



建科环能科技有限公司技术报告

## 能隙发热设备测试报告

建科环能科技有限公司

2025年7月





## 能隙发热设备测试报告

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| 主要编制人   | 李 浩                 |  |
| 校 审 人   | 徐昭炜                 |  |
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建科环能科技有限公司

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## 1. 项目概述

佛山市佳汇科技有限公司提供能隙半导体发热片并完成整体设计后，委托东莞市海湃电子有限公司制作能隙发热设备。建科环能科技有限公司受东莞市海湃电子有限公司委托，于2025年7月2日在空调设备检测部（佛山）进行性能测试。

## 2. 能隙发热片原理与发热设备

能隙半导体发热片的发热原理是通过对其施加精准控制的脉冲电压，在内部超高密度的纳米级微结构上诱导产生瞬态的超高电流密度和极端局域化强电场。此强电场驱动载流子的场致激发与能隙跳动，激发的高能载流子通过高效的非辐射弛豫将电能瞬间转化为晶格热能，从而在每个微结构处产生瞬时、超高功率密度的热源。通过精密调控脉冲的“通”（局域极端加热）、“断”（热量向宏观基体扩散）周期，实现宏观目标温度的高效稳定维持，同时避免微观结构因持续过热而损毁。能隙发热片的核心技术是脉冲诱导的纳米尺度超高密度离散热源阵列的协同作用。

能隙发热设备通过电路叠加集成多组能隙发热片实现功率扩展，并在其背面集成高比热容金属肋片阵列构建热管理核心——该肋片结构利用金属高比热容特性在脉冲间歇期存储热能、缓冲温度波动，同时通过增大传热面积将纳米热源产生的瞬时高温高效传递至受热介质。

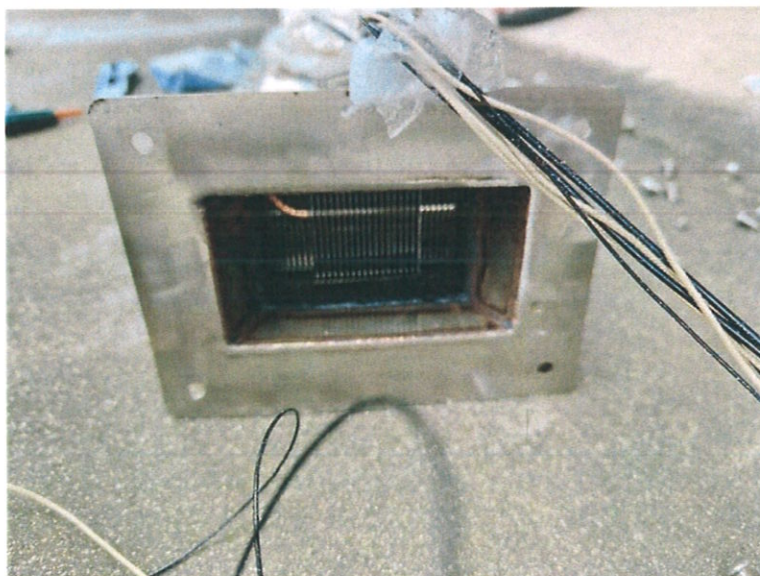


图1 能隙发热设备进风口（尺寸106mm×58mm）



图2 能隙发热设备出风口（尺寸 70mm×50mm）

### 3. 测试方案

#### 3.1 试验工况要求

在焓差实验室测试，控制环境温度 25℃，输入功率与制热量稳定后，取 30min 的平均值为测试结果。

#### 3.2 仪器仪表

| 序号 | 仪器名称           | 仪器编号           | 测量范围             | 最大（相对）示值误差 |
|----|----------------|----------------|------------------|------------|
| 1  | 三相电参数测试仪       | 155-0157337632 | 电参数              | 0.38%      |
| 2  | 大气压力变送器        | 3873950        | (80.0~120.0) kPa | -0.08kPa   |
| 3  | 数据采集器<br>(热电偶) | 91M237897      | (-30~120) °C     | 0.31°C     |
| 4  | 微压差压力变送器       | 91N615978      | (-250~250) Pa    | 0Pa        |
| 5  | 微压差压力变送器       | 91N615979      | (200~1000) Pa    | -0.2Pa     |

#### 3.3 测点布置与测试步骤

在能隙发热设备的进风口和出风口各布置一个温度测试点，空气动力由实验室引风机和送风机共同提供，试验中保持引风机和送风机恒定的输出量，使得出口风量达到 250m<sup>3</sup>/h，设定能隙发热设备 150℃，稳定运行半小时后，记录进出风口温度、电压、电流和输入功率，计算制热量和能效值。

#### 4. 测试过程

2025年7月2日，在建科环能科技有限公司空调设备检测部（佛山）（地址：广东省佛山市三水工业园区C区63号）10#空调及制冷设备检验装置内开展能隙发热设备性能测试。

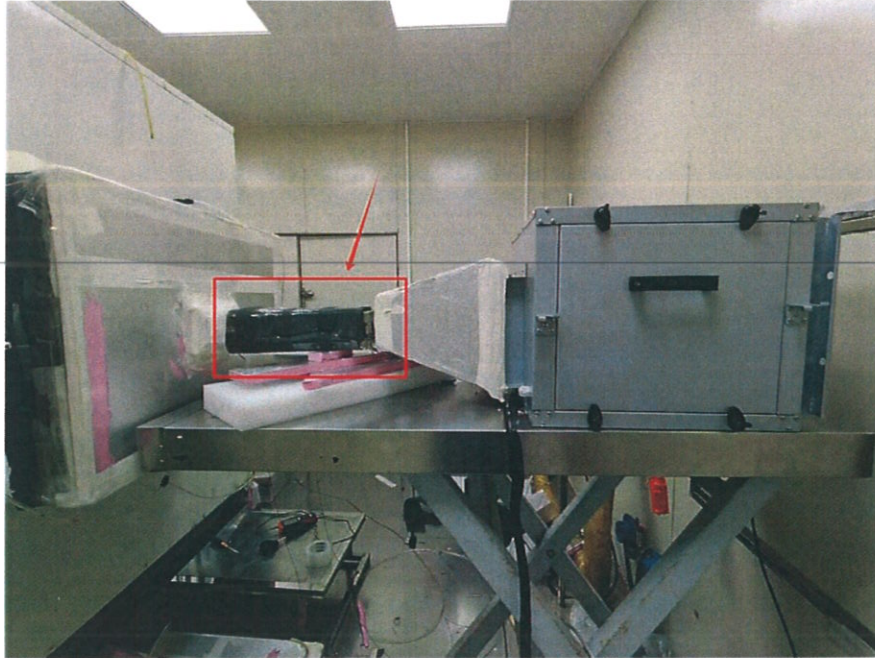


图3 样机安装图

在设定能隙发热设备控制器温度为 150℃时，测试结果如下表所示：

| 使用仪器及编号   |             | 10#空调及制冷设备检验装置 (T-KZ-F-0052)       |                                    |                                    |                                    |                             |                             |                  |                            |
|---|-------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|-----------------------------|-----------------------------|------------------|----------------------------|
| 测试工况  | 制热工况        | 喷嘴尺寸                               |                                    |                                    |                                    | 100mm                       | 70mm                        | 80mm             | 189mm                      |
|   |             | 喷嘴组合                               |                                    |                                    |                                    | /                           | 1                           | /                | /                          |
| 采集次数  | NO1         | NO2                                | NO3                                | NO4                                | NO5                                | NO6                         | NO7                         | 平均值              |                            |
| 采集时间  | 16:57       | 17:02                              | 17:07                              | 17:12                              | 17:17                              | 17:22                       | 17:27                       | /                |                            |
| 大气压力 (kPa)  | 100.6       | 100.6                              | 100.6                              | 100.6                              | 100.6                              | 100.6                       | 100.6                       | 100.6            |                            |
| 室内侧   | 出口静压 (Pa)   | -0.5                               | -0.4                               | -0.7                               | -0.6                               | -0.6                        | -0.6                        | -0.7             | -0.6                       |
|   | 喷嘴压差 (Pa)   | 190.5                              | 190.7                              | 190.8                              | 190.9                              | 190.9                       | 191.0                       | 192.7            | 191.1                      |
|   | 进口干球温度 (℃)  | 27.83                              | 27.69                              | 27.63                              | 27.59                              | 27.56                       | 27.57                       | 27.56            | 27.63                      |
|   | 进口湿球温度 (℃)  | /                                  | /                                  | /                                  | /                                  | /                           | /                           | /                | /                          |
|   | 出口干球温度 (℃)  | 35.12                              | 35.11                              | 35.08                              | 35.02                              | 35.02                       | 35.06                       | 35.05            | 35.06                      |
|   | 出口湿球温度 (℃)  | /                                  | /                                  | /                                  | /                                  | /                           | /                           | /                | /                          |
|   | 喷嘴处干球温度 (℃) | 35.13                              | 35.15                              | 35.13                              | 35.13                              | 35.14                       | 35.21                       | 35.24            | 35.16                      |
|   | 喷嘴处湿球温度 (℃) | 19.21                              | 19.17                              | 19.16                              | 19.14                              | 19.16                       | 19.24                       | 19.36            | 19.21                      |
| 电参数   | 电压 (V)      | 219.9                              | 219.9                              | 219.9                              | 219.9                              | 219.9                       | 219.9                       | 219.9            | 219.9                      |
|   | 电流 (A)      | 3.09                               | 3.29                               | 3.07                               | 3.28                               | 3.36                        | 3.17                        | 3.12             | 3.20                       |
|   | 输入功率 (W)    | 456.59                             | 476.24                             | 397.39                             | 427.85                             | 441.33                      | 412.97                      | 399.99           | 430.3                      |
| 检测结果  | 空气状态        | 室内侧进口空气状态                          |                                    |                                    |                                    | 室内侧出口空气状态                   |                             |                  |                            |
|   | 项目          | 焓值<br>(kJ/kg <sub>干</sub> )        | 含湿量<br>(g/kg <sub>干</sub> )        | 相对湿度<br>(%)                        | 密度<br>(kg/m <sup>3</sup> )         | 焓值<br>(kJ/kg <sub>干</sub> ) | 含湿量<br>(g/kg <sub>干</sub> ) | 相对湿度<br>(%)      | 密度<br>(kg/m <sup>3</sup> ) |
|   | 计算值         | 48.78                              | /                                  | /                                  | 1.16                               | 53.86                       | 7.22                        | 20.36            | 1.13                       |
|   | 空气状态        | 室外侧进口空气状态                          |                                    |                                    |                                    | 室外侧出口空气状态                   |                             |                  |                            |
|   | 项目          | 焓值<br>(kJ/kg <sub>干</sub> )        | 含湿量<br>(g/kg <sub>干</sub> )        | 相对湿度<br>(%)                        | 密度<br>(kg/m <sup>3</sup> )         | 焓值<br>(kJ/kg <sub>干</sub> ) | 含湿量<br>(g/kg <sub>干</sub> ) | 相对湿度<br>(%)      | 密度<br>(kg/m <sup>3</sup> ) |
|   | 计算值         | /                                  | /                                  | /                                  | /                                  | /                           | /                           | /                | /                          |
|   | 项目          | 室内侧<br>实测风量<br>(m <sup>3</sup> /h) | 室内侧<br>标准风量<br>(m <sup>3</sup> /h) | 室外侧<br>实测风量<br>(m <sup>3</sup> /h) | 室外侧<br>标准风量<br>(m <sup>3</sup> /h) | 室内侧<br>冷/热量<br>(W)          | 能效比<br>(W/W)                | 显冷/热<br>量<br>(W) | 显冷/热<br>比(W/W)             |
|   | 计算值         | 250                                | 237                                | /                                  | /                                  | 590                         | 1.38                        | /                | /                          |
|   | 备注：         |                                    |                                    |                                    |                                    |                             |                             |                  |                            |
| 1、表中室内侧空气参数和电参数为 5min 平均值。  |             |                                    |                                    |                                    |                                    |                             |                             |                  |                            |
| 2、根据计量证书，进风温度修正公式 $y=1.0014x-0.1426$ ，出风温度修正公式 $y=1.0009x-0.1285$ 。 |             |                                    |                                    |                                    |                                    |                             |                             |                  |                            |

## 5.测试结果

设定能隙发热模块控制器温度为 150℃，风量为 250 m<sup>3</sup>/h 时，能隙发热设备的出风温度为 35.06 ℃，制热量为 590 W，输入功率为 430.3 W，制热性能系数为 1.38 W/W。

附件 1 测试过程中采集历史数据

| 测试时间              | 电源电压   | 电流   | 输入功率    | 功率因数 | 电源频率  | 进风温度  | 出风温度  |
|-------------------|--------|------|---------|------|-------|-------|-------|
|                   | V      | A    | W       | -    | HZ    | °C    | °C    |
| 25-07-02 16:53:02 | 219.49 | 6.54 | 983.75  | 0.60 | 49.99 | 27.95 | 34.73 |
| 25-07-02 16:53:07 | 219.50 | 6.75 | 1025.95 | 0.62 | 49.99 | 27.98 | 34.68 |
| 25-07-02 16:53:12 | 220.00 | 2.25 | 323.02  | 0.58 | 49.99 | 28.03 | 34.90 |
| 25-07-02 16:53:17 | 219.92 | 2.53 | 332.21  | 0.54 | 49.99 | 27.98 | 35.25 |
| 25-07-02 16:53:22 | 220.18 | 0.25 | 69.75   | 0.31 | 50.00 | 27.95 | 35.55 |
| 25-07-02 16:53:27 | 220.20 | 0.44 | 86.27   | 0.36 | 50.00 | 27.98 | 35.45 |
| 25-07-02 16:53:32 | 219.85 | 3.76 | 486.42  | 0.59 | 49.99 | 28.05 | 35.28 |
| 25-07-02 16:53:37 | 219.60 | 6.41 | 954.42  | 0.56 | 49.99 | 27.98 | 35.00 |
| 25-07-02 16:53:42 | 219.67 | 5.28 | 763.51  | 0.55 | 49.99 | 28.03 | 34.90 |
| 25-07-02 16:53:47 | 219.58 | 5.92 | 860.88  | 0.54 | 50.00 | 27.90 | 35.15 |
| 25-07-02 16:53:52 | 219.83 | 3.40 | 499.23  | 0.57 | 49.99 | 27.95 | 35.35 |
| 25-07-02 16:53:57 | 220.21 | 0.25 | 69.75   | 0.35 | 49.99 | 27.93 | 35.45 |
| 25-07-02 16:54:02 | 220.20 | 0.24 | 69.75   | 0.36 | 49.99 | 27.93 | 35.43 |
| 25-07-02 16:54:07 | 219.64 | 5.43 | 758.06  | 0.56 | 49.99 | 27.90 | 35.18 |
| 25-07-02 16:54:12 | 219.68 | 5.15 | 758.05  | 0.53 | 50.00 | 27.93 | 34.90 |
| 25-07-02 16:54:17 | 219.71 | 3.57 | 502.94  | 0.53 | 50.00 | 27.85 | 34.80 |
| 25-07-02 16:54:22 | 219.69 | 4.80 | 704.85  | 0.51 | 49.99 | 27.98 | 35.18 |
| 25-07-02 16:54:27 | 219.83 | 4.52 | 653.44  | 0.50 | 50.00 | 27.95 | 35.38 |
| 25-07-02 16:54:32 | 220.20 | 0.24 | 71.59   | 0.36 | 50.00 | 27.90 | 35.55 |
| 25-07-02 16:54:37 | 220.21 | 0.24 | 69.75   | 0.37 | 49.99 | 28.10 | 35.70 |
| 25-07-02 16:54:42 | 220.08 | 1.12 | 157.85  | 0.37 | 49.99 | 27.90 | 35.30 |
| 25-07-02 16:54:47 | 219.40 | 7.49 | 1139.84 | 0.63 | 49.99 | 27.93 | 34.98 |
| 25-07-02 16:54:52 | 219.69 | 5.28 | 756.23  | 0.61 | 49.99 | 27.98 | 34.73 |
| 25-07-02 16:54:57 | 219.86 | 3.16 | 453.31  | 0.60 | 49.99 | 27.98 | 34.85 |
| 25-07-02 16:55:02 | 219.93 | 3.33 | 482.68  | 0.51 | 49.99 | 27.98 | 35.43 |
| 25-07-02 16:55:07 | 220.19 | 0.24 | 69.74   | 0.36 | 49.99 | 27.90 | 35.55 |
| 25-07-02 16:55:12 | 220.20 | 0.24 | 69.74   | 0.36 | 49.99 | 28.03 | 35.68 |
| 25-07-02 16:55:17 | 220.07 | 1.55 | 220.24  | 0.36 | 49.99 | 27.90 | 35.50 |
| 25-07-02 16:55:22 | 219.59 | 5.36 | 752.47  | 0.56 | 49.99 | 27.90 | 34.93 |
| 25-07-02 16:55:27 | 219.53 | 5.76 | 816.66  | 0.63 | 49.99 | 27.93 | 34.75 |
| 25-07-02 16:55:32 | 219.91 | 3.19 | 455.18  | 0.57 | 49.99 | 27.98 | 34.88 |
| 25-07-02 16:55:37 | 219.94 | 3.29 | 446.02  | 0.52 | 50.00 | 27.95 | 35.18 |
| 25-07-02 16:55:42 | 220.22 | 0.24 | 69.75   | 0.36 | 49.99 | 27.98 | 35.75 |
| 25-07-02 16:55:47 | 220.21 | 0.24 | 69.75   | 0.37 | 50.00 | 27.95 | 35.75 |
| 25-07-02 16:55:52 | 220.21 | 0.24 | 69.75   | 0.36 | 50.00 | 27.98 | 35.50 |
| 25-07-02 16:55:57 | 219.40 | 7.31 | 1092.15 | 0.60 | 50.00 | 27.88 | 35.18 |
| 25-07-02 16:56:02 | 219.67 | 5.40 | 796.58  | 0.60 | 50.00 | 27.93 | 34.68 |

| 测试时间              | 电源电压   | 电流   | 输入功率    | 功率因数 | 电源频率  | 进风温度  | 出风温度  |
|-------------------|--------|------|---------|------|-------|-------|-------|
|                   | V      | A    | W       | -    | HZ    | °C    | °C    |
| 25-07-02 16:56:07 | 219.99 | 2.51 | 361.58  | 0.61 | 49.99 | 27.98 | 34.83 |
| 25-07-02 16:56:12 | 219.85 | 3.12 | 449.67  | 0.53 | 49.99 | 27.90 | 35.10 |
| 25-07-02 16:56:17 | 219.90 | 3.18 | 462.54  | 0.56 | 50.00 | 27.85 | 35.28 |
| 25-07-02 16:56:22 | 220.15 | 0.27 | 69.75   | 0.44 | 49.99 | 27.90 | 35.55 |
| 25-07-02 16:56:27 | 220.19 | 0.24 | 69.75   | 0.36 | 49.99 | 27.90 | 35.58 |
| 25-07-02 16:56:32 | 220.17 | 1.25 | 163.35  | 0.45 | 49.99 | 27.98 | 35.43 |
| 25-07-02 16:56:37 | 219.66 | 5.66 | 818.61  | 0.63 | 49.99 | 27.95 | 35.03 |
| 25-07-02 16:56:42 | 219.58 | 5.53 | 811.23  | 0.59 | 49.99 | 27.88 | 34.83 |
| 25-07-02 16:56:47 | 219.92 | 2.97 | 387.27  | 0.58 | 49.99 | 27.93 | 35.10 |
| 25-07-02 16:56:52 | 220.05 | 1.80 | 245.95  | 0.49 | 50.00 | 27.98 | 35.43 |
| 25-07-02 16:56:57 | 220.20 | 0.24 | 71.59   | 0.36 | 50.00 | 27.93 | 35.75 |
| 25-07-02 16:57:02 | 220.20 | 0.24 | 69.75   | 0.37 | 49.99 | 27.98 | 35.70 |
| 25-07-02 16:57:07 | 220.18 | 0.71 | 132.15  | 0.36 | 50.00 | 27.90 | 35.43 |
| 25-07-02 16:57:12 | 219.54 | 6.19 | 925.05  | 0.62 | 49.99 | 27.95 | 35.08 |
| 25-07-02 16:57:17 | 219.65 | 5.41 | 780.03  | 0.65 | 49.99 | 27.90 | 34.73 |
| 25-07-02 16:57:22 | 219.96 | 2.87 | 401.97  | 0.61 | 49.99 | 27.93 | 34.85 |
| 25-07-02 16:57:27 | 219.96 | 2.95 | 400.13  | 0.55 | 50.00 | 27.88 | 35.13 |
| 25-07-02 16:57:32 | 219.87 | 4.34 | 620.36  | 0.58 | 49.99 | 27.88 | 35.38 |
| 25-07-02 16:57:37 | 220.21 | 0.24 | 69.75   | 0.36 | 49.99 | 27.88 | 35.55 |
| 25-07-02 16:57:42 | 220.22 | 0.24 | 71.59   | 0.36 | 50.00 | 27.93 | 35.55 |
| 25-07-02 16:57:47 | 219.79 | 3.59 | 513.89  | 0.50 | 49.99 | 27.85 | 35.30 |
| 25-07-02 16:57:52 | 219.54 | 6.06 | 890.18  | 0.62 | 49.99 | 27.80 | 34.95 |
| 25-07-02 16:57:57 | 219.75 | 4.65 | 647.96  | 0.62 | 50.00 | 27.83 | 34.80 |
| 25-07-02 16:58:02 | 219.82 | 4.11 | 611.23  | 0.60 | 50.00 | 27.80 | 35.08 |
| 25-07-02 16:58:07 | 220.06 | 1.71 | 244.11  | 0.53 | 49.99 | 27.80 | 35.35 |
| 25-07-02 16:58:12 | 220.19 | 0.24 | 71.58   | 0.33 | 49.99 | 27.78 | 35.55 |
| 25-07-02 16:58:17 | 220.20 | 0.24 | 71.58   | 0.36 | 49.99 | 27.78 | 35.65 |
| 25-07-02 16:58:22 | 219.88 | 3.85 | 548.77  | 0.43 | 49.99 | 27.73 | 35.23 |
| 25-07-02 16:58:27 | 219.59 | 5.84 | 877.39  | 0.52 | 50.00 | 27.78 | 34.90 |
| 25-07-02 16:58:32 | 219.79 | 4.82 | 697.52  | 0.57 | 50.00 | 27.80 | 34.80 |
| 25-07-02 16:58:37 | 219.75 | 5.00 | 712.15  | 0.57 | 49.99 | 27.85 | 34.90 |
| 25-07-02 16:58:42 | 219.89 | 3.47 | 495.57  | 0.53 | 50.00 | 27.93 | 35.45 |
| 25-07-02 16:58:47 | 220.21 | 0.24 | 69.75   | 0.36 | 50.00 | 27.93 | 35.70 |
| 25-07-02 16:58:52 | 220.20 | 0.24 | 69.75   | 0.37 | 49.99 | 27.70 | 35.75 |
| 25-07-02 16:58:57 | 220.21 | 0.24 | 69.75   | 0.36 | 50.00 | 27.85 | 35.60 |
| 25-07-02 16:59:02 | 219.55 | 6.54 | 969.14  | 0.61 | 49.99 | 27.73 | 34.95 |
| 25-07-02 16:59:07 | 219.49 | 6.88 | 1046.24 | 0.60 | 50.00 | 27.85 | 34.73 |
| 25-07-02 16:59:12 | 219.60 | 5.98 | 873.68  | 0.57 | 49.99 | 27.85 | 34.73 |
| 25-07-02 16:59:17 | 219.86 | 3.02 | 444.16  | 0.56 | 49.99 | 27.78 | 34.98 |

| 测试时间              | 电源电压   | 电流   | 输入功率    | 功率因数 | 电源频率  | 进风温度  | 出风温度  |
|-------------------|--------|------|---------|------|-------|-------|-------|
|                   | V      | A    | W       | -    | HZ    | °C    | °C    |
| 25-07-02 16:59:22 | 220.06 | 1.20 | 163.35  | 0.52 | 49.99 | 27.75 | 35.55 |
| 25-07-02 16:59:27 | 220.18 | 0.24 | 71.59   | 0.36 | 50.00 | 27.65 | 35.58 |
| 25-07-02 16:59:32 | 220.20 | 0.24 | 71.58   | 0.36 | 49.99 | 27.73 | 35.50 |
| 25-07-02 16:59:37 | 219.55 | 6.14 | 902.94  | 0.65 | 49.99 | 27.78 | 35.25 |
| 25-07-02 16:59:42 | 219.88 | 3.64 | 526.73  | 0.60 | 49.99 | 27.85 | 34.75 |
| 25-07-02 16:59:47 | 219.76 | 4.38 | 609.36  | 0.64 | 49.99 | 27.70 | 34.80 |
| 25-07-02 16:59:52 | 219.76 | 4.66 | 673.59  | 0.55 | 49.99 | 27.80 | 35.03 |
| 25-07-02 16:59:57 | 220.11 | 1.83 | 251.46  | 0.50 | 50.00 | 27.83 | 35.30 |
| 25-07-02 17:00:02 | 220.20 | 0.24 | 69.75   | 0.37 | 49.99 | 27.75 | 35.65 |
| 25-07-02 17:00:07 | 220.20 | 0.24 | 69.75   | 0.36 | 50.00 | 27.75 | 35.58 |
| 25-07-02 17:00:12 | 219.96 | 2.19 | 312.05  | 0.41 | 50.00 | 27.78 | 35.35 |
| 25-07-02 17:00:17 | 219.46 | 7.41 | 1108.64 | 0.63 | 50.00 | 27.75 | 34.98 |
| 25-07-02 17:00:22 | 219.66 | 5.40 | 800.32  | 0.63 | 50.00 | 27.78 | 34.68 |
| 25-07-02 17:00:27 | 219.67 | 5.27 | 761.71  | 0.60 | 50.00 | 27.88 | 34.95 |
| 25-07-02 17:00:32 | 219.77 | 4.80 | 690.14  | 0.54 | 50.00 | 27.85 | 35.25 |
| 25-07-02 17:00:37 | 220.19 | 0.24 | 69.75   | 0.37 | 49.99 | 27.93 | 35.48 |
| 25-07-02 17:00:42 | 220.20 | 0.24 | 69.74   | 0.36 | 49.99 | 27.85 | 35.68 |
| 25-07-02 17:00:47 | 220.22 | 0.24 | 69.74   | 0.35 | 49.99 | 27.75 | 35.43 |
| 25-07-02 17:00:52 | 219.57 | 6.31 | 956.20  | 0.59 | 49.99 | 27.78 | 35.08 |
| 25-07-02 17:00:57 | 219.54 | 6.38 | 915.85  | 0.57 | 49.99 | 27.83 | 34.80 |
| 25-07-02 17:01:02 | 219.55 | 6.89 | 1014.97 | 0.63 | 49.99 | 27.80 | 34.80 |
| 25-07-02 17:01:07 | 219.81 | 3.62 | 491.87  | 0.59 | 49.99 | 27.80 | 35.00 |
| 25-07-02 17:01:12 | 219.78 | 3.98 | 585.47  | 0.49 | 49.99 | 27.73 | 35.30 |
| 25-07-02 17:01:17 | 220.17 | 0.24 | 69.75   | 0.36 | 49.99 | 27.83 | 35.55 |
| 25-07-02 17:01:22 | 220.20 | 0.24 | 69.74   | 0.36 | 49.99 | 27.78 | 35.55 |
| 25-07-02 17:01:27 | 219.98 | 2.13 | 310.20  | 0.35 | 50.00 | 27.88 | 35.30 |
| 25-07-02 17:01:32 | 219.62 | 5.76 | 860.87  | 0.61 | 50.00 | 27.73 | 34.98 |
| 25-07-02 17:01:37 | 219.68 | 5.10 | 743.45  | 0.65 | 50.00 | 27.80 | 34.73 |
| 25-07-02 17:01:42 | 219.78 | 4.27 | 614.92  | 0.48 | 50.00 | 27.73 | 34.98 |
| 25-07-02 17:01:47 | 219.70 | 4.94 | 710.31  | 0.61 | 49.99 | 27.85 | 35.30 |
| 25-07-02 17:01:52 | 220.17 | 0.66 | 60.57   | 0.45 | 49.99 | 27.85 | 35.55 |
| 25-07-02 17:01:57 | 220.19 | 0.24 | 11.01   | 0.05 | 49.99 | 27.80 | 35.73 |
| 25-07-02 17:02:02 | 220.20 | 0.24 | 12.85   | 0.07 | 49.99 | 27.78 | 35.45 |
| 25-07-02 17:02:07 | 219.73 | 4.64 | 622.14  | 0.48 | 49.99 | 27.83 | 35.15 |
| 25-07-02 17:02:12 | 219.45 | 6.95 | 980.09  | 0.58 | 49.99 | 27.93 | 34.83 |
| 25-07-02 17:02:17 | 219.57 | 5.67 | 761.70  | 0.50 | 49.99 | 27.68 | 34.60 |
| 25-07-02 17:02:22 | 219.75 | 4.57 | 596.55  | 0.57 | 50.00 | 27.75 | 34.93 |
| 25-07-02 17:02:27 | 219.72 | 4.71 | 611.23  | 0.53 | 50.00 | 27.83 | 35.23 |
| 25-07-02 17:02:32 | 220.19 | 1.11 | 95.44   | 0.46 | 50.00 | 27.75 | 35.50 |

| 测试时间              | 电源电压   | 电流   | 输入功率   | 功率因数 | 电源频率  | 进风温度  | 出风温度  |
|-------------------|--------|------|--------|------|-------|-------|-------|
|                   | V      | A    | W      | -    | HZ    | °C    | °C    |
| 25-07-02 17:02:37 | 220.20 | 0.24 | 11.01  | 0.07 | 49.99 | 27.70 | 35.65 |
| 25-07-02 17:02:42 | 220.20 | 0.24 | 9.18   | 0.08 | 49.99 | 27.75 | 35.45 |
| 25-07-02 17:02:47 | 219.59 | 5.70 | 767.23 | 0.52 | 49.99 | 27.68 | 35.13 |
| 25-07-02 17:02:52 | 219.54 | 6.34 | 860.82 | 0.57 | 49.99 | 27.73 | 34.80 |
| 25-07-02 17:02:57 | 219.63 | 5.17 | 666.16 | 0.54 | 49.99 | 27.80 | 34.68 |
| 25-07-02 17:03:02 | 219.81 | 4.48 | 576.23 | 0.51 | 49.99 | 27.75 | 35.10 |
| 25-07-02 17:03:07 | 219.91 | 3.04 | 350.52 | 0.53 | 49.99 | 27.70 | 35.38 |
| 25-07-02 17:03:12 | 220.18 | 0.24 | 11.01  | 0.07 | 49.99 | 27.70 | 35.63 |
| 25-07-02 17:03:17 | 220.20 | 0.24 | 9.18   | 0.08 | 49.99 | 27.78 | 35.73 |
| 25-07-02 17:03:22 | 220.20 | 0.24 | 11.01  | 0.06 | 49.99 | 27.75 | 35.35 |
| 25-07-02 17:03:27 | 219.45 | 6.79 | 959.86 | 0.53 | 49.99 | 27.75 | 34.98 |
| 25-07-02 17:03:32 | 219.57 | 5.64 | 737.77 | 0.54 | 49.99 | 27.85 | 34.63 |
| 25-07-02 17:03:37 | 219.70 | 4.53 | 583.64 | 0.56 | 49.99 | 27.85 | 34.68 |
| 25-07-02 17:03:42 | 219.89 | 3.21 | 401.97 | 0.46 | 50.00 | 27.85 | 35.15 |
| 25-07-02 17:03:47 | 219.96 | 2.98 | 357.92 | 0.58 | 50.00 | 27.65 | 35.35 |
| 25-07-02 17:03:52 | 220.21 | 0.24 | 12.85  | 0.20 | 49.99 | 27.70 | 35.55 |
| 25-07-02 17:03:57 | 220.20 | 0.24 | 11.01  | 0.07 | 49.99 | 27.80 | 35.50 |
| 25-07-02 17:04:02 | 219.52 | 6.05 | 835.15 | 0.54 | 49.99 | 27.75 | 35.08 |
| 25-07-02 17:04:07 | 219.50 | 6.53 | 906.67 | 0.54 | 50.00 | 27.68 | 34.85 |
| 25-07-02 17:04:12 | 219.75 | 4.65 | 614.86 | 0.52 | 49.99 | 27.75 | 34.90 |
| 25-07-02 17:04:17 | 220.07 | 1.60 | 157.84 | 0.45 | 49.99 | 27.78 | 35.15 |
| 25-07-02 17:04:22 | 220.20 | 0.24 | 11.01  | 0.06 | 50.00 | 27.75 | 35.65 |
| 25-07-02 17:04:27 | 220.21 | 0.24 | 11.01  | 0.07 | 49.99 | 27.68 | 35.60 |
| 25-07-02 17:04:32 | 220.20 | 0.48 | 36.71  | 0.05 | 49.99 | 27.75 | 35.35 |
| 25-07-02 17:04:37 | 219.59 | 6.41 | 880.98 | 0.56 | 49.99 | 27.75 | 35.00 |
| 25-07-02 17:04:42 | 219.71 | 4.49 | 598.32 | 0.55 | 49.99 | 27.73 | 34.63 |
| 25-07-02 17:04:47 | 219.48 | 6.71 | 952.52 | 0.44 | 49.99 | 27.75 | 34.80 |
| 25-07-02 17:04:52 | 220.03 | 1.88 | 229.43 | 0.50 | 49.99 | 27.68 | 35.00 |
| 25-07-02 17:04:57 | 220.01 | 1.96 | 240.44 | 0.33 | 49.99 | 27.73 | 35.28 |
| 25-07-02 17:05:02 | 220.04 | 1.77 | 185.38 | 0.32 | 49.99 | 27.70 | 35.43 |
| 25-07-02 17:05:07 | 220.00 | 2.75 | 346.93 | 0.41 | 50.00 | 27.83 | 35.30 |
| 25-07-02 17:05:12 | 219.83 | 3.47 | 457.04 | 0.40 | 49.99 | 27.80 | 35.15 |
| 25-07-02 17:05:17 | 219.54 | 6.13 | 870.02 | 0.53 | 50.00 | 27.73 | 34.98 |
| 25-07-02 17:05:22 | 219.60 | 5.50 | 767.27 | 0.55 | 50.00 | 27.70 | 35.08 |
| 25-07-02 17:05:27 | 219.76 | 4.50 | 572.73 | 0.51 | 50.00 | 27.75 | 35.25 |
| 25-07-02 17:05:32 | 220.22 | 0.56 | 34.88  | 0.28 | 50.00 | 27.78 | 35.48 |
| 25-07-02 17:05:37 | 220.21 | 0.24 | 12.85  | 0.05 | 50.00 | 27.78 | 35.60 |
| 25-07-02 17:05:42 | 220.15 | 1.64 | 174.36 | 0.16 | 49.99 | 27.78 | 35.30 |
| 25-07-02 17:05:47 | 219.60 | 6.41 | 879.19 | 0.61 | 49.99 | 27.70 | 34.93 |

| 测试时间              | 电源电压   | 电流   | 输入功率   | 功率因数 | 电源频率  | 进风温度  | 出风温度  |
|-------------------|--------|------|--------|------|-------|-------|-------|
|                   | V      | A    | W      | -    | HZ    | °C    | °C    |
| 25-07-02 17:05:52 | 219.57 | 5.88 | 816.73 | 0.57 | 49.99 | 27.68 | 34.73 |
| 25-07-02 17:05:57 | 219.64 | 4.87 | 644.21 | 0.59 | 49.99 | 27.75 | 34.83 |
| 25-07-02 17:06:02 | 219.95 | 2.84 | 334.04 | 0.34 | 50.00 | 27.75 | 35.45 |
| 25-07-02 17:06:07 | 220.19 | 0.24 | 11.01  | 0.07 | 49.99 | 27.70 | 35.65 |
| 25-07-02 17:06:12 | 220.20 | 0.24 | 11.01  | 0.07 | 49.99 | 27.73 | 35.63 |
| 25-07-02 17:06:17 | 220.04 | 1.83 | 211.06 | 0.25 | 49.99 | 27.65 | 35.38 |
| 25-07-02 17:06:22 | 219.60 | 5.68 | 761.70 | 0.59 | 49.99 | 27.80 | 34.73 |
| 25-07-02 17:06:27 | 219.54 | 5.86 | 796.54 | 0.55 | 49.99 | 27.75 | 34.68 |
| 25-07-02 17:06:32 | 219.71 | 5.48 | 741.54 | 0.51 | 50.00 | 27.70 | 34.73 |
| 25-07-02 17:06:37 | 219.85 | 3.52 | 457.02 | 0.47 | 49.99 | 27.73 | 34.95 |
| 25-07-02 17:06:42 | 219.89 | 2.82 | 352.41 | 0.44 | 50.00 | 27.75 | 35.45 |
| 25-07-02 17:06:47 | 220.19 | 0.24 | 11.01  | 0.07 | 49.99 | 27.73 | 35.55 |
| 25-07-02 17:06:52 | 220.20 | 0.24 | 11.01  | 0.07 | 49.99 | 27.80 | 35.50 |
| 25-07-02 17:06:57 | 219.79 | 3.90 | 504.71 | 0.40 | 49.99 | 27.70 | 35.23 |
| 25-07-02 17:07:02 | 219.54 | 6.49 | 908.50 | 0.55 | 49.99 | 27.73 | 34.68 |
| 25-07-02 17:07:07 | 219.97 | 2.63 | 330.35 | 0.56 | 49.99 | 27.70 | 34.75 |
| 25-07-02 17:07:12 | 219.87 | 4.45 | 594.67 | 0.49 | 49.99 | 27.75 | 35.03 |
| 25-07-02 17:07:17 | 220.08 | 1.81 | 201.90 | 0.51 | 49.99 | 27.73 | 35.30 |
| 25-07-02 17:07:22 | 220.17 | 0.24 | 11.01  | 0.07 | 49.99 | 27.75 | 35.45 |
| 25-07-02 17:07:27 | 220.20 | 0.24 | 11.01  | 0.07 | 50.00 | 27.68 | 35.35 |
| 25-07-02 17:07:32 | 219.69 | 4.98 | 653.38 | 0.50 | 49.99 | 27.73 | 35.10 |
| 25-07-02 17:07:37 | 219.53 | 6.09 | 838.81 | 0.57 | 50.00 | 27.85 | 34.80 |
| 25-07-02 17:07:42 | 219.96 | 2.40 | 260.66 | 0.56 | 50.00 | 27.75 | 34.83 |
| 25-07-02 17:07:47 | 219.80 | 3.91 | 469.91 | 0.54 | 50.00 | 27.65 | 35.10 |
| 25-07-02 17:07:52 | 220.06 | 0.94 | 88.10  | 0.39 | 50.00 | 27.60 | 35.35 |
| 25-07-02 17:07:57 | 220.21 | 0.24 | 12.85  | 0.07 | 50.00 | 27.70 | 35.58 |
| 25-07-02 17:08:02 | 220.22 | 0.24 | 9.18   | 0.07 | 50.00 | 27.73 | 35.35 |
| 25-07-02 17:08:07 | 219.60 | 5.92 | 802.15 | 0.60 | 50.00 | 27.60 | 35.03 |
| 25-07-02 17:08:12 | 219.56 | 5.81 | 792.88 | 0.57 | 50.00 | 27.68 | 34.63 |
| 25-07-02 17:08:17 | 219.87 | 3.81 | 502.96 | 0.54 | 50.00 | 27.70 | 34.73 |
| 25-07-02 17:08:22 | 219.82 | 4.33 | 559.81 | 0.49 | 50.00 | 27.78 | 35.00 |
| 25-07-02 17:08:27 | 219.97 | 3.40 | 411.16 | 0.56 | 50.00 | 27.68 | 35.25 |
| 25-07-02 17:08:32 | 220.15 | 0.24 | 12.85  | 0.05 | 50.00 | 27.78 | 35.45 |
| 25-07-02 17:08:37 | 220.20 | 0.24 | 11.01  | 0.08 | 49.99 | 27.68 | 35.35 |
| 25-07-02 17:08:42 | 219.72 | 4.61 | 616.74 | 0.49 | 50.00 | 27.73 | 35.03 |
| 25-07-02 17:08:47 | 219.60 | 5.60 | 767.29 | 0.61 | 50.00 | 27.70 | 34.73 |
| 25-07-02 17:08:52 | 219.59 | 6.34 | 886.63 | 0.45 | 50.00 | 27.70 | 34.63 |
| 25-07-02 17:08:57 | 219.69 | 5.10 | 642.48 | 0.56 | 50.00 | 27.68 | 35.05 |
| 25-07-02 17:09:02 | 219.85 | 4.27 | 578.19 | 0.45 | 50.00 | 27.63 | 35.30 |

| 测试时间              | 电源电压   | 电流   | 输入功率    | 功率因数 | 电源频率  | 进风温度  | 出风温度  |
|-------------------|--------|------|---------|------|-------|-------|-------|
|                   | V      | A    | W       | -    | HZ    | °C    | °C    |
| 25-07-02 17:09:07 | 220.17 | 0.24 | 11.01   | 0.07 | 49.99 | 27.60 | 35.50 |
| 25-07-02 17:09:12 | 220.19 | 0.24 | 11.01   | 0.07 | 49.99 | 27.65 | 35.50 |
| 25-07-02 17:09:17 | 219.98 | 2.58 | 317.54  | 0.36 | 50.00 | 27.63 | 34.98 |
| 25-07-02 17:09:22 | 219.45 | 7.13 | 1005.87 | 0.59 | 50.00 | 27.63 | 34.73 |
| 25-07-02 17:09:27 | 219.71 | 5.06 | 675.45  | 0.53 | 49.99 | 27.70 | 34.63 |
| 25-07-02 17:09:32 | 219.61 | 5.86 | 809.35  | 0.50 | 49.99 | 27.68 | 34.83 |
| 25-07-02 17:09:37 | 220.19 | 0.51 | 38.54   | 0.33 | 50.00 | 27.68 | 35.43 |
| 25-07-02 17:09:42 | 220.18 | 0.24 | 11.01   | 0.07 | 50.00 | 27.65 | 35.58 |
| 25-07-02 17:09:47 | 220.20 | 0.24 | 12.85   | 0.07 | 49.99 | 27.75 | 35.55 |
| 25-07-02 17:09:52 | 220.04 | 2.00 | 207.41  | 0.34 | 50.00 | 27.68 | 35.28 |
| 25-07-02 17:09:57 | 219.63 | 5.45 | 699.31  | 0.58 | 49.99 | 27.75 | 34.63 |
| 25-07-02 17:10:02 | 219.61 | 5.80 | 759.82  | 0.52 | 49.99 | 27.68 | 34.60 |
| 25-07-02 17:10:07 | 219.78 | 4.19 | 532.28  | 0.52 | 49.99 | 27.70 | 34.80 |
| 25-07-02 17:10:12 | 219.94 | 3.29 | 379.93  | 0.58 | 49.99 | 27.68 | 35.05 |
| 25-07-02 17:10:17 | 220.00 | 2.03 | 234.95  | 0.41 | 50.00 | 27.73 | 35.50 |
| 25-07-02 17:10:22 | 220.21 | 0.24 | 12.85   | 0.06 | 50.00 | 27.73 | 35.60 |
| 25-07-02 17:10:27 | 220.20 | 0.24 | 11.01   | 0.07 | 50.00 | 27.73 | 35.35 |
| 25-07-02 17:10:32 | 219.75 | 4.88 | 664.46  | 0.53 | 50.00 | 27.68 | 35.10 |
| 25-07-02 17:10:37 | 219.29 | 8.08 | 1172.93 | 0.59 | 50.00 | 27.68 | 34.68 |
| 25-07-02 17:10:42 | 219.84 | 3.79 | 469.89  | 0.59 | 50.00 | 27.63 | 34.80 |
| 25-07-02 17:10:47 | 220.07 | 1.61 | 168.85  | 0.44 | 49.99 | 27.65 | 35.10 |
| 25-07-02 17:10:52 | 219.71 | 5.10 | 686.42  | 0.52 | 49.99 | 27.68 | 35.30 |
| 25-07-02 17:10:57 | 219.92 | 2.78 | 321.20  | 0.44 | 50.00 | 27.68 | 35.30 |
| 25-07-02 17:11:02 | 220.16 | 0.83 | 64.24   | 0.26 | 49.99 | 27.65 | 35.35 |
| 25-07-02 17:11:07 | 220.03 | 1.84 | 211.07  | 0.22 | 49.99 | 27.80 | 35.35 |
| 25-07-02 17:11:12 | 219.66 | 5.38 | 693.81  | 0.53 | 49.99 | 27.70 | 35.15 |
| 25-07-02 17:11:17 | 219.47 | 7.24 | 1029.71 | 0.54 | 49.99 | 27.68 | 34.83 |
| 25-07-02 17:11:22 | 219.76 | 4.72 | 611.22  | 0.50 | 49.99 | 27.75 | 35.00 |
| 25-07-02 17:11:27 | 219.75 | 4.57 | 616.72  | 0.50 | 49.99 | 27.68 | 35.18 |
| 25-07-02 17:11:32 | 220.21 | 0.24 | 9.18    | 0.06 | 49.99 | 27.73 | 35.43 |
| 25-07-02 17:11:37 | 220.21 | 0.24 | 11.01   | 0.07 | 49.99 | 27.73 | 35.50 |
| 25-07-02 17:11:42 | 220.18 | 0.90 | 82.59   | 0.07 | 49.99 | 27.73 | 35.28 |
| 25-07-02 17:11:47 | 219.60 | 5.72 | 774.52  | 0.59 | 49.99 | 27.65 | 34.88 |
| 25-07-02 17:11:52 | 219.58 | 5.54 | 759.84  | 0.61 | 49.99 | 27.78 | 34.73 |
| 25-07-02 17:11:57 | 219.43 | 7.26 | 1029.71 | 0.53 | 50.00 | 27.75 | 34.90 |
| 25-07-02 17:12:02 | 219.66 | 4.56 | 587.32  | 0.45 | 49.99 | 27.75 | 35.18 |
| 25-07-02 17:12:07 | 220.17 | 0.25 | 11.01   | 0.29 | 50.00 | 27.68 | 35.48 |
| 25-07-02 17:12:12 | 220.19 | 0.24 | 11.01   | 0.05 | 49.99 | 27.70 | 35.60 |
| 25-07-02 17:12:17 | 220.20 | 0.24 | 11.01   | 0.07 | 49.98 | 27.65 | 35.35 |

| 测试时间              | 电源电压   | 电流   | 输入功率    | 功率因数 | 电源频率  | 进风温度  | 出风温度  |
|-------------------|--------|------|---------|------|-------|-------|-------|
|                   | V      | A    | W       | -    | HZ    | °C    | °C    |
| 25-07-02 17:12:22 | 219.90 | 3.47 | 425.79  | 0.40 | 49.99 | 27.75 | 35.05 |
| 25-07-02 17:12:27 | 219.56 | 6.76 | 952.59  | 0.58 | 49.99 | 27.68 | 34.73 |
| 25-07-02 17:12:32 | 219.58 | 6.32 | 879.19  | 0.61 | 49.99 | 27.70 | 34.53 |
| 25-07-02 17:12:37 | 219.68 | 5.03 | 647.88  | 0.59 | 49.99 | 27.73 | 34.93 |
| 25-07-02 17:12:42 | 220.11 | 1.06 | 110.12  | 0.44 | 49.99 | 27.73 | 35.30 |
| 25-07-02 17:12:47 | 220.14 | 0.27 | 12.85   | 0.36 | 50.00 | 27.73 | 35.55 |
| 25-07-02 17:12:52 | 220.19 | 0.25 | 11.01   | 0.05 | 50.00 | 27.75 | 35.58 |
| 25-07-02 17:12:57 | 219.94 | 2.57 | 310.19  | 0.37 | 50.00 | 27.68 | 35.05 |
| 25-07-02 17:13:02 | 219.53 | 5.77 | 805.71  | 0.60 | 49.99 | 27.65 | 34.75 |
| 25-07-02 17:13:07 | 219.69 | 4.73 | 635.04  | 0.55 | 49.99 | 27.70 | 34.68 |
| 25-07-02 17:13:12 | 219.73 | 5.52 | 743.29  | 0.51 | 49.99 | 27.70 | 34.85 |
| 25-07-02 17:13:17 | 219.72 | 4.42 | 585.50  | 0.52 | 49.99 | 27.73 | 35.30 |
| 25-07-02 17:13:22 | 220.17 | 0.90 | 78.92   | 0.33 | 49.99 | 27.73 | 35.50 |
| 25-07-02 17:13:27 | 220.21 | 0.24 | 11.01   | 0.07 | 49.99 | 27.70 | 35.55 |
| 25-07-02 17:13:32 | 219.93 | 2.49 | 308.34  | 0.09 | 49.99 | 27.75 | 35.45 |
| 25-07-02 17:13:37 | 219.48 | 7.41 | 1047.98 | 0.61 | 49.99 | 27.75 | 34.85 |
| 25-07-02 17:13:42 | 219.76 | 4.66 | 616.70  | 0.56 | 50.00 | 27.78 | 34.75 |
| 25-07-02 17:13:47 | 219.48 | 6.46 | 906.66  | 0.58 | 49.99 | 27.73 | 34.85 |
| 25-07-02 17:13:52 | 220.05 | 1.60 | 187.22  | 0.36 | 49.99 | 27.70 | 35.15 |
| 25-07-02 17:13:57 | 220.12 | 0.42 | 25.70   | 0.26 | 49.99 | 27.68 | 35.60 |
| 25-07-02 17:14:02 | 220.20 | 0.24 | 11.01   | 0.07 | 50.00 | 27.65 | 35.50 |
| 25-07-02 17:14:07 | 219.98 | 3.02 | 346.90  | 0.39 | 49.99 | 27.65 | 35.28 |
| 25-07-02 17:14:12 | 219.76 | 3.97 | 501.09  | 0.54 | 50.00 | 27.65 | 34.93 |
| 25-07-02 17:14:17 | 219.77 | 4.33 | 587.39  | 0.47 | 50.00 | 27.65 | 34.73 |
| 25-07-02 17:14:22 | 219.74 | 5.35 | 714.01  | 0.49 | 50.00 | 27.68 | 34.88 |
| 25-07-02 17:14:27 | 219.91 | 2.68 | 326.71  | 0.30 | 50.00 | 27.68 | 35.15 |
| 25-07-02 17:14:32 | 220.14 | 1.05 | 99.12   | 0.43 | 49.99 | 27.73 | 35.38 |
| 25-07-02 17:14:37 | 220.19 | 0.25 | 11.01   | 0.07 | 49.99 | 27.73 | 35.45 |
| 25-07-02 17:14:42 | 219.98 | 2.36 | 275.32  | 0.28 | 50.00 | 27.73 | 35.25 |
| 25-07-02 17:14:47 | 219.44 | 6.93 | 980.15  | 0.52 | 49.99 | 27.70 | 35.00 |
| 25-07-02 17:14:52 | 219.85 | 3.04 | 383.62  | 0.53 | 50.00 | 27.63 | 34.80 |
| 25-07-02 17:14:57 | 219.66 | 4.96 | 635.08  | 0.57 | 49.99 | 27.70 | 35.08 |
| 25-07-02 17:15:02 | 219.95 | 2.99 | 389.10  | 0.42 | 49.99 | 27.65 | 35.25 |
| 25-07-02 17:15:07 | 220.18 | 0.24 | 12.85   | 0.12 | 50.00 | 27.60 | 35.45 |
| 25-07-02 17:15:12 | 220.19 | 0.24 | 11.01   | 0.07 | 49.99 | 27.68 | 35.50 |
| 25-07-02 17:15:17 | 219.83 | 3.83 | 462.51  | 0.39 | 49.99 | 27.68 | 35.03 |
| 25-07-02 17:15:22 | 219.61 | 6.46 | 882.87  | 0.56 | 49.99 | 27.73 | 34.75 |
| 25-07-02 17:15:27 | 219.82 | 3.44 | 436.80  | 0.59 | 49.99 | 27.60 | 34.73 |
| 25-07-02 17:15:32 | 219.63 | 5.45 | 719.43  | 0.51 | 49.99 | 27.55 | 34.83 |

| 测试时间              | 电源电压   | 电流   | 输入功率    | 功率因数 | 电源频率  | 进风温度  | 出风温度  |
|-------------------|--------|------|---------|------|-------|-------|-------|
|                   | V      | A    | W       | -    | HZ    | °C    | °C    |
| 25-07-02 17:15:37 | 219.86 | 3.51 | 442.32  | 0.57 | 49.99 | 27.65 | 35.18 |
| 25-07-02 17:15:42 | 220.12 | 1.42 | 135.81  | 0.43 | 49.99 | 27.70 | 35.35 |
| 25-07-02 17:15:47 | 220.18 | 0.24 | 11.01   | 0.07 | 49.99 | 27.70 | 35.55 |
| 25-07-02 17:15:52 | 220.21 | 0.24 | 12.85   | 0.06 | 49.99 | 27.65 | 35.48 |
| 25-07-02 17:15:57 | 219.50 | 6.66 | 954.44  | 0.57 | 49.99 | 27.60 | 34.93 |
| 25-07-02 17:16:02 | 219.59 | 5.98 | 822.31  | 0.59 | 50.00 | 27.65 | 34.80 |
| 25-07-02 17:16:07 | 219.57 | 6.69 | 926.90  | 0.56 | 49.99 | 27.60 | 34.80 |
| 25-07-02 17:16:12 | 219.77 | 4.80 | 622.17  | 0.55 | 49.99 | 27.60 | 35.10 |
| 25-07-02 17:16:17 | 220.21 | 0.23 | 11.01   | 0.07 | 49.99 | 27.63 | 35.73 |
| 25-07-02 17:16:22 | 220.21 | 0.24 | 12.85   | 0.07 | 49.99 | 27.60 | 35.73 |
| 25-07-02 17:16:27 | 220.20 | 0.24 | 11.01   | 0.05 | 50.00 | 27.65 | 35.55 |
| 25-07-02 17:16:32 | 219.93 | 2.93 | 343.22  | 0.49 | 49.99 | 27.60 | 35.23 |
| 25-07-02 17:16:37 | 219.74 | 4.58 | 598.32  | 0.59 | 49.99 | 27.55 | 34.50 |
| 25-07-02 17:16:42 | 219.71 | 4.94 | 646.02  | 0.59 | 49.99 | 27.58 | 34.48 |
| 25-07-02 17:16:47 | 219.56 | 6.72 | 956.16  | 0.55 | 49.99 | 27.68 | 34.68 |
| 25-07-02 17:16:52 | 219.75 | 5.35 | 726.74  | 0.50 | 49.99 | 27.68 | 34.98 |
| 25-07-02 17:16:57 | 220.07 | 0.85 | 69.74   | 0.26 | 49.99 | 27.65 | 35.60 |
| 25-07-02 17:17:02 | 220.21 | 0.24 | 11.01   | 0.06 | 49.99 | 27.63 | 35.63 |
| 25-07-02 17:17:07 | 220.21 | 0.24 | 11.01   | 0.07 | 49.99 | 27.63 | 35.43 |
| 25-07-02 17:17:12 | 219.64 | 5.10 | 688.33  | 0.50 | 50.00 | 27.70 | 35.13 |
| 25-07-02 17:17:17 | 219.74 | 4.82 | 635.11  | 0.55 | 50.00 | 27.73 | 34.55 |
| 25-07-02 17:17:22 | 219.54 | 6.50 | 925.13  | 0.56 | 50.00 | 27.60 | 34.55 |
| 25-07-02 17:17:27 | 219.79 | 3.49 | 458.92  | 0.50 | 50.00 | 27.73 | 34.80 |
| 25-07-02 17:17:32 | 219.97 | 2.83 | 352.44  | 0.41 | 50.00 | 27.70 | 35.13 |
| 25-07-02 17:17:37 | 220.18 | 0.44 | 29.37   | 0.19 | 50.00 | 27.60 | 35.43 |
| 25-07-02 17:17:42 | 220.20 | 0.24 | 11.01   | 0.05 | 49.99 | 27.60 | 35.38 |
| 25-07-02 17:17:47 | 220.00 | 2.90 | 356.07  | 0.42 | 49.99 | 27.60 | 35.18 |
| 25-07-02 17:17:52 | 219.50 | 6.68 | 930.50  | 0.58 | 49.99 | 27.58 | 34.88 |
| 25-07-02 17:17:57 | 219.49 | 7.18 | 1029.67 | 0.43 | 49.99 | 27.63 | 34.73 |
| 25-07-02 17:18:02 | 219.76 | 4.50 | 550.63  | 0.50 | 49.99 | 27.68 | 34.95 |
| 25-07-02 17:18:07 | 219.94 | 3.20 | 368.94  | 0.54 | 50.00 | 27.68 | 35.23 |
| 25-07-02 17:18:12 | 220.18 | 0.24 | 11.01   | 0.10 | 49.99 | 27.58 | 35.43 |
| 25-07-02 17:18:17 | 220.20 | 0.24 | 9.18    | 0.07 | 50.00 | 27.63 | 35.43 |
| 25-07-02 17:18:22 | 219.92 | 2.47 | 279.00  | 0.28 | 49.99 | 27.65 | 35.15 |
| 25-07-02 17:18:27 | 219.60 | 5.49 | 741.57  | 0.55 | 50.00 | 27.63 | 34.80 |
| 25-07-02 17:18:32 | 219.42 | 7.22 | 1013.25 | 0.62 | 50.00 | 27.63 | 34.63 |
| 25-07-02 17:18:37 | 219.60 | 5.92 | 789.28  | 0.57 | 49.99 | 27.53 | 34.95 |
| 25-07-02 17:18:42 | 219.99 | 1.96 | 214.74  | 0.46 | 49.99 | 27.65 | 35.38 |
| 25-07-02 17:18:47 | 220.21 | 0.24 | 9.18    | 0.08 | 49.99 | 27.70 | 35.68 |

| 测试时间              | 电源电压   | 电流   | 输入功率   | 功率因数 | 电源频率  | 进风温度  | 出风温度  |
|-------------------|--------|------|--------|------|-------|-------|-------|
|                   | V      | A    | W      | -    | HZ    | °C    | °C    |
| 25-07-02 17:18:52 | 220.21 | 0.24 | 11.01  | 0.07 | 49.99 | 27.68 | 35.75 |
| 25-07-02 17:18:57 | 220.21 | 0.24 | 12.85  | 0.07 | 49.99 | 27.68 | 35.25 |
| 25-07-02 17:19:02 | 219.54 | 5.90 | 820.38 | 0.61 | 49.99 | 27.58 | 34.85 |
| 25-07-02 17:19:07 | 219.61 | 6.11 | 840.57 | 0.56 | 49.99 | 27.70 | 34.55 |
| 25-07-02 17:19:12 | 219.53 | 6.64 | 919.56 | 0.57 | 49.99 | 27.60 | 34.48 |
| 25-07-02 17:19:17 | 219.59 | 5.41 | 737.77 | 0.56 | 49.99 | 27.73 | 34.83 |
| 25-07-02 17:19:22 | 220.02 | 2.06 | 231.24 | 0.51 | 49.99 | 27.70 | 35.18 |
| 25-07-02 17:19:27 | 220.14 | 1.12 | 113.78 | 0.46 | 49.99 | 27.73 | 35.50 |
| 25-07-02 17:19:32 | 220.20 | 0.24 | 9.18   | 0.07 | 49.99 | 27.63 | 35.63 |
| 25-07-02 17:19:37 | 220.21 | 0.24 | 11.01  | 0.06 | 49.99 | 27.63 | 35.25 |
| 25-07-02 17:19:42 | 219.46 | 6.84 | 969.07 | 0.54 | 49.99 | 27.78 | 34.98 |
| 25-07-02 17:19:47 | 219.72 | 5.43 | 725.03 | 0.55 | 50.00 | 27.65 | 34.68 |
| 25-07-02 17:19:52 | 219.52 | 6.49 | 888.33 | 0.57 | 49.99 | 27.65 | 34.63 |
| 25-07-02 17:19:57 | 219.79 | 3.42 | 407.47 | 0.49 | 49.99 | 27.60 | 35.05 |
| 25-07-02 17:20:02 | 219.95 | 3.04 | 389.09 | 0.45 | 49.99 | 27.65 | 35.30 |
| 25-07-02 17:20:07 | 220.21 | 0.24 | 11.01  | 0.07 | 49.99 | 27.63 | 35.55 |
| 25-07-02 17:20:12 | 220.21 | 0.24 | 9.18   | 0.08 | 49.99 | 27.63 | 35.60 |
| 25-07-02 17:20:17 | 219.99 | 1.77 | 179.86 | 0.07 | 49.99 | 27.60 | 35.10 |
| 25-07-02 17:20:22 | 219.50 | 6.67 | 941.55 | 0.56 | 49.99 | 27.70 | 34.80 |
| 25-07-02 17:20:27 | 219.63 | 5.45 | 732.34 | 0.56 | 49.99 | 27.68 | 34.60 |
| 25-07-02 17:20:32 | 219.60 | 6.08 | 818.60 | 0.53 | 50.00 | 27.65 | 34.73 |
| 25-07-02 17:20:37 | 220.03 | 2.31 | 273.50 | 0.49 | 49.99 | 27.68 | 35.30 |
| 25-07-02 17:20:42 | 220.13 | 0.24 | 12.85  | 0.24 | 50.00 | 27.63 | 35.60 |
| 25-07-02 17:20:47 | 220.20 | 0.24 | 11.01  | 0.07 | 50.00 | 27.75 | 35.70 |
| 25-07-02 17:20:52 | 220.21 | 0.24 | 11.01  | 0.07 | 50.00 | 27.63 | 35.50 |
| 25-07-02 17:20:57 | 219.80 | 3.91 | 493.76 | 0.42 | 50.00 | 27.68 | 34.90 |
| 25-07-02 17:21:02 | 219.52 | 6.64 | 902.99 | 0.59 | 49.99 | 27.68 | 34.63 |
| 25-07-02 17:21:07 | 219.72 | 5.02 | 647.92 | 0.50 | 49.99 | 27.65 | 34.68 |
| 25-07-02 17:21:12 | 219.92 | 2.87 | 370.77 | 0.53 | 50.00 | 27.68 | 34.93 |
| 25-07-02 17:21:17 | 219.96 | 3.06 | 378.13 | 0.39 | 50.00 | 27.73 | 35.48 |
| 25-07-02 17:21:22 | 220.22 | 0.24 | 11.01  | 0.06 | 49.99 | 27.63 | 35.60 |
| 25-07-02 17:21:27 | 220.22 | 0.24 | 11.01  | 0.07 | 49.99 | 27.60 | 35.50 |
| 25-07-02 17:21:32 | 219.70 | 4.96 | 660.82 | 0.53 | 50.00 | 27.65 | 35.25 |
| 25-07-02 17:21:38 | 219.55 | 6.68 | 921.43 | 0.51 | 50.00 | 27.78 | 34.73 |
| 25-07-02 17:21:42 | 219.68 | 4.73 | 646.10 | 0.53 | 49.99 | 27.78 | 34.80 |
| 25-07-02 17:21:47 | 219.89 | 3.98 | 501.10 | 0.58 | 50.00 | 27.68 | 34.93 |
| 25-07-02 17:21:52 | 219.70 | 4.41 | 585.52 | 0.56 | 49.99 | 27.65 | 35.18 |
| 25-07-02 17:21:57 | 220.23 | 0.26 | 11.01  | 0.36 | 49.99 | 27.75 | 35.65 |
| 25-07-02 17:22:02 | 220.21 | 0.24 | 9.18   | 0.07 | 49.99 | 27.78 | 35.68 |

| 测试时间              | 电源电压   | 电流   | 输入功率    | 功率因数 | 电源频率  | 进风温度  | 出风温度  |
|-------------------|--------|------|---------|------|-------|-------|-------|
|                   | V      | A    | W       | -    | HZ    | °C    | °C    |
| 25-07-02 17:22:07 | 220.22 | 0.24 | 11.01   | 0.07 | 49.99 | 27.73 | 35.48 |
| 25-07-02 17:22:12 | 219.53 | 6.39 | 858.93  | 0.59 | 49.99 | 27.78 | 35.18 |
| 25-07-02 17:22:17 | 219.64 | 5.10 | 669.87  | 0.57 | 49.99 | 27.78 | 34.75 |
| 25-07-02 17:22:22 | 219.67 | 5.73 | 778.16  | 0.51 | 49.99 | 27.75 | 34.85 |
| 25-07-02 17:22:27 | 219.72 | 3.79 | 482.67  | 0.54 | 49.99 | 27.68 | 35.13 |
| 25-07-02 17:22:32 | 220.21 | 0.55 | 45.88   | 0.39 | 49.99 | 27.73 | 35.43 |
| 25-07-02 17:22:37 | 220.21 | 0.24 | 11.01   | 0.08 | 49.99 | 27.70 | 35.80 |
| 25-07-02 17:22:42 | 220.21 | 0.24 | 11.01   | 0.07 | 49.99 | 27.65 | 35.68 |
| 25-07-02 17:22:48 | 220.21 | 0.24 | 11.01   | 0.07 | 49.99 | 27.63 | 35.38 |
| 25-07-02 17:22:52 | 219.34 | 7.90 | 1143.47 | 0.59 | 49.99 | 27.68 | 34.98 |
| 25-07-02 17:22:58 | 219.78 | 4.23 | 530.46  | 0.60 | 50.00 | 27.60 | 34.60 |
| 25-07-02 17:23:02 | 219.74 | 4.40 | 565.29  | 0.57 | 49.99 | 27.70 | 34.85 |
| 25-07-02 17:23:07 | 219.91 | 2.89 | 350.55  | 0.55 | 49.99 | 27.65 | 35.10 |
| 25-07-02 17:23:12 | 220.18 | 0.46 | 33.04   | 0.30 | 49.99 | 27.68 | 35.35 |
| 25-07-02 17:23:17 | 220.21 | 0.24 | 11.01   | 0.08 | 49.99 | 27.55 | 35.55 |
| 25-07-02 17:23:22 | 220.21 | 0.24 | 11.01   | 0.07 | 49.99 | 27.58 | 35.35 |
| 25-07-02 17:23:27 | 219.74 | 4.44 | 556.10  | 0.42 | 49.99 | 27.68 | 35.05 |
| 25-07-02 17:23:32 | 219.75 | 4.25 | 515.70  | 0.57 | 49.99 | 27.75 | 34.73 |
| 25-07-02 17:23:37 | 219.75 | 4.46 | 601.97  | 0.50 | 49.99 | 27.63 | 34.68 |
| 25-07-02 17:23:42 | 219.97 | 2.90 | 346.90  | 0.58 | 49.99 | 27.63 | 34.95 |
| 25-07-02 17:23:47 | 220.13 | 0.97 | 106.47  | 0.33 | 50.00 | 27.60 | 35.23 |
| 25-07-02 17:23:53 | 220.07 | 1.79 | 174.37  | 0.36 | 49.99 | 27.63 | 35.35 |
| 25-07-02 17:23:58 | 219.72 | 4.97 | 658.88  | 0.57 | 49.99 | 27.68 | 35.18 |
| 25-07-02 17:24:02 | 219.82 | 4.03 | 502.90  | 0.52 | 49.99 | 27.75 | 35.15 |
| 25-07-02 17:24:08 | 220.14 | 1.16 | 95.44   | 0.24 | 49.99 | 27.70 | 35.30 |
| 25-07-02 17:24:13 | 220.17 | 0.58 | 31.20   | 0.14 | 49.99 | 27.68 | 35.35 |
| 25-07-02 17:24:18 | 219.69 | 4.38 | 581.76  | 0.44 | 49.99 | 27.63 | 35.05 |
| 25-07-02 17:24:23 | 219.62 | 6.67 | 939.63  | 0.54 | 49.99 | 27.68 | 34.88 |
| 25-07-02 17:24:28 | 219.77 | 4.84 | 651.53  | 0.46 | 49.99 | 27.73 | 34.85 |
| 25-07-02 17:24:33 | 220.14 | 1.38 | 145.00  | 0.51 | 49.99 | 27.75 | 35.05 |
| 25-07-02 17:24:38 | 220.18 | 1.20 | 97.28   | 0.54 | 50.00 | 27.70 | 35.45 |
| 25-07-02 17:24:43 | 220.21 | 0.24 | 11.01   | 0.08 | 49.99 | 27.65 | 35.55 |
| 25-07-02 17:24:48 | 220.21 | 0.24 | 11.01   | 0.05 | 49.99 | 27.70 | 35.43 |
| 25-07-02 17:24:53 | 219.67 | 5.61 | 770.89  | 0.56 | 50.00 | 27.70 | 35.18 |
| 25-07-02 17:24:58 | 219.70 | 5.29 | 675.50  | 0.58 | 50.00 | 27.60 | 34.73 |
| 25-07-02 17:25:02 | 219.84 | 3.87 | 479.02  | 0.59 | 49.99 | 27.65 | 34.80 |
| 25-07-02 17:25:08 | 219.85 | 3.88 | 451.52  | 0.49 | 49.99 | 27.63 | 34.98 |
| 25-07-02 17:25:13 | 219.98 | 3.35 | 398.30  | 0.55 | 50.00 | 27.73 | 35.23 |
| 25-07-02 17:25:17 | 220.17 | 0.25 | 12.85   | 0.05 | 49.99 | 27.68 | 35.58 |

| 测试时间              | 电源电压   | 电流   | 输入功率    | 功率因数 | 电源频率  | 进风温度  | 出风温度  |
|-------------------|--------|------|---------|------|-------|-------|-------|
|                   | V      | A    | W       | -    | HZ    | °C    | °C    |
| 25-07-02 17:25:23 | 220.21 | 0.24 | 11.01   | 0.07 | 49.99 | 27.78 | 35.50 |
| 25-07-02 17:25:27 | 219.91 | 3.48 | 420.30  | 0.50 | 49.99 | 27.75 | 35.28 |
| 25-07-02 17:25:33 | 219.47 | 6.87 | 969.11  | 0.61 | 49.99 | 27.60 | 34.90 |
| 25-07-02 17:25:38 | 219.64 | 5.36 | 713.98  | 0.59 | 49.99 | 27.65 | 34.68 |
| 25-07-02 17:25:43 | 219.72 | 4.84 | 633.23  | 0.52 | 49.99 | 27.75 | 34.95 |
| 25-07-02 17:25:48 | 219.75 | 4.42 | 589.18  | 0.53 | 50.00 | 27.73 | 35.25 |
| 25-07-02 17:25:53 | 220.22 | 0.24 | 11.01   | 0.06 | 49.99 | 27.70 | 35.55 |
| 25-07-02 17:25:58 | 220.21 | 0.24 | 11.01   | 0.06 | 50.00 | 27.75 | 35.70 |
| 25-07-02 17:26:03 | 220.21 | 0.24 | 11.01   | 0.07 | 49.99 | 27.58 | 35.43 |
| 25-07-02 17:26:08 | 219.51 | 6.44 | 879.17  | 0.55 | 49.99 | 27.53 | 35.05 |
| 25-07-02 17:26:13 | 219.54 | 6.65 | 930.58  | 0.58 | 49.99 | 27.73 | 34.73 |
| 25-07-02 17:26:18 | 219.67 | 5.12 | 680.94  | 0.52 | 49.99 | 27.70 | 34.73 |
| 25-07-02 17:26:23 | 219.79 | 3.74 | 490.03  | 0.53 | 49.99 | 27.65 | 35.00 |
| 25-07-02 17:26:28 | 219.82 | 3.70 | 471.67  | 0.54 | 49.99 | 27.60 | 35.30 |
| 25-07-02 17:26:33 | 220.20 | 0.24 | 11.01   | 0.07 | 49.99 | 27.73 | 35.55 |
| 25-07-02 17:26:38 | 220.22 | 0.24 | 11.01   | 0.07 | 49.99 | 27.65 | 35.50 |
| 25-07-02 17:26:43 | 220.02 | 2.05 | 240.47  | 0.10 | 50.00 | 27.68 | 35.23 |
| 25-07-02 17:26:48 | 219.48 | 7.15 | 1013.28 | 0.58 | 50.00 | 27.68 | 34.85 |
| 25-07-02 17:26:53 | 219.63 | 5.68 | 791.11  | 0.55 | 49.99 | 27.60 | 34.68 |
| 25-07-02 17:26:58 | 219.72 | 4.78 | 635.08  | 0.49 | 49.99 | 27.60 | 34.95 |
| 25-07-02 17:27:03 | 219.88 | 3.32 | 418.47  | 0.54 | 49.99 | 27.58 | 35.15 |
| 25-07-02 17:27:08 | 220.16 | 1.26 | 106.46  | 0.51 | 49.99 | 27.68 | 35.35 |
| 25-07-02 17:27:13 | 220.18 | 0.24 | 11.01   | 0.07 | 49.99 | 27.63 | 35.43 |
| 25-07-02 17:27:18 | 220.16 | 1.40 | 146.84  | 0.10 | 49.99 | 27.55 | 35.18 |
| 25-07-02 17:27:23 | 219.54 | 6.35 | 880.96  | 0.58 | 49.99 | 27.63 | 34.93 |
| 25-07-02 17:27:28 | 219.53 | 6.48 | 890.14  | 0.60 | 49.99 | 27.68 | 34.75 |
| 25-07-02 17:27:33 | 219.67 | 4.55 | 607.45  | 0.52 | 49.99 | 27.63 | 34.83 |
| 25-07-02 17:27:38 | 220.13 | 1.51 | 150.49  | 0.28 | 49.99 | 27.60 | 35.38 |
| 25-07-02 17:27:43 | 220.19 | 0.25 | 11.01   | 0.07 | 49.99 | 27.73 | 35.55 |
| 25-07-02 17:27:48 | 220.20 | 0.24 | 11.01   | 0.07 | 50.00 | 27.70 | 35.43 |
| 25-07-02 17:27:53 | 219.64 | 5.31 | 712.20  | 0.57 | 50.00 | 27.63 | 35.18 |
| 25-07-02 17:27:58 | 219.68 | 5.62 | 743.32  | 0.54 | 49.99 | 27.63 | 34.63 |

附件 2 建科环能科技有限公司空调设备检测资质



# 中国合格评定国家认可委员会 实验室认可证书

(注册号: CNAS L1045)

兹证明:

**建科环能科技有限公司**

(法人: 建科环能科技有限公司)

**北京市朝阳区安定门外小黄庄路 9 号, 100013**

符合 ISO/IEC 17025: 2017《检测和校准实验室能力的通用要求》  
(CNAS-CL01《检测和校准实验室能力认可准则》)的要求, 具备承担本  
证书附件所列服务能力, 予以认可。

获认可的能力范围见标有相同认可注册号的证书附件, 证书附件是  
本证书组成部分。

生效日期: 2025-03-03

截止日期: 2028-07-30



中国合格评定国家认可委员会授权人 **张朝华**

中国合格评定国家认可委员会 (CNAS) 经国家认证认可监督管理委员会 (CNCA) 授权, 负责实施合格评定国家认可制度。  
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# 检验检测机构 资质认定证书

编号：220020344460

名称：建科环能科技有限公司

地址：北京市朝阳区安定门外小黄庄路9号（100013）

经审查，你机构已具备国家有关法律、行政法规规定的基本条件和能力，现予批准，可以向社会出具具有证明作用的数据和结果，特发此证。资质认定包括检验检测机构计量认证。

检验检测能力及授权签字人见证书附表。授权名称和分支机构名称见附页。

许可使用标志



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