

TRANSCAT® CERTIFICATE OF CALIBRATION

Trust in every measure

Customer: ILLIANA INSTRUMENT
1831 Govert Drive
Scherverville, IN 46375

NVLAP®
NVLAP LAB CODE
200867-0

PO Number: 3624

Certificate/SO Number: 15-A7Q2N-20-1 Revision 0

Manufacturer: Hart Scientific/Fluke
Model Number: 5626-15-S
Description: Secondary Standard PRT
Serial Number: 0411
ID: ITEM 1225

As-Found: NA
As-Left: NA

Calibration Date: July 13, 2016

Calibrated To: Data Only
Calibration Procedure: 1-AC14153-4

Transcat Calibration Laboratories have been audited and found in compliance with ISO/IEC 17025:2005. Accredited calibrations performed within the Lab's Scope of Accreditation are indicated by the presence of the Accrediting Body's Logo and Certificate Number on this Certificate of Calibration. Any measurements on an accredited calibration not covered by that Lab's Scope of Accreditation are listed in the notes section of the certificate. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, SCC, NRC, CLAS, ANAB or any agency of the Federal Government. NVLAP, NIST, SCC, NRC, CLAS or ANAB do not guarantee the accuracy of an individual calibration by accredited laboratories.

Transcat calibrations, as applicable, are performed in compliance with the requirements of the Transcat Quality Manual Revision I, ISO 9001:2008, ANSI/NCCL Z540.1-1994 (R2002), and ISO 10012:2003. When specified contractually, the requirements of ISO TS16949:2009, 10CFR21, 10CFR50 App. B and ASME NQA-1:2012 are also covered. Complete records of work performed are maintained by Transcat and are available for inspection. Laboratory standards used in the performance of this calibration are shown on the Supplemental Report.

Transcat documents the traceability of measurements to the SI units through the National Institute of Standards and Technology (NIST), or the National Research Council of Canada (NRC), or other recognized national measurement institutes (NMI) that are signatories to the CIPM Mutual Recognition Arrangement, or accepted fundamental and/or natural physical constants, or by the use of specified methods, consensus standards or ratio type measurements. Documentation supporting traceability information is available for review at a Transcat facility. The measured quantity and the measurement uncertainty are required for further dissemination of traceability.

Uncertainties are reported with a coverage factor $k=2$, providing a level of confidence of approximately 95%. All calibrations have been performed using processes having a TUR of 4:1 or better (3:1 for mass calibrations), unless otherwise noted on the Supplemental Report. The Test Uncertainty Ratio (TUR) is calculated in accordance with NCSL International RP-18. For mass calibrations: Conventional mass referenced to 8.0 g/cm³.


The results in this report relate only to the item calibrated or tested, and the determination of in or out of tolerance is specific to the model/serial no. referenced above based on the tolerances shown on the supplemental report; these tolerances are either the original equipment manufacturer's (OEM's) warranted specifications or the client's requested specifications. Any number of factors can cause a unit to drift out of tolerance at any time following its calibration. Limitations on the uses of this instrument are detailed in the OEM's operating instructions. This certificate may not be reproduced except in full, without the written approval of Transcat. Additional information, if applicable may be included on separate report(s).


Notes:

ITS-90 Coefficients:
RTPW = 100.7411
a4 = -1.7210228 E-04
b4 = -3.1209104 E-06
a7 = -1.9365012 E-04
b7 = 1.3240651 E-05
c7 = -1.1902672 E-05

Calibrated At:
2056 S. Alex Road
West Carrollton, OH 45449

Facility Responsible:
2056 S. Alex Road
West Carrollton, OH 45449
800-828-1470

Calibrated By:
 Digitally Signed By
Martha Lis
Date: July 13, 2016

Reviewed By:
 Digitally Signed By
Marc Rhoades for
Date: July 14, 2016

Martha Lis
Calibration Technician

Derek Atkinson
Lab Manager

Unit Barcode: 
901B0076175

Date Received: June 21, 2016

TRANSCAT[®] SUPPLEMENTAL REPORT

Trust in every measure CALIBRATION LAB DATA AS FOUND / AS LEFT

Customer: ILLIANA INSTRUMENT
PO Number: 3624

Certificate/SO Number: 15-A7Q2N-20-1 Revision 0

Manufacturer: Hart Scientific/Fluke

Service Type: P9

Model Number: 5626-15-S

Description: Secondary Standard PRT

Serial Number: 0411

Calibration Date: Jul 13, 2016

ID: ITEM 1225

Date Due:

Calibration Procedure: 1-AC14153-4

Description	Setpoints	Accuracy	Low Limit	High Limit	As Found / As Left	Cal Process Measurement		Units	TUR
						O Uncertainty (k=2; ±)	T Uncertainty (k=2; ±)		

Function Check

External Data Verification

P

As Found and As Left Data recorded on July 13, 2016

Temperature 71.0°F / 21.7°C Relative Humidity 45% Temp/RH Asset M1319

The column labeled Cal Process Uncertainty (CPU) does not include the short term component of the UUT. The column labeled Measurement Uncertainty includes both CPU and the short term component of the UUT. TUR is calculated using CPU.
Note: Reported resolution of the UUT does not represent calibration uncertainty or accuracy of the UUT.

Revision 0

Field not applicable. (P = Pass, F = Fail)

Calibration Lab Data Report - Page 1 of 2

Certificate/SO Number: 15-A7Q2N-20-1 Revision 0

F0177R2 03/22/16

TRANSCAT® SUPPLEMENTAL REPORT

Trust in every measure CALIBRATION LAB DATA AS FOUND / AS LEFT

Customer: ILLIANA INSTRUMENT
PO Number: 3624

Certificate/SO Number: 15-A7Q2N-20-1 Revision 0

Asset	Manufacturer	Model	Description	Cal Date	Due Date	Traceability Numbers
31173	Hart Scientific	5916A	Fixed Point Cell - Zn	Apr 15, 2003	Dec 11, 2025	Intrinsic Standard
C251	Fluke	5915A	Fixed Point Cell, Sn	Jul 27, 2000	Jan 23, 2020	6-&C251-1-1
H1108	Guidline Instruments Inc.	9334A-100	Precision Resistor	Dec 03, 2015	Dec 31, 2016	5-&H1108 -5-1
J871	Hart Scientific	5699	SPRT	Oct 02, 2015	Oct 31, 2016	15-&J871-5-2
M1190	Fluke Corporation	742A-100	Resistance Standard, 100 Ohm	Aug 26, 2015	Aug 31, 2016	5-&M1190-25-1
M1195	Hart Scientific	5914	Fixed Point Cell, Indium (In) Freeze Point	Jan 22, 2009	Jan 31, 2019	Intrinsic Standard
M1616	Hart Scientific	5901B-G	Fixed Point Cell, Triple Point of Water	Dec 03, 2012	Dec 31, 2022	5901B-G B-G2559 12-3-12
M1889	Hart Scientific/Fluke	5947	Fixed Point Cell, Aluminum (Al)	Dec 04, 2015	Dec 09, 2025	Intrinsic Standard
M4000	Hart Scientific	1595A	Super Thermometer	Sep 14, 2015	Sep 30, 2016	5-&M4000-2-1
M5000	Hart Scientific/Fluke	1590	Superthermometer	Jul 01, 2015	Jul 31, 2016	5-&M5000-2-1

Remarks

ITS-90 Coefficients:
RTPW = 100.7411
a4 = -1.7210228 E-04
b4 = -3.1209104 E-06
a7 = -1.9365012 E-04
b7 = 1.3240651 E-05
c7 = -1.1902672 E-05

The column labeled Cal Process Uncertainty (CPU) does not include the short term component of the UUT. The column labeled Measurement Uncertainty includes both CPU and the short term component of the UUT. TUR is calculated using CPU.
Note: Reported resolution of the UUT does not represent calibration uncertainty or accuracy of the UUT.

Revision 0

Field not applicable. (P = Pass, F = Fail)

Calibration Lab Data Report - Page 2 of 2

Certificate/SO Number: 15-A7Q2N-20-1 Revision 0

F0177R2 03/22/16

Supplemental Report for 15-A7Q2N-20-1 Calibration Lab Data

INTERNATIONAL TEMPERATURE SCALE OF 1990
Secondary Standard PRT Probe

Model : Hart 5626-15-S
Serial : 0411
Calibration Date : 13 July 2016
Customer : Illiana Instrument

This PRT was calibrated with fixed-point cells and by comparison method to a laboratory standard SPRT/Precision DC Thermometry system at a constant current of 1 mADC. The procedure is based on the technical information contained in NIST Technical Note 1265, "Guidelines for Realizing the International Temperature Scale of 1990 (ITS-90)". The following measurement points and their uncertainties ($k=2$) were used to calibrate the thermometer. All temperature data is in °C.

ITS-90 Fixed Point	Comparison Point Nominal	Comparison Point Actual (Standard)	Measured Resistance (Ohms) UUT	Measurement Uncertainty ($k=2$)
Ar TP	-189.3442	-195.9037	18.8948	2.5 mK
n/a	-80.0000	-80.0000	68.1864	2.0 mK
Hg TP	-38.8344	-38.8355	85.0417	1.4 mK
TPW	0.0100	0.0100	100.7411	0.6 mK
In FP	156.5985	156.5985	162.1614	1.9 mK
Sn FP	231.9280	231.9280	190.6655	2.1 mK
Zn FP	419.5270	419.5270	258.7636	3.5 mK
Al FP	660.3230	660.3230	340.0479	8.6 mK

Note: Data points below 0.010 °C are measured by comparison in LN2 and precision baths and are compared directly to an SPRT.

The following values were determined for the resistance at the triple point of water (RTPW) and the coefficients of the pertinent deviation functions of the ITS-90. The attached interpolation tables were generated using these values. The as found RTPW value was 100.7430 Ohms.

ITS-90 Coefficients:

$$\begin{aligned} \text{RTPW} &= 100.7411 \\ a_4 &= -1.7210228 \text{ E-04} \\ b_4 &= -3.1209104 \text{ E-06} \\ a_7 &= -1.9365012 \text{ E-04} \\ b_7 &= 1.3240651 \text{ E-05} \\ c_7 &= -1.1902672 \text{ E-05} \end{aligned}$$

°C	Resistance	dr/dT	°C	Resistance	dr/dT	°C	Resistance	dr/dT
-196.00	18.8529	0.4358	-129.00	47.7518	0.4221	-62.00	75.5869	0.4097
-195.00	19.2887	0.4362	-128.00	48.1739	0.4219	-61.00	75.9966	0.4096
-194.00	19.7249	0.4365	-127.00	48.5958	0.4216	-60.00	76.4062	0.4094
-193.00	20.1614	0.4368	-126.00	49.0174	0.4214	-59.00	76.8156	0.4093
-192.00	20.5982	0.4370	-125.00	49.4388	0.4211	-58.00	77.2249	0.4092
-191.00	21.0352	0.4372	-124.00	49.8599	0.4209	-57.00	77.6341	0.4090
-190.00	21.4724	0.4373	-123.00	50.2808	0.4207	-56.00	78.0431	0.4089
-189.00	21.9097	0.4374	-122.00	50.7015	0.4204	-55.00	78.4520	0.4087
-188.00	22.3471	0.4374	-121.00	51.1219	0.4202	-54.00	78.8607	0.4086
-187.00	22.7845	0.4374	-120.00	51.5421	0.4200	-53.00	79.2693	0.4085
-186.00	23.2219	0.4374	-119.00	51.9621	0.4198	-52.00	79.6777	0.4083
-185.00	23.6593	0.4373	-118.00	52.3819	0.4195	-51.00	80.0860	0.4082
-184.00	24.0966	0.4372	-117.00	52.8014	0.4193	-50.00	80.4942	0.4080
-183.00	24.5338	0.4371	-116.00	53.2207	0.4191	-49.00	80.9022	0.4079
-182.00	24.9709	0.4370	-115.00	53.6398	0.4189	-48.00	81.3101	0.4078
-181.00	25.4079	0.4368	-114.00	54.0587	0.4187	-47.00	81.7179	0.4076
-180.00	25.8448	0.4367	-113.00	54.4774	0.4185	-46.00	82.1255	0.4075
-179.00	26.2814	0.4365	-112.00	54.8958	0.4183	-45.00	82.5330	0.4074
-178.00	26.7179	0.4363	-111.00	55.3141	0.4180	-44.00	82.9404	0.4072
-177.00	27.1541	0.4360	-110.00	55.7321	0.4178	-43.00	83.3476	0.4071
-176.00	27.5902	0.4358	-109.00	56.1500	0.4176	-42.00	83.7547	0.4070
-175.00	28.0260	0.4355	-108.00	56.5676	0.4174	-41.00	84.1616	0.4068
-174.00	28.4615	0.4353	-107.00	56.9851	0.4172	-40.00	84.5685	0.4067
-173.00	28.8968	0.4350	-106.00	57.4023	0.4170	-39.00	84.9752	0.4066
-172.00	29.3318	0.4347	-105.00	57.8193	0.4168	-38.00	85.3817	0.4064
-171.00	29.7665	0.4345	-104.00	58.2362	0.4167	-37.00	85.7881	0.4063
-170.00	30.2010	0.4342	-103.00	58.6528	0.4165	-36.00	86.1944	0.4062
-169.00	30.6352	0.4339	-102.00	59.0693	0.4163	-35.00	86.6006	0.4060
-168.00	31.0690	0.4336	-101.00	59.4856	0.4161	-34.00	87.0066	0.4059
-167.00	31.5026	0.4333	-100.00	59.9017	0.4159	-33.00	87.4125	0.4058
-166.00	31.9359	0.4330	-99.00	60.3176	0.4157	-32.00	87.8183	0.4056
-165.00	32.3688	0.4326	-98.00	60.7333	0.4155	-31.00	88.2240	0.4055
-164.00	32.8015	0.4323	-97.00	61.1488	0.4153	-30.00	88.6295	0.4054
-163.00	33.2338	0.4320	-96.00	61.5642	0.4152	-29.00	89.0349	0.4053
-162.00	33.6658	0.4317	-95.00	61.9793	0.4150	-28.00	89.4402	0.4051
-161.00	34.0976	0.4314	-94.00	62.3943	0.4148	-27.00	89.8453	0.4050
-160.00	34.5289	0.4311	-93.00	62.8091	0.4146	-26.00	90.2503	0.4049
-159.00	34.9600	0.4308	-92.00	63.2238	0.4145	-25.00	90.6552	0.4048
-158.00	35.3908	0.4304	-91.00	63.6382	0.4143	-24.00	91.0600	0.4046
-157.00	35.8212	0.4301	-90.00	64.0525	0.4141	-23.00	91.4646	0.4045
-156.00	36.2513	0.4298	-89.00	64.4666	0.4139	-22.00	91.8691	0.4044
-155.00	36.6811	0.4295	-88.00	64.8806	0.4138	-21.00	92.2735	0.4043
-154.00	37.1106	0.4292	-87.00	65.2944	0.4136	-20.00	92.6777	0.4041
-153.00	37.5398	0.4289	-86.00	65.7080	0.4134	-19.00	93.0819	0.4040
-152.00	37.9687	0.4286	-85.00	66.1214	0.4133	-18.00	93.4859	0.4039
-151.00	38.3972	0.4282	-84.00	66.5347	0.4131	-17.00	93.8898	0.4038
-150.00	38.8255	0.4279	-83.00	66.9478	0.4129	-16.00	94.2935	0.4036
-149.00	39.2534	0.4276	-82.00	67.3608	0.4128	-15.00	94.6972	0.4035
-148.00	39.6810	0.4273	-81.00	67.7735	0.4126	-14.00	95.1007	0.4034
-147.00	40.1084	0.4270	-80.00	68.1862	0.4125	-13.00	95.5041	0.4033
-146.00	40.5354	0.4267	-79.00	68.5986	0.4123	-12.00	95.9074	0.4031
-145.00	40.9622	0.4264	-78.00	69.0109	0.4121	-11.00	96.3105	0.4030
-144.00	41.3886	0.4262	-77.00	69.4231	0.4120	-10.00	96.7135	0.4029
-143.00	41.8148	0.4259	-76.00	69.8351	0.4118	-9.00	97.1164	0.4028
-142.00	42.2406	0.4256	-75.00	70.2469	0.4117	-8.00	97.5192	0.4027
-141.00	42.6662	0.4253	-74.00	70.6586	0.4115	-7.00	97.9219	0.4025
-140.00	43.0915	0.4250	-73.00	71.0701	0.4114	-6.00	98.3244	0.4024
-139.00	43.5165	0.4247	-72.00	71.4815	0.4112	-5.00	98.7268	0.4023
-138.00	43.9413	0.4245	-71.00	71.8927	0.4111	-4.00	99.1291	0.4022
-137.00	44.3657	0.4242	-70.00	72.3038	0.4109	-3.00	99.5313	0.4020
-136.00	44.7899	0.4239	-69.00	72.7147	0.4108	-2.00	99.9333	0.4019
-135.00	45.2138	0.4237	-68.00	73.1254	0.4106	-1.00	100.3353	0.4018
-134.00	45.6375	0.4234	-67.00	73.5360	0.4105	0.00	100.7371	0.4017
-133.00	46.0609	0.4231	-66.00	73.9465	0.4103	1.00	101.1387	0.4015
-132.00	46.4840	0.4229	-65.00	74.3568	0.4102	2.00	101.5403	0.4014
-131.00	46.9069	0.4226	-64.00	74.7670	0.4100	3.00	101.9417	0.4013
-130.00	47.3295	0.4224	-63.00	75.1770	0.4099	4.00	102.3430	0.4012

°C	Resistance	dr/dT	°C	Resistance	dr/dT	°C	Resistance	dr/dT
5.00	102.7442	0.4011	72.00	129.3457	0.3929	139.00	155.4056	0.3849
6.00	103.1453	0.4009	73.00	129.7387	0.3928	140.00	155.7905	0.3848
7.00	103.5462	0.4008	74.00	130.1315	0.3927	141.00	156.1752	0.3846
8.00	103.9470	0.4007	75.00	130.5241	0.3926	142.00	156.5599	0.3845
9.00	104.3477	0.4006	76.00	130.9167	0.3924	143.00	156.9444	0.3844
10.00	104.7483	0.4004	77.00	131.3091	0.3923	144.00	157.3288	0.3843
11.00	105.1487	0.4003	78.00	131.7014	0.3922	145.00	157.7131	0.3842
12.00	105.5490	0.4002	79.00	132.0936	0.3921	146.00	158.0973	0.3840
13.00	105.9492	0.4001	80.00	132.4857	0.3920	147.00	158.4813	0.3839
14.00	106.3493	0.4000	81.00	132.8777	0.3918	148.00	158.8652	0.3838
15.00	106.7493	0.3998	82.00	133.2695	0.3917	149.00	159.2490	0.3837
16.00	107.1491	0.3997	83.00	133.6612	0.3916	150.00	159.6327	0.3836
17.00	107.5488	0.3996	84.00	134.0528	0.3915	151.00	160.0163	0.3835
18.00	107.9484	0.3995	85.00	134.4443	0.3914	152.00	160.3998	0.3833
19.00	108.3479	0.3993	86.00	134.8356	0.3912	153.00	160.7831	0.3832
20.00	108.7472	0.3992	87.00	135.2269	0.3911	154.00	161.1663	0.3831
21.00	109.1464	0.3991	88.00	135.6180	0.3910	155.00	161.5494	0.3830
22.00	109.5455	0.3990	89.00	136.0090	0.3909	156.00	161.9324	0.3829
23.00	109.9445	0.3989	90.00	136.3998	0.3908	157.00	162.3152	0.3827
24.00	110.3434	0.3987	91.00	136.7906	0.3906	158.00	162.6980	0.3826
25.00	110.7421	0.3986	92.00	137.1812	0.3905	159.00	163.0806	0.3825
26.00	111.1407	0.3985	93.00	137.5717	0.3904	160.00	163.4631	0.3824
27.00	111.5392	0.3984	94.00	137.9621	0.3903	161.00	163.8455	0.3823
28.00	111.9376	0.3982	95.00	138.3524	0.3901	162.00	164.2277	0.3821
29.00	112.3358	0.3981	96.00	138.7425	0.3900	163.00	164.6099	0.3820
30.00	112.7340	0.3980	97.00	139.1326	0.3899	164.00	164.9919	0.3819
31.00	113.1320	0.3979	98.00	139.5225	0.3898	165.00	165.3738	0.3818
32.00	113.5298	0.3978	99.00	139.9123	0.3897	166.00	165.7556	0.3817
33.00	113.9276	0.3976	100.00	140.3019	0.3895	167.00	166.1373	0.3816
34.00	114.3252	0.3975	101.00	140.6915	0.3894	168.00	166.5188	0.3814
35.00	114.7228	0.3974	102.00	141.0809	0.3893	169.00	166.9003	0.3813
36.00	115.1202	0.3973	103.00	141.4702	0.3892	170.00	167.2816	0.3812
37.00	115.5174	0.3972	104.00	141.8594	0.3891	171.00	167.6628	0.3811
38.00	115.9146	0.3970	105.00	142.2485	0.3889	172.00	168.0438	0.3810
39.00	116.3116	0.3969	106.00	142.6374	0.3888	173.00	168.4248	0.3808
40.00	116.7085	0.3968	107.00	143.0263	0.3887	174.00	168.8056	0.3807
41.00	117.1053	0.3967	108.00	143.4150	0.3886	175.00	169.1864	0.3806
42.00	117.5020	0.3965	109.00	143.8036	0.3885	176.00	169.5670	0.3805
43.00	117.8985	0.3964	110.00	144.1920	0.3883	177.00	169.9475	0.3804
44.00	118.2950	0.3963	111.00	144.5804	0.3882	178.00	170.3278	0.3802
45.00	118.6913	0.3962	112.00	144.9686	0.3881	179.00	170.7081	0.3801
46.00	119.0875	0.3961	113.00	145.3567	0.3880	180.00	171.0882	0.3800
47.00	119.4835	0.3959	114.00	145.7447	0.3879	181.00	171.4682	0.3799
48.00	119.8795	0.3958	115.00	146.1326	0.3878	182.00	171.8481	0.3798
49.00	120.2753	0.3957	116.00	146.5203	0.3876	183.00	172.2279	0.3797
50.00	120.6710	0.3956	117.00	146.9080	0.3875	184.00	172.6075	0.3795
51.00	121.0666	0.3955	118.00	147.2955	0.3874	185.00	172.9871	0.3794
52.00	121.4620	0.3953	119.00	147.6829	0.3873	186.00	173.3665	0.3793
53.00	121.8573	0.3952	120.00	148.0701	0.3872	187.00	173.7458	0.3792
54.00	122.2526	0.3951	121.00	148.4573	0.3870	188.00	174.1250	0.3791
55.00	122.6476	0.3950	122.00	148.8443	0.3869	189.00	174.5040	0.3789
56.00	123.0426	0.3949	123.00	149.2312	0.3868	190.00	174.8830	0.3788
57.00	123.4375	0.3947	124.00	149.6180	0.3867	191.00	175.2618	0.3787
58.00	123.8322	0.3946	125.00	150.0047	0.3866	192.00	175.6405	0.3786
59.00	124.2268	0.3945	126.00	150.3912	0.3864	193.00	176.0191	0.3785
60.00	124.6213	0.3944	127.00	150.7777	0.3863	194.00	176.3976	0.3784
61.00	125.0157	0.3942	128.00	151.1640	0.3862	195.00	176.7759	0.3782
62.00	125.4099	0.3941	129.00	151.5502	0.3861	196.00	177.1542	0.3781
63.00	125.8040	0.3940	130.00	151.9363	0.3860	197.00	177.5323	0.3780
64.00	126.1980	0.3939	131.00	152.3222	0.3858	198.00	177.9103	0.3779
65.00	126.5919	0.3938	132.00	152.7081	0.3857	199.00	178.2882	0.3778
66.00	126.9857	0.3936	133.00	153.0938	0.3856	200.00	178.6659	0.3776
67.00	127.3793	0.3935	134.00	153.4794	0.3855	201.00	179.0436	0.3775
68.00	127.7729	0.3934	135.00	153.8649	0.3854	202.00	179.4211	0.3774
69.00	128.1663	0.3933	136.00	154.2502	0.3852	203.00	179.7985	0.3773
70.00	128.5595	0.3932	137.00	154.6355	0.3851	204.00	180.1758	0.3772
71.00	128.9527	0.3930	138.00	155.0206	0.3850	205.00	180.5530	0.3771

°C	Resistance	dr/dT	°C	Resistance	dr/dT	°C	Resistance	dr/dT
206.00	180.9300	0.3769	273.00	205.9254	0.3691	340.00	230.3964	0.3613
207.00	181.3070	0.3768	274.00	206.2945	0.3690	341.00	230.7577	0.3612
208.00	181.6838	0.3767	275.00	206.6634	0.3689	342.00	231.1189	0.3610
209.00	182.0605	0.3766	276.00	207.0323	0.3687	343.00	231.4799	0.3609
210.00	182.4371	0.3765	277.00	207.4010	0.3686	344.00	231.8408	0.3608
211.00	182.8136	0.3764	278.00	207.7696	0.3685	345.00	232.2017	0.3607
212.00	183.1899	0.3762	279.00	208.1381	0.3684	346.00	232.5624	0.3606
213.00	183.5662	0.3761	280.00	208.5065	0.3683	347.00	232.9229	0.3605
214.00	183.9423	0.3760	281.00	208.8748	0.3682	348.00	233.2834	0.3603
215.00	184.3183	0.3759	282.00	209.2429	0.3680	349.00	233.6438	0.3602
216.00	184.6941	0.3758	283.00	209.6110	0.3679	350.00	234.0040	0.3601
217.00	185.0699	0.3756	284.00	209.9789	0.3678	351.00	234.3641	0.3600
218.00	185.4456	0.3755	285.00	210.3467	0.3677	352.00	234.7241	0.3599
219.00	185.8211	0.3754	286.00	210.7144	0.3676	353.00	235.0840	0.3598
220.00	186.1965	0.3753	287.00	211.0820	0.3675	354.00	235.4438	0.3596
221.00	186.5718	0.3752	288.00	211.4494	0.3673	355.00	235.8034	0.3595
222.00	186.9470	0.3751	289.00	211.8167	0.3672	356.00	236.1629	0.3594
223.00	187.3220	0.3749	290.00	212.1840	0.3671	357.00	236.5224	0.3593
224.00	187.6969	0.3748	291.00	212.5511	0.3670	358.00	236.8817	0.3592
225.00	188.0718	0.3747	292.00	212.9180	0.3669	359.00	237.2408	0.3591
226.00	188.4465	0.3746	293.00	213.2849	0.3668	360.00	237.5999	0.3590
227.00	188.8211	0.3745	294.00	213.6517	0.3666	361.00	237.9589	0.3588
228.00	189.1955	0.3744	295.00	214.0183	0.3665	362.00	238.3177	0.3587
229.00	189.5699	0.3742	296.00	214.3848	0.3664	363.00	238.6764	0.3586
230.00	189.9441	0.3741	297.00	214.7512	0.3663	364.00	239.0350	0.3585
231.00	190.3182	0.3740	298.00	215.1175	0.3662	365.00	239.3935	0.3584
232.00	190.6922	0.3739	299.00	215.4837	0.3661	366.00	239.7519	0.3583
233.00	191.0661	0.3738	300.00	215.8497	0.3659	367.00	240.1101	0.3581
234.00	191.4399	0.3736	301.00	216.2157	0.3658	368.00	240.4682	0.3580
235.00	191.8135	0.3735	302.00	216.5815	0.3657	369.00	240.8263	0.3579
236.00	192.1871	0.3734	303.00	216.9472	0.3656	370.00	241.1842	0.3578
237.00	192.5605	0.3733	304.00	217.3128	0.3655	371.00	241.5419	0.3577
238.00	192.9338	0.3732	305.00	217.6783	0.3654	372.00	241.8996	0.3576
239.00	193.3069	0.3731	306.00	218.0436	0.3652	373.00	242.2572	0.3574
240.00	193.6800	0.3729	307.00	218.4089	0.3651	374.00	242.6146	0.3573
241.00	194.0530	0.3728	308.00	218.7740	0.3650	375.00	242.9719	0.3572
242.00	194.4258	0.3727	309.00	219.1390	0.3649	376.00	243.3291	0.3571
243.00	194.7985	0.3726	310.00	219.5039	0.3648	377.00	243.6862	0.3570
244.00	195.1711	0.3725	311.00	219.8686	0.3647	378.00	244.0432	0.3569
245.00	195.5436	0.3724	312.00	220.2333	0.3645	379.00	244.4000	0.3567
246.00	195.9159	0.3722	313.00	220.5978	0.3644	380.00	244.7568	0.3566
247.00	196.2882	0.3721	314.00	220.9623	0.3643	381.00	245.1134	0.3565
248.00	196.6603	0.3720	315.00	221.3266	0.3642	382.00	245.4699	0.3564
249.00	197.0323	0.3719	316.00	221.6908	0.3641	383.00	245.8263	0.3563
250.00	197.4042	0.3718	317.00	222.0548	0.3640	384.00	246.1825	0.3561
251.00	197.7759	0.3717	318.00	222.4188	0.3638	385.00	246.5387	0.3560
252.00	198.1476	0.3715	319.00	222.7826	0.3637	386.00	246.8947	0.3559
253.00	198.5191	0.3714	320.00	223.1464	0.3636	387.00	247.2506	0.3558
254.00	198.8906	0.3713	321.00	223.5100	0.3635	388.00	247.6064	0.3557
255.00	199.2619	0.3712	322.00	223.8735	0.3634	389.00	247.9621	0.3556
256.00	199.6331	0.3711	323.00	224.2368	0.3633	390.00	248.3177	0.3554
257.00	200.0041	0.3710	324.00	224.6001	0.3631	391.00	248.6731	0.3553
258.00	200.3751	0.3708	325.00	224.9632	0.3630	392.00	249.0284	0.3552
259.00	200.7459	0.3707	326.00	225.3263	0.3629	393.00	249.3836	0.3551
260.00	201.1166	0.3706	327.00	225.6892	0.3628	394.00	249.7387	0.3550
261.00	201.4872	0.3705	328.00	226.0520	0.3627	395.00	250.0937	0.3549
262.00	201.8577	0.3704	329.00	226.4147	0.3626	396.00	250.4486	0.3547
263.00	202.2281	0.3703	330.00	226.7772	0.3624	397.00	250.8033	0.3546
264.00	202.5984	0.3701	331.00	227.1397	0.3623	398.00	251.1580	0.3545
265.00	202.9685	0.3700	332.00	227.5020	0.3622	399.00	251.5125	0.3544
266.00	203.3385	0.3699	333.00	227.8642	0.3621	400.00	251.8669	0.3543
267.00	203.7084	0.3698	334.00	228.2263	0.3620	401.00	252.2211	0.3542
268.00	204.0782	0.3697	335.00	228.5883	0.3619	402.00	252.5753	0.3540
269.00	204.4479	0.3696	336.00	228.9501	0.3617	403.00	252.9293	0.3539
270.00	204.8174	0.3694	337.00	229.3119	0.3616	404.00	253.2833	0.3538
271.00	205.1869	0.3693	338.00	229.6735	0.3615	405.00	253.6371	0.3537
272.00	205.5562	0.3692	339.00	230.0350	0.3614	406.00	253.9908	0.3536

°C	Resistance	dr/dT	°C	Resistance	dr/dT	°C	Resistance	dr/dT
407.00	254.3443	0.3535	474.00	277.7651	0.3455	541.00	300.6503	0.3375
408.00	254.6978	0.3533	475.00	278.1107	0.3454	542.00	300.9878	0.3373
409.00	255.0511	0.3532	476.00	278.4561	0.3453	543.00	301.3251	0.3372
410.00	255.4044	0.3531	477.00	278.8014	0.3452	544.00	301.6623	0.3371
411.00	255.7575	0.3530	478.00	279.1466	0.3451	545.00	301.9994	0.3370
412.00	256.1104	0.3529	479.00	279.4916	0.3449	546.00	302.3364	0.3368
413.00	256.4633	0.3528	480.00	279.8366	0.3448	547.00	302.6733	0.3367
414.00	256.8161	0.3526	481.00	280.1814	0.3447	548.00	303.0100	0.3366
415.00	257.1687	0.3525	482.00	280.5261	0.3446	549.00	303.3466	0.3365
416.00	257.5212	0.3524	483.00	280.8706	0.3445	550.00	303.6831	0.3364
417.00	257.8736	0.3523	484.00	281.2151	0.3443	551.00	304.0194	0.3362
418.00	258.2259	0.3522	485.00	281.5594	0.3442	552.00	304.3557	0.3361
419.00	258.5781	0.3520	486.00	281.9037	0.3441	553.00	304.6918	0.3360
420.00	258.9301	0.3519	487.00	282.2478	0.3440	554.00	305.0278	0.3359
421.00	259.2820	0.3518	488.00	282.5917	0.3439	555.00	305.3637	0.3358
422.00	259.6338	0.3517	489.00	282.9356	0.3437	556.00	305.6994	0.3356
423.00	259.9855	0.3516	490.00	283.2793	0.3436	557.00	306.0350	0.3355
424.00	260.3371	0.3515	491.00	283.6230	0.3435	558.00	306.3705	0.3354
425.00	260.6886	0.3513	492.00	283.9665	0.3434	559.00	306.7059	0.3353
426.00	261.0399	0.3512	493.00	284.3098	0.3433	560.00	307.0412	0.3351
427.00	261.3911	0.3511	494.00	284.6531	0.3431	561.00	307.3763	0.3350
428.00	261.7422	0.3510	495.00	284.9962	0.3430	562.00	307.7113	0.3349
429.00	262.0932	0.3509	496.00	285.3393	0.3429	563.00	308.0462	0.3348
430.00	262.4441	0.3508	497.00	285.6822	0.3428	564.00	308.3810	0.3346
431.00	262.7948	0.3506	498.00	286.0249	0.3427	565.00	308.7156	0.3345
432.00	263.1455	0.3505	499.00	286.3676	0.3425	566.00	309.0502	0.3344
433.00	263.4960	0.3504	500.00	286.7101	0.3424	567.00	309.3846	0.3343
434.00	263.8464	0.3503	501.00	287.0526	0.3423	568.00	309.7189	0.3342
435.00	264.1967	0.3502	502.00	287.3949	0.3422	569.00	310.0530	0.3340
436.00	264.5468	0.3500	503.00	287.7370	0.3421	570.00	310.3871	0.3339
437.00	264.8969	0.3499	504.00	288.0791	0.3419	571.00	310.7210	0.3338
438.00	265.2468	0.3498	505.00	288.4210	0.3418	572.00	311.0548	0.3337
439.00	265.5966	0.3497	506.00	288.7628	0.3417	573.00	311.3884	0.3335
440.00	265.9463	0.3496	507.00	289.1045	0.3416	574.00	311.7220	0.3334
441.00	266.2958	0.3495	508.00	289.4461	0.3415	575.00	312.0554	0.3333
442.00	266.6453	0.3493	509.00	289.7876	0.3413	576.00	312.3887	0.3332
443.00	266.9946	0.3492	510.00	290.1289	0.3412	577.00	312.7219	0.3331
444.00	267.3438	0.3491	511.00	290.4701	0.3411	578.00	313.0549	0.3329
445.00	267.6929	0.3490	512.00	290.8112	0.3410	579.00	313.3878	0.3328
446.00	268.0419	0.3489	513.00	291.1522	0.3409	580.00	313.7206	0.3327
447.00	268.3908	0.3487	514.00	291.4931	0.3407	581.00	314.0533	0.3326
448.00	268.7395	0.3486	515.00	291.8338	0.3406	582.00	314.3859	0.3324
449.00	269.0881	0.3485	516.00	292.1744	0.3405	583.00	314.7183	0.3323
450.00	269.4367	0.3484	517.00	292.5149	0.3404	584.00	315.0506	0.3322
451.00	269.7850	0.3483	518.00	292.8553	0.3402	585.00	315.3828	0.3321
452.00	270.1333	0.3481	519.00	293.1955	0.3401	586.00	315.7149	0.3319
453.00	270.4815	0.3480	520.00	293.5356	0.3400	587.00	316.0468	0.3318
454.00	270.8295	0.3479	521.00	293.8756	0.3399	588.00	316.3786	0.3317
455.00	271.1774	0.3478	522.00	294.2155	0.3398	589.00	316.7103	0.3316
456.00	271.5252	0.3477	523.00	294.5553	0.3396	590.00	317.0419	0.3314
457.00	271.8729	0.3476	524.00	294.8949	0.3395	591.00	317.3734	0.3313
458.00	272.2204	0.3474	525.00	295.2345	0.3394	592.00	317.7047	0.3312
459.00	272.5679	0.3473	526.00	295.5739	0.3393	593.00	318.0359	0.3311
460.00	272.9152	0.3472	527.00	295.9131	0.3392	594.00	318.3670	0.3310
461.00	273.2624	0.3471	528.00	296.2523	0.3390	595.00	318.6979	0.3308
462.00	273.6095	0.3470	529.00	296.5913	0.3389	596.00	319.0288	0.3307
463.00	273.9564	0.3468	530.00	296.9303	0.3388	597.00	319.3595	0.3306
464.00	274.3033	0.3467	531.00	297.2691	0.3387	598.00	319.6901	0.3305
465.00	274.6500	0.3466	532.00	297.6077	0.3386	599.00	320.0205	0.3303
466.00	274.9966	0.3465	533.00	297.9463	0.3384	600.00	320.3508	0.3302
467.00	275.3431	0.3464	534.00	298.2847	0.3383	601.00	320.6811	0.3301
468.00	275.6894	0.3462	535.00	298.6230	0.3382	602.00	321.0112	0.3300
469.00	276.0357	0.3461	536.00	298.9612	0.3381	603.00	321.3411	0.3298
470.00	276.3818	0.3460	537.00	299.2993	0.3379	604.00	321.6710	0.3297
471.00	276.7278	0.3459	538.00	299.6372	0.3378	605.00	322.0007	0.3296
472.00	277.0737	0.3458	539.00	299.9750	0.3377	606.00	322.3303	0.3295
473.00	277.4195	0.3457	540.00	300.3128	0.3376	607.00	322.6597	0.3293

°C	Resistance	dr/dT
608.00	322.9891	0.3292
609.00	323.3183	0.3291
610.00	323.6474	0.3290
611.00	323.9764	0.3288
612.00	324.3052	0.3287
613.00	324.6340	0.3286
614.00	324.9626	0.3285
615.00	325.2910	0.3284
616.00	325.6194	0.3282
617.00	325.9476	0.3281
618.00	326.2757	0.3280
619.00	326.6037	0.3279
620.00	326.9316	0.3277
621.00	327.2593	0.3276
622.00	327.5869	0.3275
623.00	327.9144	0.3274
624.00	328.2417	0.3272
625.00	328.5690	0.3271
626.00	328.8961	0.3270
627.00	329.2231	0.3269
628.00	329.5499	0.3267
629.00	329.8767	0.3266
630.00	330.2033	0.3265
631.00	330.5298	0.3264
632.00	330.8561	0.3262
633.00	331.1824	0.3261
634.00	331.5085	0.3260
635.00	331.8345	0.3259
636.00	332.1603	0.3257
637.00	332.4861	0.3256
638.00	332.8117	0.3255
639.00	333.1372	0.3254
640.00	333.4626	0.3252
641.00	333.7878	0.3251
642.00	334.1129	0.3250
643.00	334.4379	0.3249
644.00	334.7628	0.3247
645.00	335.0875	0.3246
646.00	335.4121	0.3245
647.00	335.7366	0.3244
648.00	336.0610	0.3242
649.00	336.3852	0.3241
650.00	336.7094	0.3240
651.00	337.0333	0.3239
652.00	337.3572	0.3237
653.00	337.6810	0.3236
654.00	338.0046	0.3235
655.00	338.3281	0.3234
656.00	338.6514	0.3232
657.00	338.9747	0.3231
658.00	339.2978	0.3230
659.00	339.6208	0.3229
660.00	339.9437	0.3227