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南京时恒电子科技有限公司

Nanjing Shiheng Electronics Co.,Ltd.

产品承认书

APPROVAL SHEET

客户名称 CUSTOMER：	
产品名称 PART NAME：	MF51 玻封测温型 NTC 热敏电阻器 MF51 Series Glass shell NTC Thermistor
产品型号 PART NUMBER：	MF51-103F3950 (B)
版次 REV.NO:	C0
日期 DATE:	2026-9-3

南京时恒电子科技有限公司
NANJING SHIHENG ELECTRONICS CO.,LTD.
地址：南京市江宁区湖熟镇金阳路 18 号
Address: No.18 Jinyang Road Hushu Town Jiangning District Nanjing China
邮编 Postcode：211121
TEL: 025-52121868
Http: //www.shiheng.com.cn E-MAIL: sales@shiheng.com.cn

变更登记表

REVISED RECORD SHEET

版次 REV. NO	变更日期 REV.DATE	变更内容 CHANGE CONTENT	申请人 APPLICANT	批准人 APPROVED
A0	2015/10/11	版本制定。 Version formulation	鞠晓丽	李少媛
B0	2022/4/1	更新规格书版本格式，增加版次管控，细化规格纸。 Update for version form of data sheet, add to management and control for number of edition, refine to PN and draw.	吴迎丽	李少媛
C0	2025/12/01	去掉：产品图纸此一页的变更履历表 Remove: Change history table on this page of the product drawing	刘星月	李少媛

1、产品型号说明 Product model specification

MF51	103	F	3950	(B)
①	②	③	④	⑤

① MF51：玻封测温型 NTC 热敏电阻器系列 (Glass shell NTC Thermistor Series)

② 103：25°C的零功率电阻值 10kΩ (Zero Power Resistance at 25°C is 10kΩ)

③ F：阻值精度代码 E-±0.5% F-±1% G-±2% H-±3% J-±5%（Resistance precision code E-±0.5% F-±1% G-±2% H-±3% J-±5%）

④ 3950：$B_{25/50}$ 值 3950K（$B_{25/50}$:3950K）

⑤ B：外形尺寸代码 (Dimension Code)

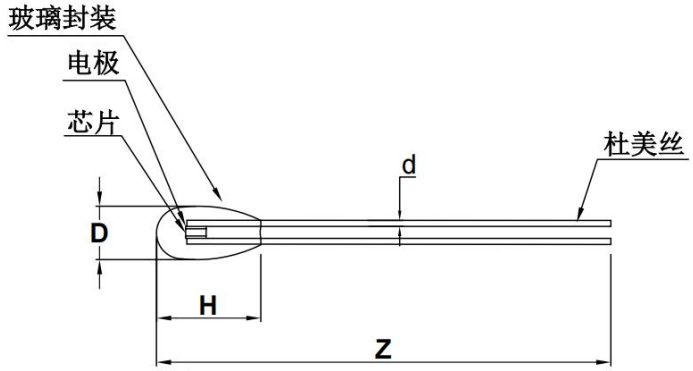
2、电气性能 Electrical Characteristics

No.	项目 Item	符号 Symbol	测试条件 Test conditions	单位 Unit	性能要求 Requirements
2.1	25°C的零功率电阻值 Zero Power Resistance at 25°C	R_{25}	Ta=25±0.01°C (Test Power≤0.1mW)	kΩ	10kΩ±1%
2.2	B 值 B-value	$B_{25/50}$	$B=[(T_a\times T_b)/(T_b-T_a)]\times \ln(R_a/R_b)$ T_a=25±0.01°C T_b=50±0.01°C	K	3950K±1%
2.3	耗散系数 Thermal dissipation Coefficient	δ	静止空气中 In still air	mW/°C	约 0.96
2.4	时间常数 Thermal time constant	τ	静止空气中 In still air	sec	约 9
2.5	工作温度范围 Operating temperature range	/	/	°C	-55 ~ +250
2.6	最大额定功率 Maximum rated power	Pmax	/	mW	35
2.7	阻温特性 R&T-table	/	/	/	见附表 I See attached table I
2.8	阻值误差&温度误差 Resistance tolerance& Temperature tolerance	/	/	/	见附表 II See attached table II

3、产品图纸 Product drawing

产品图纸 Product drawing		客户确认 Customer confirm	客户名称 Customer:			
			确认 Confirm		日期 DATE	
产品型号 MODEL NO.	MF51-103F3950(B)		审核 Approve:		日期 DATE	

尺寸 Dimensions: （Unit：mm）



型号	D （mm）	H （mm）	Z （mm）	d （mm）
MF51-B	1.7±0.25	3.2±0.5	65±5	0.25±0.02

技术要求 Technical requirements:

1) 零功率阻值：R_{25}：10kΩ±1% (Zero Power Resistance: R_{25}：10kΩ±1%)；
2) $B_{25/50}$ 数值：3950K±1% (B-value:$B_{25/50}$: 3950K±1%)；
3) 引线：ϕ0.25 杜镁丝线(Φ0.25 Magnesite wire)
4) 符合 RoHS 环保要求 (Meet environmental protection requirements:RoHS)。

材料规格 Material specifications

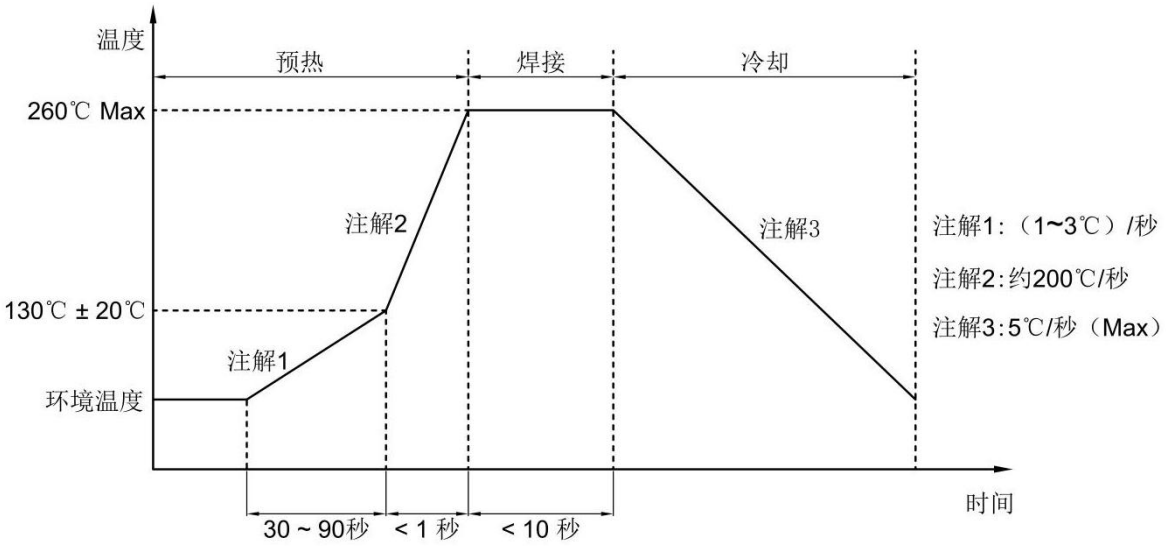
No.	名称 Name	材料规格 Material specifications	数量 Quantity	备注 Note
1	核心元件 Core element	热敏电阻芯片 10kΩ	1	
2	包封类 Coating material	玻壳	1	
3	引线 Lead	杜镁丝线	2	

4、可靠性 Reliability

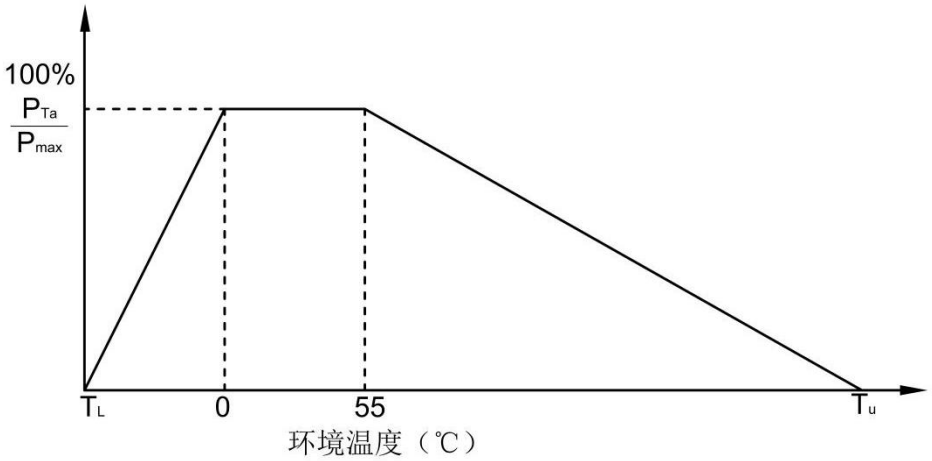
No.	项目 Test Item	试验标准 Test Standard	试验条件及方法 Test Conditions / Methods	性能要求 Acceptance Criteria
4.1	引出端强度 Tensile Strength of Terminals	IEC60068-2-21	固定电阻端，拉力：5N±1 N，时间：10±1 秒 Keep the unit fixed, apply 5±1 N for 10±1 seconds.	无可见性损伤 No Visible damage $\|\Delta R_{25}/R_{25}\|\leqslant 2\%$
4.2	可焊性 Solderability	IEC60068-2-20	温度：245°C±5°C ，时间：2-3 秒 Temperature: 245°C ± 5°C for 2 ~ 3 seconds.	着锡面积≥95% Coverage area≥95%
4.3	耐焊接热 Resistance to Soldering Heat	IEC60068-2-20	锡锅温度：260°C±5°C，浸入深度距电阻体 6mm，时间：5±1 秒 Temperature of solder bath: 260°C ± 5°C, insertion depth: 6 mm from resistor body, duration: 5 ± 1 seconds.	无可见性损伤 No Visible damage $\|\Delta R_{25}/R_{25}\|\leqslant 2\%$
4.4	稳态湿热 Damp heat, Steady State	IEC60068-2-78	温度：40°C±2°C,湿度：93%RH±2%RH,时间：500h Temperature: 40°C ± 2°C, 93% RH ± 2% RH, 500 hrs.	无可见性损伤 No Visible damage $\|\Delta R_{25}/R_{25}\|\leqslant 2\%$
4.5	温度快速变化 Rapid changes of temperature	IEC60068-2-14	以下条件重复 5 个周期 The conditions shown below shall be repeated 5 cycles.	无可见性损伤 No Visible damage $\|\Delta R_{25}/R_{25}\|\leqslant 2\%$
			步骤 Step / 温度 Temperature (°C) / 周期 Period (minutes)	
			1 / -55±5 / 30±3	
			2 / Room Temperature (室温) / 5±3	
			3 / 250±5 / 30±3	
			4 / Room Temperature (室温) / 5±3	
4.6	高温储存 High temperature storage	IEC60068-2-2	温度：250°C±2°C，时间：1000h Temperature: 250°C ± 2°C, Duration: 1000 hrs.	无可见性损伤 No Visible damage $\|\Delta R_{25}/R_{25}\|\leqslant 2\%$
4.7	低温储存 Low temperature storage	IEC60068-2-1	温度：-55°C±2°C，时间：1000h Temperature: –55°C ± 2°C, Duration: 1000 hrs.	无可见性损伤 No Visible damage $\|\Delta R_{25}/R_{25}\|\leqslant 2\%$

▲注： 1）稳态湿热及温度快速变化试验结束后，样品需在常温环境下静置 2 小时后再做性能测试；
▲Note：1）After the test of steady-state humid heat and rapid temperature change, the sample should be kept for 2 hours at room temperature before performance test;
2）高温存储结束后，需随测试环境自然恢复至常温，再取出做性能测试。
2）After the test of high-temperature storage is complete, and then take it out for performance test when the test environment naturally regain to normal temperature.

5、推荐波峰焊曲线 Recommended wave soldering profile



6、降功耗曲线 Power derating curve



例如： 环境温度（T_a）=85°C

最高工作温度（T_U）=250°C

P_{Ta}=（T_U-T_a)/(T_U-55)*P_{max}=84.6%P_{max}

环境温度（T_a）= -10°C

最低工作温度（T_L）= -55°C

P_{Ta}=（T_L-T_a)/(T_L-0)*P_{max}=81.8%P_{max}

7、产品包装 Product packaging

7.1 包装方式 Packing Type

☑ 散装方式 Bulk Type ☐盒装方式 Boxed Type ☐ 盘装方式 Reel Type

7.2 包装规格 Packing specification

No.	包装规格 Packing specification	包装材料、尺寸 Packing material, size	产品数量 Quantity
1	包装袋 Packing bag	热封口袋(Heat sealing bag) W×H＝110mm×130mm	500
2	内包装盒 Inner box	纸箱(Carton) L×W×H=282mm×193mm×72mm	

8、存储&运输要求 Storage & Transportation requirements

8.1 存储环境要求；Storage environment requirements；

8.1.1 储存温度：-10°C～ +40°C；储存湿度：≤75% RH；

Storage temperature: -10°C～ +40°C; storage humidity: ≤75% RH；

8.1.2 避免存放在具有腐蚀性物质及气体的环境中、光照及辐射源的环境下；

Avoid storage in the environment of corrosive substances and gas, light and radiation source；

8.1.3 包装打开后需重新密封保存，贮存期 1 年，超过贮存期，可按本标准规定的项目重新检验，如符合要求仍可使用；

After the package is opened, it should be re-sealed and stored for one year. If the storage period exceeds, it can be retested according to the items specified in this sheet. If it meets the requirements, it can still be used；

8.2 运输要求；Transportation requirements；

8.2.1 存储或运输过程中，产品叠放高度不超过 4 箱产品；

During storage or transportation, the height of stacked products should not exceed the height of 4 boxes；

8.2.2 避免产品在运输过程中强烈碰撞和跌落；

Avoid strong collision and fall during transportation；

8.2.3 产品运输方式不限，但需要避免雨水、雪、冰雹、海水的直接或间接淋袭。

The transportation method is not limited, but the direct or indirect attack of rain, snow, hail and sea water should be avoided.

9、安装&使用注意事项 Installation & Use precautions

9.1 本产品的用途：温度测量与控制；

Usage of this product: Temperature measurement and control；

9.2 本产品适用于常规家用、工业产品上，如果用于特殊设备/装置如：航空航天、深海探测、医疗、军用、新能源电源、铁道交通、消防、交通信号等设备上，请联系我司人员对相应的要求进行确认；

This product is used for conventional household and industrial products. If used in special equipment/device such as: aerospace, deep sea exploration, medical, military, new energy power supply, railway traffic, fire control, traffic signals and other equipment, please contact our staff to confirm the corresponding requirements；

9.3 产品使用的最大工作温度，最大功率等，依照规格书要求作业，不可超出规格书范围；

The maximum working temperature, maximum power, etc. of the product shall be operated in accordance with the requirements of the specification, and shall not exceed the scope of the specification；

9.4 设计使用时，避免过大的电流引起元件自身发热而产生测量误差；

When designing and using, avoid measuring error caused by excessive current；

9.5 产品外观发现变形、破损时，不建议使用，可能会影响产品电气性能；
If the product is deformed or damaged, do not use it. Otherwise, the electrical performance may be affected；
9.6 烙铁焊接时，焊接处距玻壳距离至少 2mm，焊接温度应低于 360°C，焊接时间＜3ses；
When soldering by soldering iron, the distance between the welding place and the glass shell should be at least 2mm, the welding temperature should be lower than 360°C, and the welding time should be less than 3sec；
9.7 如在加工过程中需使用热缩管，热缩管热缩时不可使用电吹风进行吹制，建议热缩工艺，将套好热缩管后的产品放入恒温烘箱中，按 110°C/10～12min 进行热缩；
If the heat shrinkable tube is used in the manufacturing process, do not use a hair dryer to shrink the tube. This is a recommended heat shrinkable process that puts the product covered shrinkable tube into a constant temperature oven, and shrink them at 110°C/10 ~ 12min；
9.8 一般不建议做注塑加工，因为注塑工艺的高温和高压会直接影响产品性能，本产品如果采用注塑工艺加工，需与我司确认具体的注塑工艺参数；
Generally, injection molding is not recommended, because the high temperature and high pressure of injection molding process will directly affect the product performance. If the product is processed by injection molding process, it is necessary to confirm the specific injection molding process parameters with our company；
9.9 产品核心芯片为陶瓷半导体，在使用过程中避免挤压或对玻壳物理撞击，以免造成产品损伤；
The core chip of the product is a ceramic semiconductor. Avoid extrusion or physical impact on the glass shell in the process of use, so as not to cause product damage；
9.10 若引线弯曲时，弯曲点应距玻壳端 2mm 以上，以免造成玻壳损伤；
In case of lead bending,the dot of bending should be above 2mm from glass shell to avoid of damaging for glas s shell；
9.11 对于 MF51 型号的测温型 NTC 热敏电阻器，其均为径向引出线结构，不得将其两引线拉成 180°轴向使用。
For the MF51 Type NTC thermistors, they are all radial lead-out structure, shall not be used to pull its two leads into 180° axial.

10、产品认证 Product certification

No.	项目 Projects	产品认证 Product certification
10.1	质量管理体系认证 Quality Management System Certification	ISO9001:2015
		IATF16949：2016
10.2	环境管理体系认证 Environmental Management System Certification	ISO14001:2015
10.3	知识产权管理体系认证 Intellectual Property Management System Certification	GB/T29490-2023
10.4	环保检测报告 Environmental test report	RoHS 2.0
10.5	UL/cUL 认证（E240991） UL/cUL certificate（E240991）	
10.6	CQC 认证（CQC19001222003） CQC certificate（CQC19001222003）	
10.7	TUV 认证（R50245892） TUV certificate（R50245892）	
10.8		

附表 I Attachment I

南京时恒电子科技有限公司							
R_{25}=10kΩ 精度:±1% $B_{25/50}$=3950K 精度:±1% (P390-7A)							
温度(°C)	电阻(kΩ)			电阻精度(%)		温度精度(°C)	
	最小值	中心值	最大值	△R	-△R	△T	-△T
-55	739.97	781.9	823.82	5.361	-5.361	1.886	-1.886
-54	691.55	730.2	768.85	5.292	-5.292	1.849	-1.849
-53	646.75	682.41	718.07	5.225	-5.225	1.813	-1.813
-52	605.25	638.16	671.08	5.158	-5.158	1.777	-1.777
-51	566.75	597.15	627.55	5.091	-5.091	1.741	-1.741
-50	531	559.1	587.19	5.025	-5.025	1.706	-1.706
-49	497.77	523.75	549.73	4.96	-4.96	1.672	-1.672
-48	466.88	490.91	514.94	4.895	-4.895	1.638	-1.638
-47	438.12	460.37	482.61	4.831	-4.831	1.604	-1.604
-46	411.35	431.95	452.54	4.767	-4.767	1.571	-1.571
-45	386.42	405.5	424.57	4.704	-4.704	1.539	-1.539
-44	363.18	380.86	398.54	4.641	-4.641	1.507	-1.507
-43	341.52	357.91	374.3	4.579	-4.579	1.476	-1.476
-42	321.31	336.52	351.72	4.517	-4.517	1.445	-1.445
-41	302.46	316.57	330.67	4.456	-4.456	1.414	-1.414
-40	284.69	297.78	310.86	4.394	-4.394	1.384	-1.384
-39	268.4	280.57	292.73	4.335	-4.335	1.354	-1.354
-38	253.02	264.33	275.63	4.275	-4.275	1.325	-1.325
-37	238.64	249.14	259.65	4.216	-4.216	1.297	-1.297
-36	225.17	234.94	244.7	4.157	-4.157	1.268	-1.268
-35	212.55	221.63	230.72	4.099	-4.099	1.24	-1.24
-34	200.71	209.17	217.62	4.041	-4.041	1.213	-1.213
-33	189.61	197.47	205.34	3.983	-3.983	1.186	-1.186
-32	179.17	186.5	193.82	3.926	-3.926	1.159	-1.159
-31	169.37	176.19	183.01	3.869	-3.869	1.133	-1.133
-30	160.15	166.5	172.85	3.813	-3.813	1.107	-1.107
-29	151.47	157.38	163.29	3.756	-3.756	1.082	-1.082
-28	143.29	148.8	154.3	3.7	-3.7	1.057	-1.057

-27	135.58	140.71	145.84	3.644	-3.644	1.032	-1.032
-26	128.31	133.09	137.87	3.589	-3.589	1.008	-1.008
-25	121.46	125.91	130.35	3.533	-3.533	0.9844	-0.9844
-24	114.98	119.13	123.27	3.478	-3.478	0.961	-0.961
-23	108.87	112.73	116.59	3.422	-3.422	0.9379	-0.9379
-22	103.09	106.69	110.28	3.367	-3.367	0.9152	-0.9152
-21	97.63	100.98	104.33	3.312	-3.312	0.8928	-0.8928
-20	92.48	95.59	98.7	3.257	-3.257	0.8709	-0.8709
-19	87.6	90.5	93.4	3.203	-3.203	0.8493	-0.8493
-18	82.99	85.69	88.38	3.148	-3.148	0.828	-0.828
-17	78.63	81.14	83.65	3.094	-3.094	0.8071	-0.8071
-16	74.51	76.84	79.18	3.039	-3.039	0.7866	-0.7866
-15	70.61	72.78	74.95	2.985	-2.985	0.7664	-0.7664
-14	66.92	68.94	70.96	2.931	-2.931	0.7466	-0.7466
-13	63.43	65.31	67.19	2.876	-2.876	0.7271	-0.7271
-12	60.14	61.88	63.63	2.823	-2.823	0.7079	-0.7079
-11	57.02	58.64	60.27	2.769	-2.769	0.6891	-0.6891
-10	53.77	55.27	56.77	2.709	-2.709	0.6714	-0.6714
-9	51.28	52.69	54.09	2.662	-2.662	0.6524	-0.6524
-8	48.65	49.95	51.26	2.608	-2.608	0.6345	-0.6345
-7	46.16	47.37	48.58	2.555	-2.555	0.6169	-0.6169
-6	43.8	44.93	46.05	2.502	-2.502	0.5996	-0.5996
-5	41.58	42.62	43.67	2.45	-2.45	0.5827	-0.5827
-4	39.47	40.44	41.41	2.397	-2.397	0.566	-0.566
-3	37.48	38.39	39.29	2.345	-2.345	0.5496	-0.5496
-2	35.6	36.44	37.28	2.293	-2.293	0.5335	-0.5335
-1	33.83	34.6	35.38	2.241	-2.241	0.5177	-0.5177
0	32.15	32.87	33.59	2.19	-2.19	0.5022	-0.5022
1	30.56	31.23	31.89	2.138	-2.138	0.4869	-0.4869
2	29.06	29.68	30.3	2.088	-2.088	0.4719	-0.4719
3	27.64	28.21	28.79	2.037	-2.037	0.4571	-0.4571
4	26.29	26.83	27.36	1.987	-1.987	0.4427	-0.4427
5	25.02	25.52	26.01	1.936	-1.936	0.4284	-0.4284
6	23.82	24.28	24.74	1.887	-1.887	0.4144	-0.4144

7	22.68	23.11	23.53	1.837	-1.837	0.4007	-0.4007
8	21.6	22	22.39	1.788	-1.788	0.3872	-0.3872
9	20.58	20.95	21.31	1.739	-1.739	0.3739	-0.3739
10	19.26	19.59	19.91	1.672	-1.672	0.3668	-0.3668
11	18.71	19.02	19.33	1.643	-1.643	0.3481	-0.3481
12	17.84	18.13	18.42	1.595	-1.595	0.3355	-0.3355
13	17.02	17.29	17.55	1.547	-1.547	0.3232	-0.3232
14	16.24	16.49	16.74	1.5	-1.5	0.311	-0.311
15	15.5	15.73	15.96	1.453	-1.453	0.2991	-0.2991
16	14.8	15.01	15.23	1.406	-1.406	0.2874	-0.2874
17	14.14	14.33	14.53	1.36	-1.36	0.2759	-0.2759
18	13.51	13.69	13.87	1.314	-1.314	0.2646	-0.2646
19	12.91	13.08	13.24	1.268	-1.268	0.2535	-0.2535
20	12.34	12.49	12.65	1.223	-1.223	0.2426	-0.2426
21	11.8	11.94	12.08	1.177	-1.177	0.2319	-0.2319
22	11.29	11.42	11.55	1.133	-1.133	0.2214	-0.2214
23	10.8	10.92	11.04	1.088	-1.088	0.2111	-0.2111
24	10.34	10.45	10.55	1.044	-1.044	0.2009	-0.2009
25	9.9	10	10.1	1	-1	0.191	-0.191
26	9.471	9.571	9.671	1.043	-1.043	0.2007	-0.2007
27	9.063	9.163	9.263	1.087	-1.087	0.2106	-0.2106
28	8.676	8.775	8.874	1.13	-1.13	0.2205	-0.2205
29	8.307	8.405	8.504	1.173	-1.173	0.2304	-0.2304
30	7.955	8.053	8.151	1.216	-1.216	0.2405	-0.2405
31	7.621	7.718	7.815	1.259	-1.259	0.2506	-0.2506
32	7.302	7.398	7.494	1.301	-1.301	0.2608	-0.2608
33	6.998	7.093	7.189	1.343	-1.343	0.271	-0.271
34	6.708	6.803	6.897	1.385	-1.385	0.2813	-0.2813
35	6.432	6.525	6.619	1.426	-1.426	0.2917	-0.2917
36	6.169	6.261	6.353	1.468	-1.468	0.3021	-0.3021
37	5.918	6.009	6.099	1.509	-1.509	0.3126	-0.3126
38	5.678	5.768	5.857	1.55	-1.55	0.3232	-0.3232
39	5.449	5.537	5.626	1.59	-1.59	0.3339	-0.3339
40	5.231	5.318	5.404	1.631	-1.631	0.3446	-0.3446

41	5.022	5.108	5.193	1.671	-1.671	0.3554	-0.3554
42	4.823	4.907	4.991	1.711	-1.711	0.3663	-0.3663
43	4.633	4.715	4.798	1.751	-1.751	0.3772	-0.3772
44	4.451	4.532	4.613	1.791	-1.791	0.3882	-0.3882
45	4.277	4.357	4.437	1.83	-1.83	0.3993	-0.3993
46	4.111	4.189	4.268	1.869	-1.869	0.4104	-0.4104
47	3.952	4.029	4.106	1.908	-1.908	0.4216	-0.4216
48	3.8	3.876	3.951	1.947	-1.947	0.4329	-0.4329
49	3.655	3.729	3.803	1.986	-1.986	0.4443	-0.4443
50	3.516	3.589	3.661	2.024	-2.024	0.4557	-0.4557
51	3.383	3.454	3.525	2.062	-2.062	0.4672	-0.4672
52	3.255	3.325	3.395	2.1	-2.1	0.4788	-0.4788
53	3.134	3.202	3.271	2.138	-2.138	0.4905	-0.4905
54	3.017	3.084	3.151	2.176	-2.176	0.5022	-0.5022
55	2.905	2.971	3.037	2.213	-2.213	0.514	-0.514
56	2.798	2.863	2.927	2.25	-2.25	0.5258	-0.5258
57	2.696	2.759	2.822	2.287	-2.287	0.5378	-0.5378
58	2.598	2.659	2.721	2.324	-2.324	0.5498	-0.5498
59	2.503	2.564	2.625	2.36	-2.36	0.5619	-0.5619
60	2.413	2.473	2.532	2.397	-2.397	0.5741	-0.5741
61	2.327	2.385	2.443	2.433	-2.433	0.5863	-0.5863
62	2.244	2.301	2.358	2.469	-2.469	0.5986	-0.5986
63	2.165	2.22	2.276	2.504	-2.504	0.611	-0.611
64	2.088	2.143	2.197	2.54	-2.54	0.6235	-0.6235
65	2.015	2.069	2.122	2.575	-2.575	0.636	-0.636
66	1.945	1.997	2.05	2.61	-2.61	0.6486	-0.6486
67	1.878	1.929	1.98	2.645	-2.645	0.6613	-0.6613
68	1.814	1.863	1.913	2.68	-2.68	0.6741	-0.6741
69	1.752	1.8	1.849	2.714	-2.714	0.6869	-0.6869
70	1.692	1.74	1.788	2.748	-2.748	0.6998	-0.6998
71	1.635	1.682	1.729	2.782	-2.782	0.7128	-0.7128
72	1.58	1.626	1.672	2.816	-2.816	0.7259	-0.7259
73	1.528	1.572	1.617	2.849	-2.849	0.739	-0.739
74	1.477	1.521	1.565	2.883	-2.883	0.7523	-0.7523

75	1.428	1.471	1.514	2.916	-2.916	0.7655	-0.7655
76	1.382	1.424	1.466	2.949	-2.949	0.7789	-0.7789
77	1.337	1.378	1.419	2.982	-2.982	0.7924	-0.7924
78	1.293	1.334	1.374	3.014	-3.014	0.8059	-0.8059
79	1.252	1.291	1.331	3.046	-3.046	0.8195	-0.8195
80	1.212	1.25	1.289	3.079	-3.079	0.8331	-0.8331
81	1.174	1.211	1.249	3.11	-3.11	0.8469	-0.8469
82	1.137	1.173	1.21	3.142	-3.142	0.8607	-0.8607
83	1.101	1.137	1.173	3.174	-3.174	0.8746	-0.8746
84	1.067	1.102	1.137	3.205	-3.205	0.8886	-0.8886
85	1.043	1.078	1.112	3.227	-3.227	0.9037	-0.9037
86	1.002	1.036	1.07	3.267	-3.267	0.9167	-0.9167
87	0.9717	1.004	1.038	3.298	-3.298	0.9309	-0.9309
88	0.9422	0.9746	1.007	3.328	-3.328	0.9452	-0.9452
89	0.9137	0.9455	0.9772	3.359	-3.359	0.9595	-0.9595
90	0.8863	0.9174	0.9485	3.389	-3.389	0.9739	-0.9739
91	0.8599	0.8903	0.9207	3.419	-3.419	0.9884	-0.9884
92	0.8343	0.8642	0.894	3.449	-3.449	1.003	-1.003
93	0.8097	0.8389	0.8681	3.478	-3.478	1.017	-1.017
94	0.786	0.8146	0.8432	3.508	-3.508	1.032	-1.032
95	0.7631	0.7911	0.819	3.537	-3.537	1.047	-1.047
96	0.7409	0.7684	0.7958	3.566	-3.566	1.061	-1.061
97	0.7196	0.7464	0.7733	3.595	-3.595	1.076	-1.076
98	0.6989	0.7252	0.7515	3.624	-3.624	1.091	-1.091
99	0.679	0.7047	0.7305	3.653	-3.653	1.106	-1.106
100	0.6597	0.685	0.7102	3.681	-3.681	1.122	-1.122
101	0.6411	0.6658	0.6905	3.709	-3.709	1.137	-1.137
102	0.6231	0.6473	0.6715	3.738	-3.738	1.152	-1.152
103	0.6057	0.6294	0.6531	3.766	-3.766	1.167	-1.167
104	0.5888	0.6121	0.6353	3.794	-3.794	1.183	-1.183
105	0.5725	0.5953	0.618	3.821	-3.821	1.198	-1.198
106	0.5568	0.5791	0.6014	3.849	-3.849	1.214	-1.214
107	0.5415	0.5633	0.5852	3.877	-3.877	1.23	-1.23
108	0.5267	0.5481	0.5695	3.904	-3.904	1.245	-1.245

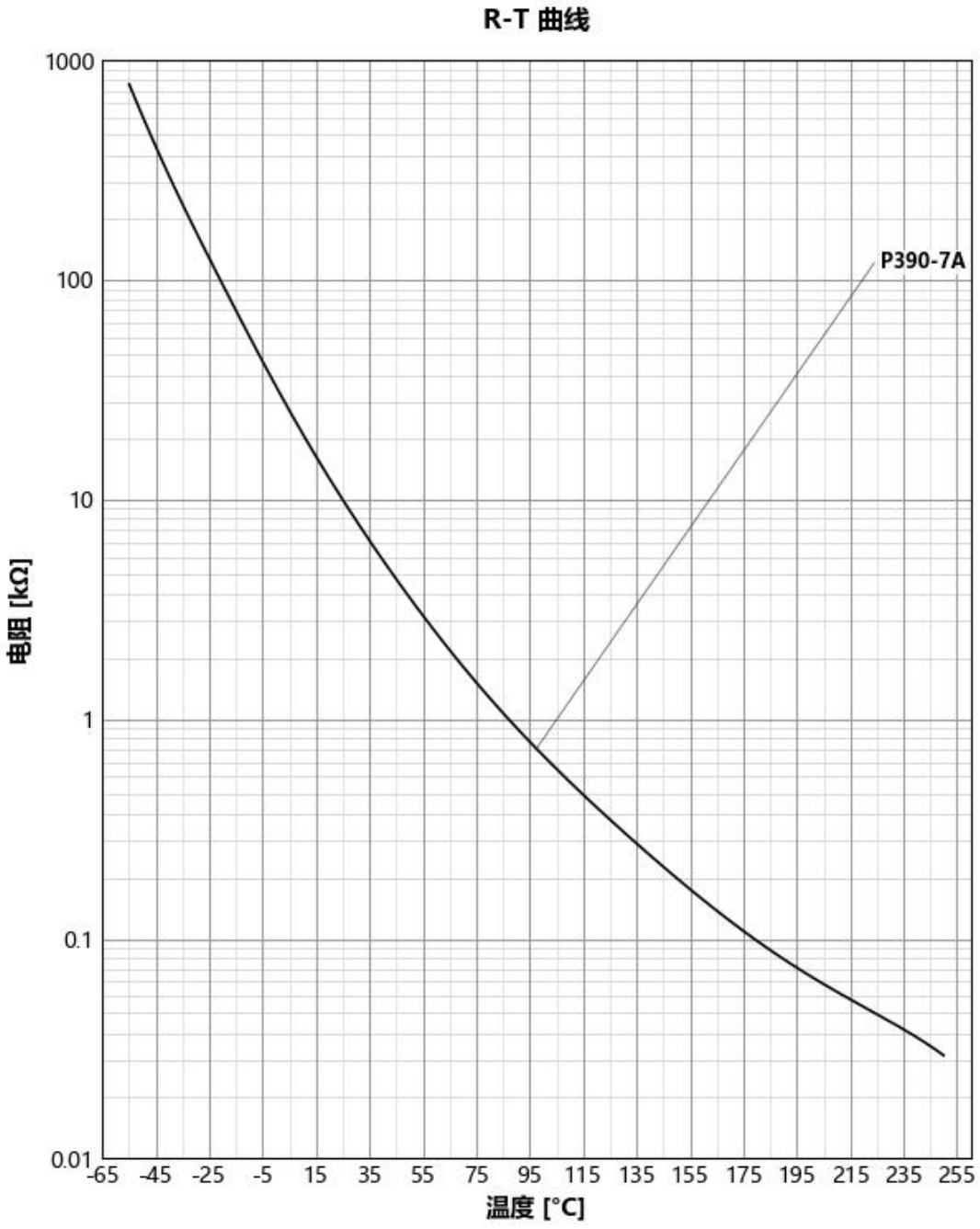
109	0.5124	0.5334	0.5544	3.931	-3.931	1.261	-1.261
110	0.4986	0.5191	0.5397	3.959	-3.959	1.277	-1.277
111	0.4851	0.5053	0.5254	3.986	-3.986	1.293	-1.293
112	0.4721	0.4919	0.5116	4.012	-4.012	1.309	-1.309
113	0.4595	0.4789	0.4982	4.039	-4.039	1.325	-1.325
114	0.4473	0.4662	0.4852	4.066	-4.066	1.341	-1.341
115	0.4354	0.454	0.4726	4.093	-4.093	1.357	-1.357
116	0.4239	0.4422	0.4604	4.119	-4.119	1.373	-1.373
117	0.4128	0.4306	0.4485	4.145	-4.145	1.39	-1.39
118	0.402	0.4195	0.437	4.172	-4.172	1.406	-1.406
119	0.3915	0.4086	0.4258	4.198	-4.198	1.423	-1.423
120	0.3813	0.3981	0.415	4.224	-4.224	1.439	-1.439
121	0.3714	0.3879	0.4044	4.25	-4.25	1.456	-1.456
122	0.3618	0.378	0.3942	4.276	-4.276	1.472	-1.472
123	0.3525	0.3684	0.3842	4.302	-4.302	1.489	-1.489
124	0.3435	0.359	0.3746	4.327	-4.327	1.506	-1.506
125	0.3347	0.35	0.3652	4.353	-4.353	1.523	-1.523
126	0.3262	0.3411	0.3561	4.379	-4.379	1.54	-1.54
127	0.3179	0.3326	0.3472	4.404	-4.404	1.557	-1.557
128	0.3099	0.3242	0.3386	4.43	-4.43	1.574	-1.574
129	0.302	0.3161	0.3302	4.455	-4.455	1.591	-1.591
130	0.2944	0.3083	0.3221	4.48	-4.48	1.608	-1.608
131	0.2871	0.3006	0.3142	4.505	-4.505	1.625	-1.625
132	0.2799	0.2932	0.3065	4.53	-4.53	1.643	-1.643
133	0.2729	0.2859	0.299	4.555	-4.555	1.66	-1.66
134	0.2661	0.2789	0.2917	4.58	-4.58	1.678	-1.678
135	0.2595	0.2721	0.2846	4.605	-4.605	1.695	-1.695
136	0.2531	0.2654	0.2777	4.63	-4.63	1.713	-1.713
137	0.2469	0.259	0.271	4.654	-4.654	1.731	-1.731
138	0.2409	0.2527	0.2645	4.679	-4.679	1.748	-1.748
139	0.235	0.2466	0.2582	4.704	-4.704	1.766	-1.766
140	0.2292	0.2406	0.252	4.728	-4.728	1.784	-1.784
141	0.2237	0.2348	0.246	4.752	-4.752	1.802	-1.802
142	0.2183	0.2292	0.2402	4.777	-4.777	1.82	-1.82

143	0.213	0.2237	0.2345	4.801	-4.801	1.838	-1.838
144	0.2079	0.2184	0.229	4.825	-4.825	1.856	-1.856
145	0.2029	0.2132	0.2236	4.849	-4.849	1.875	-1.875
146	0.198	0.2082	0.2183	4.873	-4.873	1.893	-1.893
147	0.1933	0.2033	0.2132	4.897	-4.897	1.911	-1.911
148	0.1887	0.1985	0.2083	4.921	-4.921	1.93	-1.93
149	0.1843	0.1939	0.2035	4.944	-4.944	1.948	-1.948
150	0.1799	0.1894	0.1988	4.968	-4.968	1.967	-1.967
151	0.1757	0.185	0.1942	4.991	-4.991	1.985	-1.985
152	0.1716	0.1807	0.1897	5.015	-5.015	2.004	-2.004
153	0.1676	0.1765	0.1854	5.038	-5.038	2.023	-2.023
154	0.1637	0.1725	0.1812	5.061	-5.061	2.042	-2.042
155	0.16	0.1685	0.1771	5.084	-5.084	2.061	-2.061
156	0.1563	0.1647	0.1731	5.107	-5.107	2.08	-2.08
157	0.1527	0.161	0.1692	5.13	-5.13	2.099	-2.099
158	0.1492	0.1573	0.1654	5.153	-5.153	2.118	-2.118
159	0.1458	0.1538	0.1618	5.176	-5.176	2.137	-2.137
160	0.1425	0.1504	0.1582	5.199	-5.199	2.157	-2.157
161	0.1393	0.147	0.1547	5.221	-5.221	2.176	-2.176
162	0.1362	0.1438	0.1513	5.243	-5.243	2.196	-2.196
163	0.1332	0.1406	0.148	5.266	-5.266	2.215	-2.215
164	0.1303	0.1375	0.1448	5.288	-5.288	2.235	-2.235
165	0.1274	0.1345	0.1417	5.31	-5.31	2.254	-2.254
166	0.1246	0.1316	0.1386	5.332	-5.332	2.274	-2.274
167	0.1219	0.1288	0.1357	5.354	-5.354	2.294	-2.294
168	0.1192	0.126	0.1328	5.375	-5.375	2.314	-2.314
169	0.1167	0.1233	0.13	5.397	-5.397	2.334	-2.334
170	0.1142	0.1207	0.1273	5.418	-5.418	2.354	-2.354
171	0.1117	0.1182	0.1246	5.44	-5.44	2.374	-2.374
172	0.1094	0.1157	0.122	5.461	-5.461	2.394	-2.394
173	0.1071	0.1133	0.1195	5.482	-5.482	2.415	-2.415
174	0.1048	0.111	0.1171	5.503	-5.503	2.435	-2.435
175	0.1027	0.1087	0.1147	5.524	-5.524	2.455	-2.455
176	0.1006	0.1065	0.1124	5.544	-5.544	2.476	-2.476

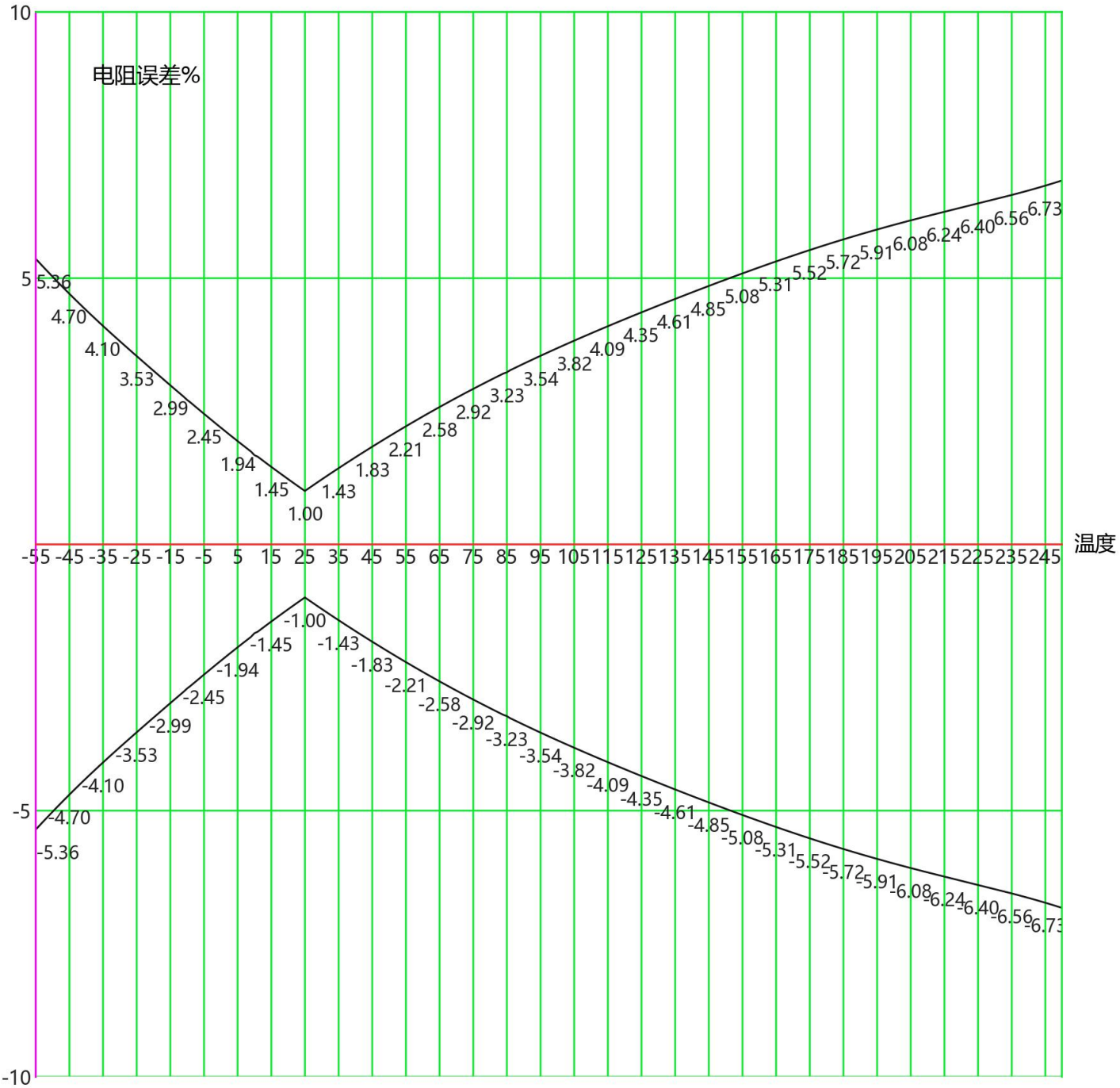
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178	0.0965	0.1022	0.1079	5.585	-5.585	2.517	-2.517
179	0.0945	0.1002	0.1058	5.605	-5.605	2.538	-2.538
180	0.0926	0.0982	0.1037	5.625	-5.625	2.559	-2.559
181	0.0908	0.0962	0.1017	5.645	-5.645	2.58	-2.58
182	0.089	0.0943	0.0997	5.665	-5.665	2.601	-2.601
183	0.0873	0.0925	0.0978	5.685	-5.685	2.622	-2.622
184	0.0856	0.0907	0.0959	5.704	-5.704	2.643	-2.643
185	0.0839	0.089	0.0941	5.724	-5.724	2.664	-2.664
186	0.0823	0.0873	0.0923	5.743	-5.743	2.685	-2.685
187	0.0807	0.0857	0.0906	5.762	-5.762	2.707	-2.707
188	0.0792	0.0841	0.0889	5.781	-5.781	2.728	-2.728
189	0.0777	0.0825	0.0873	5.8	-5.8	2.75	-2.75
190	0.0763	0.081	0.0857	5.818	-5.818	2.771	-2.771
191	0.0748	0.0795	0.0841	5.837	-5.837	2.793	-2.793
192	0.0735	0.078	0.0826	5.855	-5.855	2.815	-2.815
193	0.0721	0.0766	0.0811	5.873	-5.873	2.836	-2.836
194	0.0708	0.0753	0.0797	5.891	-5.891	2.858	-2.858
195	0.0696	0.0739	0.0783	5.909	-5.909	2.88	-2.88
196	0.0683	0.0726	0.0769	5.927	-5.927	2.902	-2.902
197	0.0671	0.0714	0.0756	5.945	-5.945	2.925	-2.925
198	0.0659	0.0701	0.0743	5.962	-5.962	2.947	-2.947
199	0.0648	0.0689	0.0731	5.979	-5.979	2.969	-2.969
200	0.0637	0.0678	0.0718	5.997	-5.997	2.992	-2.992
201	0.0626	0.0666	0.0706	6.014	-6.014	3.014	-3.014
202	0.0615	0.0655	0.0694	6.031	-6.031	3.037	-3.037
203	0.0605	0.0644	0.0683	6.048	-6.048	3.059	-3.059
204	0.0595	0.0633	0.0672	6.064	-6.064	3.082	-3.082
205	0.0585	0.0623	0.0661	6.081	-6.081	3.105	-3.105
206	0.0575	0.0613	0.065	6.097	-6.097	3.127	-3.127
207	0.0566	0.0603	0.0639	6.114	-6.114	3.15	-3.15
208	0.0556	0.0593	0.0629	6.13	-6.13	3.173	-3.173
209	0.0547	0.0583	0.0619	6.146	-6.146	3.196	-3.196
210	0.0539	0.0574	0.0609	6.162	-6.162	3.22	-3.22

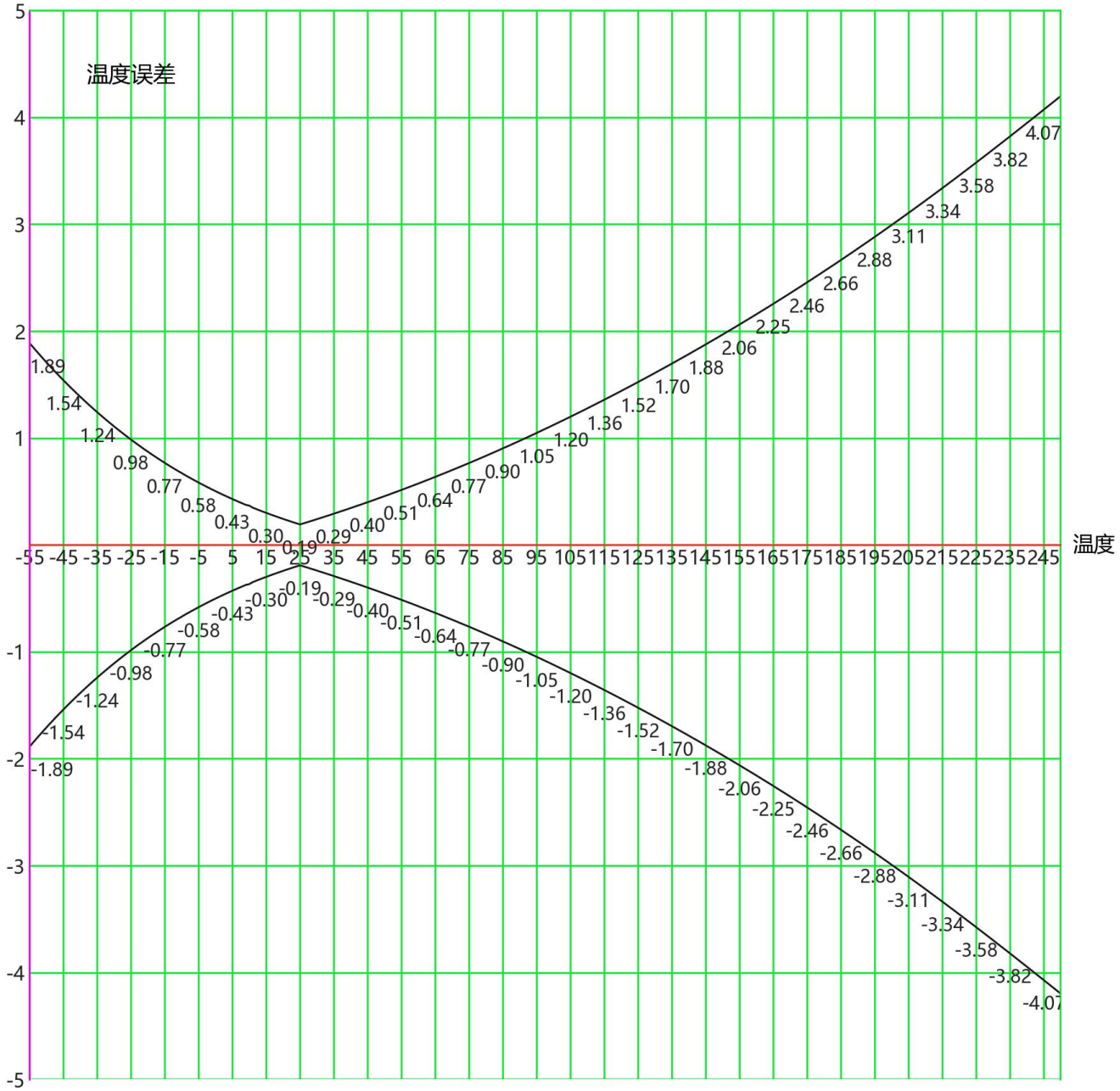
211	0.053	0.0565	0.06	6.179	-6.179	3.243	-3.243
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213	0.0513	0.0547	0.0581	6.21	-6.21	3.289	-3.289
214	0.0505	0.0539	0.0572	6.226	-6.226	3.313	-3.313
215	0.0497	0.053	0.0563	6.242	-6.242	3.336	-3.336
216	0.0489	0.0522	0.0555	6.258	-6.258	3.36	-3.36
217	0.0482	0.0514	0.0546	6.273	-6.273	3.384	-3.384
218	0.0474	0.0506	0.0538	6.289	-6.289	3.407	-3.407
219	0.0467	0.0498	0.053	6.305	-6.305	3.431	-3.431
220	0.0459	0.049	0.0521	6.32	-6.32	3.455	-3.455
221	0.0452	0.0483	0.0513	6.336	-6.336	3.479	-3.479
222	0.0445	0.0475	0.0506	6.351	-6.351	3.503	-3.503
223	0.0438	0.0468	0.0498	6.367	-6.367	3.527	-3.527
224	0.0431	0.0461	0.049	6.382	-6.382	3.551	-3.551
225	0.0425	0.0454	0.0483	6.398	-6.398	3.575	-3.575
226	0.0418	0.0447	0.0475	6.413	-6.413	3.599	-3.599
227	0.0411	0.044	0.0468	6.429	-6.429	3.624	-3.624
228	0.0405	0.0433	0.0461	6.445	-6.445	3.648	-3.648
229	0.0399	0.0426	0.0454	6.461	-6.461	3.673	-3.673
230	0.0392	0.0419	0.0447	6.476	-6.476	3.697	-3.697
231	0.0386	0.0413	0.044	6.492	-6.492	3.722	-3.722
232	0.038	0.0406	0.0433	6.508	-6.508	3.746	-3.746
233	0.0374	0.04	0.0426	6.525	-6.525	3.771	-3.771
234	0.0368	0.0393	0.0419	6.541	-6.541	3.796	-3.796
235	0.0362	0.0387	0.0412	6.557	-6.557	3.82	-3.82
236	0.0356	0.0381	0.0406	6.574	-6.574	3.845	-3.845
237	0.035	0.0374	0.0399	6.591	-6.591	3.87	-3.87
238	0.0344	0.0368	0.0392	6.608	-6.608	3.895	-3.895
239	0.0338	0.0362	0.0386	6.625	-6.625	3.92	-3.92
240	0.0332	0.0356	0.0379	6.642	-6.642	3.945	-3.945
241	0.0326	0.0349	0.0373	6.66	-6.66	3.97	-3.97
242	0.032	0.0343	0.0366	6.677	-6.677	3.995	-3.995
243	0.0314	0.0337	0.036	6.695	-6.695	4.02	-4.02
244	0.0309	0.0331	0.0353	6.714	-6.714	4.045	-4.045

245	0.0303	0.0325	0.0347	6.732	-6.732	4.07	-4.07
246	0.0297	0.0319	0.034	6.751	-6.751	4.096	-4.096
247	0.0291	0.0313	0.0334	6.771	-6.771	4.121	-4.121
248	0.0286	0.0307	0.0327	6.79	-6.79	4.146	-4.146
249	0.028	0.0301	0.0321	6.81	-6.81	4.171	-4.171
250	0.0274	0.0295	0.0315	6.83	-6.83	4.197	-4.197



附表 II Attachment II




温度误差
温度
5
4
3
2
1
-1
-2
-3
-4
-5
-55 -45 -35 -25 -15 -5 5 15 25 35 45 55 65 75 85 95 105 115 125 135 145 155 165 175 185 195 205 215 225 235 245
1.89
1.54
1.24
0.98
0.77
0.58
0.43
0.30
0.19
0.29
0.40
0.51
0.64
0.77
0.90
1.05
1.20
1.36
1.52
1.70
1.88
2.06
2.25
2.46
2.66
2.88
3.11
3.34
3.58
3.82
4.07
-1.89
-1.54
-1.24
-0.98
-0.77
-0.58
-0.43
-0.30
-0.19
-0.29
-0.40
-0.51
-0.64
-0.77
-0.90
-1.05
-1.20
-1.36
-1.52
-1.70
-1.88
-2.06
-2.25
-2.46
-2.66
-2.88
-3.11
-3.34
-3.58
-3.82
-4.07