223650	96.40	839.39171	-23.294402			
90.70	985.45664	-28.129187	96.50	837.06607	-23.218461			
90.80	982.64843	-28.035082	96.60	834.74801	-23.142801			
90.90	979.84961	-27.941336	96.70	832.43750	-23.067423			
91.00	977.06015	-27.847945	96.80	830.13451	-22.992323			
91.10	974.28001	-27.754909	96.90	827.83902	-22.917502			
91.20	971.50916	-27.662226	97.00	825.55100	-22.842958			
91.30	968.74756	-27.569895	97.10	823.27042	-22.768689			
91.40	965.99517	-27.477914	97.20	820.99726	-22.694696			
91.50	963.25196	-27.386282	97.30	818.73147	-22.620976			
91.60	960.51790	-27.294996	97.40	816.47305	-22.547528			
91.70	957.79295	-27.204057	97.50	814.22196	-22.474352			
91.80	955.07708	-27.113462	97.60	811.97817	-22.401446			
91.90	952.37025	-27.023209	97.70	809.74166	-22.328809			
92.00	949.67243	-26.933298	97.80	807.51240	-22.256441			
92.10	946.98358	-26.843727	97.90	805.29036	-22.184339			
92.20	944.30367	-26.754495	98.00	803.07552	-22.112503			
92.30	941.63267	-26.665599	98.10	800.86785	-22.040932			
92.40	938.97054	-26.577040	98.20	798.66733	-21.969624			
92.50	936.31725	-26.488814	98.30	796.47392	-21.898579			
92.60	933.67276	-26.400921	98.40	794.28760	-21.827796			
92.70	931.03705	-26.313360	98.50	792.10835	-21.757272			