



验证报告

VERIFICATION REPORT

验证企业： 民和县疾病预防控制中心

验证地址： 民和县疾病预防控制中心

验证对象： 1号冷库

温控信息： 2.0℃~8.0℃

验证性质： 定期验证

验证环境： 常温

验证类别： 满载

验证项目： 温度自动监测系统测点的准确度测试
确定设备故障或外部供电中断的状况下库房保温性能及变化趋势
温控设施设备运行参数及使用状况测试-参数测试
温度分布特性的测试与分析
温度监测系统配置的测点终端安装位置确认
开门作业对库房温度分布的影响
本地区的高温或低温等极端外部环境条件下的温度保障能力确认

验证实施日期：

签发：

验证标准和技术要求：

依照《药品经营质量管理规范》（GSP）及附录五《验证管理》、《GBT34399-2017医药产品冷链物流温控设施设备验证性能确认技术规范的要求》、《中华人民共和国人类遗传资源管理条例》。

适用范围：

医药产品储存运输过程中涉及的温控仓库、温控车辆、冷藏箱、保温箱、冰柜及温度监测系统的性能确认等活动。
保藏机构的仪器设备应保证资源的质量和安全性，根据需要定期维护和更换。关键仪器设备应定期进行验证、检定或校准。保藏机构的存储设备应有明确的监控措施或监控设备。

签发日期：

北京世福宝科技有限公司

Beijing SEVOBO Technology Co., Ltd



公司地址：北京市通州区马驹桥联东U谷西区11B

公司电话：13021079718, 18610356318

系统名称及版本号：世福宝GSP/GMP冷链物流温控验证实时云系统 V1.0

公司网址：<http://www.sevobo.com>

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1 参与人员及培训记录

1.1 验证报告的起草、审核与批准

职责	姓名	职务	企业	签名
起草	杨曜栋	验证实施专员	甘肃环恩医疗科技有限公司	
审核	老师	质量负责人	民和县疾病预防控制中心	
批准	老师	质量负责人	民和县疾病预防控制中心	

1.2 验证参与人员

职责	姓名	职务	企业	签名
组长	老师		民和县疾病预防控制中心	
组员	蔡生烧	验证实施专员	甘肃环恩医疗科技有限公司	

1.3 培训记录

2 验证目的

- 1、确定冷藏库的运行参数及性能，验证冷藏库在实际工况中是否满足冷链药品储存温度要求。
- 2、获得明确的冷藏库在实际工况运行中温度分布特性，依据温度分布特性确认库房冷点及热点所在位置，对温湿度监测系统日常监测点安装位置给予指导。
- 3、发现可能存在的冷藏库设施设备运行或使用不符合要求的状况、系统参数设定的不合理情况等偏差并进行调整和纠正，使相关设施设备及系统的运行状况符合冷链药品储存规定的要求。
- 4、验证冷藏库在断电或设备故障等特殊情况下冷藏库的保温性能，以建立应急措施。
- 5、验证测试开门作业对冷藏库内温度变化的影响，提供冷藏库日常操作指导。

3 验证依据

- 1、《药品经营质量管理规范》及附录五《验证管理》。
- 2、《医药产品冷链物流温控设施设备验证性能确认技术规范 GB/T 34399-2017》。
- 3、前述《验证方案》。
- 4、验证测试判断标准：
 - (1) 温度自动监测系统测点终端与验证用温度记录仪的差值应在 $\pm 1^{\circ}\text{C}$ 以内(冷冻库差值应

在 $\pm 2^{\circ}\text{C}$ 以内)；

(2) 测点终端安装数量及位置符合要求。

4 本次验证所用主要测量设备

4.1 验证设备标准

1. 验证所使用的温度传感器应当经法定计量机构校准。
2. 验证所使用的温度传感器应当适用被验证设备的测量范围，测量范围在 $0^{\circ}\text{C}\sim 75^{\circ}\text{C}$ 之间，温度的最大允许误差为 $\pm 0.5^{\circ}\text{C}$ ；测量范围在 $-30^{\circ}\text{C}\sim 0^{\circ}\text{C}$ 之间，温度的最大允许误差为 $\pm 1.0^{\circ}\text{C}$ 。
3. 设备的校准证书复印件应当作为验证报告的必要附件。

4.2 验证设备描述

型号	品牌	测量范围	精度	分辨率	最小采集间隔
SVB-YZ-REC-02	世福宝	$-30^{\circ}\text{C}\sim 75^{\circ}\text{C}$	$\pm 0.5^{\circ}\text{C}$ ($\geq 0^{\circ}\text{C}$ 时)； $\pm 1^{\circ}\text{C}$ ($< 0^{\circ}\text{C}$ 时)	0.1°C	1分钟
SVB-YZ-HOST	世福宝	$-30^{\circ}\text{C}\sim 75^{\circ}\text{C}$	$\pm 0.5^{\circ}\text{C}$ ($\geq 0^{\circ}\text{C}$ 时)； $\pm 1^{\circ}\text{C}$ ($< 0^{\circ}\text{C}$ 时)	0.1°C	1分钟

4.3 验证设备清单

序号	型号	设备号	校准单位	校准证书	有效期	校准结果
1	SVB-YZ-REC-02	SF304070100022306148357803				
2	SVB-YZ-REC-02	SF304070100022306088170803	济南市计量检测院	24001166809	2025-12-05	合格
3	SVB-YZ-REC-02	SF304070100022306148279803	济南市计量检测院	24001166833	2025-12-05	合格
4	SVB-YZ-REC-02	SF304070100022306148525803				
5	SVB-YZ-REC-02	SF304070100022306148198803	济南市计量检测院	24001166748	2025-12-05	合格

序号	型号	设备号	校准单位	校准证书	有效期	校准结果
6	SVB-YZ-REC-02	SF304070100022306088106803	济南市计量检测院	24001166776	2025-12-05	合格
7	SVB-YZ-REC-02	SF304070100022306148017803	济南市计量检测院	24001166749	2025-12-05	合格
8	SVB-YZ-REC-02	SF304070100022306148567803	济南市计量检测院	24001166752	2025-12-05	合格
9	SVB-YZ-REC-02	SF304070100022306028047803				
10	SVB-YZ-REC-02	SF304070100022306148530803				
11	SVB-YZ-REC-02	SF304070100022306148196803	济南市计量检测院	24001166765	2025-12-05	合格
12	SVB-YZ-REC-02	SF304070100022306088255803	济南市计量检测院	24001166732	2025-12-05	合格
13	SVB-YZ-REC-02	SF304070100022306028005803	济南市计量检测院	24001166743	2025-12-05	合格
14	SVB-YZ-REC-02	SF304070100022306148310803	济南市计量检测院	24001166733	2025-12-05	合格
15	SVB-YZ-REC-02	SF304070100022306088171803	济南市计量检测院	24001166834	2025-12-05	合格
16	SVB-YZ-REC-02	SF304070100022306088013803	济南市计量检测院	24001166760	2025-12-05	合格
17	SVB-YZ-REC-02	SF304070100022306148586803	济南市计量检测院	24001166756	2025-12-05	合格
18	SVB-YZ-REC-02	SF304070100022306148494803	济南市计量检测院	24001166817	2025-12-05	合格
19	SVB-YZ-REC-02	SF304070100022306148251803				
20	SVB-YZ-REC-02	SF304070100022306088061803	济南市计量检测院	24001166816	2025-12-05	合格
21	SVB-YZ-REC-02	SF304070100022306088089803				

序号	型号	设备号	校准单位	校准证书	有效期	校准结果
22	SVB-YZ-REC-02	SF304070100022306148389803	济南市计量检测院	24001166742	2025-12-05	合格
23	SVB-YZ-REC-02	SF304070100022306148213803	济南市计量检测院	24001166830	2025-12-05	合格
24	SVB-YZ-REC-02	SF304070100022306088244803	济南市计量检测院	24001166775	2025-12-05	合格
25	SVB-YZ-REC-02	SF304070100022306028033803	济南市计量检测院	24001166766	2025-12-05	合格

5 验证对象

5.1 对象说明

名称	1号冷库
长宽高(mm)	4000*3000*2800
面积(平米)	
验证范围	2.0℃~8.0℃
验证状态	定期验证

5.2 验证项目

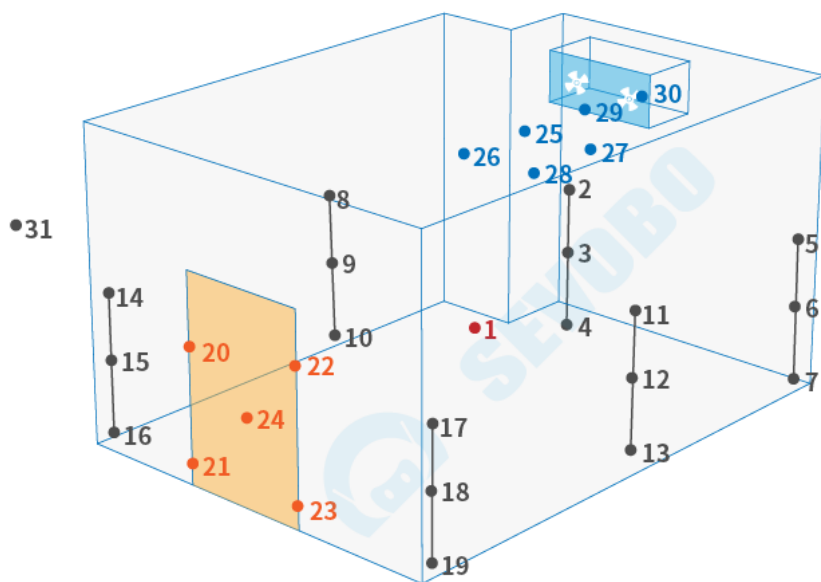
序号	验证项目
1	风机工作情况确认
2	温度分布特性的测试与分析
3	温度自动监测系统测点的准确度测试
4	温控设施设备运行参数及使用状况测试-参数测试
5	温度监测系统配置的测点终端安装位置确认
6	确定设备故障或外部供电中断的状况下库房保温性能及变化趋势
7	开门作业对库房温度分布的影响
8	本地区的高温或低温等极端外部环境条件下的温度保障能力确认
9	温控设施设备运行参数及使用状况测试-多组风机轮换

5.3 布点依据

- 1、在仓库内一次性同步布点，确保各测点采集数据的同步、有效；
- 2、每个库房中均匀性布点数量不应少于9个，仓间各角及中心位置均应布置测点，每两个测点的水平间距不应大于5m，垂直间距不应超过2m。
- 3、库房每个作业出入口及风机出风口区域至少布置5个测点，库房中每组货架或建筑结构的风向死角位置至少应布置3个测点。
- 4、特殊区域应布设温度监测点，包括空调或制冷设备回风位置、温度自动监测系统测点终端安装位置、门、窗、灯等位置。
- 5、温度监测点均应布设在货位上或货物可能存放的位置。

5.4 测点布置

5.4.1 布点示意图



布点示意图

5.4.2 布点位置详表

序号	名称	位置编码	类型	设备型号	设备编号
1	中心点1	A01	中心点	SVB-YZ- REC-02	SF304070100022306148357803
2	均匀布点 3	A03	均匀布点	SVB-YZ- REC-02	SF304070100022306088170803
3	均匀布点 4	A04	均匀布点	SVB-YZ- REC-02	SF304070100022306148279803

序号	名称	位置编码	类型	设备型号	设备编号
4	均匀布点 5	A05	均匀布点	SVB-YZ- REC-02	SF304070100022306148525803
5	均匀布点 6	A06	均匀布点	SVB-YZ- REC-02	SF304070100022306148198803
6	均匀布点 7	A07	均匀布点	SVB-YZ- REC-02	SF304070100022306088106803
7	均匀布点 8	A08	均匀布点	SVB-YZ- REC-02	SF304070100022306148017803
8	均匀布点 9	A09	均匀布点	SVB-YZ- REC-02	SF304070100022306148567803
9	均匀布点 10	A10	均匀布点	SVB-YZ- REC-02	SF304070100022306028047803
10	门19	A19	门	SVB-YZ- REC-02	SF304070100022306148530803
11	门20	A20	门	SVB-YZ- REC-02	SF304070100022306148196803
12	门21	A21	门	SVB-YZ- REC-02	SF304070100022306088255803
13	门22	A22	门	SVB-YZ- REC-02	SF304070100022306028005803
14	门23	A23	门	SVB-YZ- REC-02	SF304070100022306148310803
15	风机25	A25	风机	SVB-YZ- REC-02	SF304070100022306088171803
16	风机26	A26	风机	SVB-YZ- REC-02	SF304070100022306088013803
17	风机27	A27	风机	SVB-YZ- REC-02	SF304070100022306148586803
18	风机28	A28	风机	SVB-YZ- REC-02	SF304070100022306148494803
19	风机29	A29	风机	SVB-YZ- REC-02	SF304070100022306148251803
20	回风口30	A30	风机	SVB-YZ- REC-02	SF304070100022306088061803

序号	名称	位置编码	类型	设备型号	设备编号
21	死角02	A36	风向死角	SVB-YZ- REC-02	SF304070100022306088089803
22	死角01	A37	风向死角	SVB-YZ- REC-02	SF304070100022306148389803
23	监测位置 38	A38	监测位置	SVB-YZ- REC-02	SF304070100022306148213803
24	监测位置 39	A39	监测位置	SVB-YZ- REC-02	SF304070100022306088244803
25	环境	A40	环境外温	SVB-YZ- REC-02	SF304070100022306028033803

5.4.3 现场照片



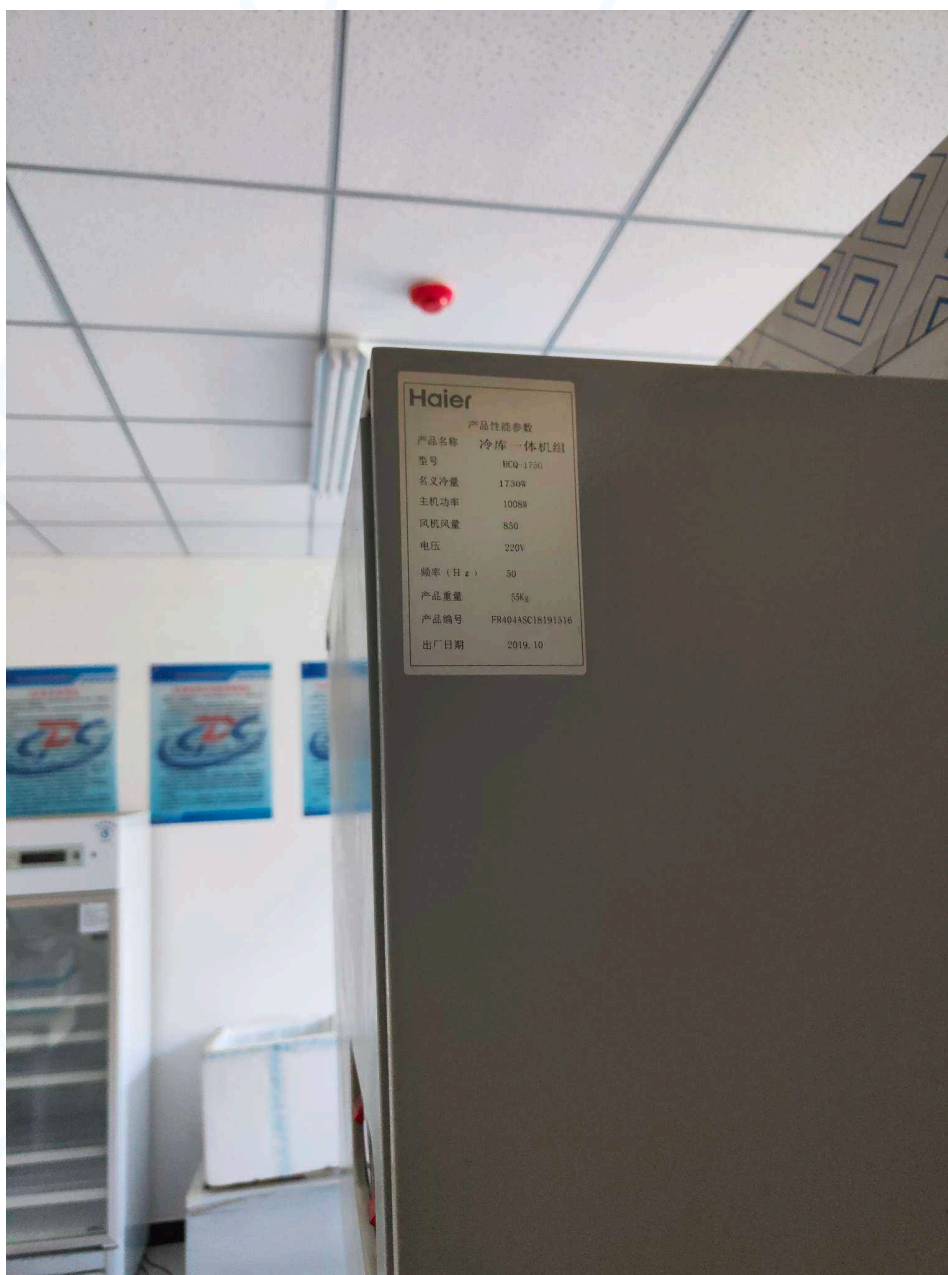










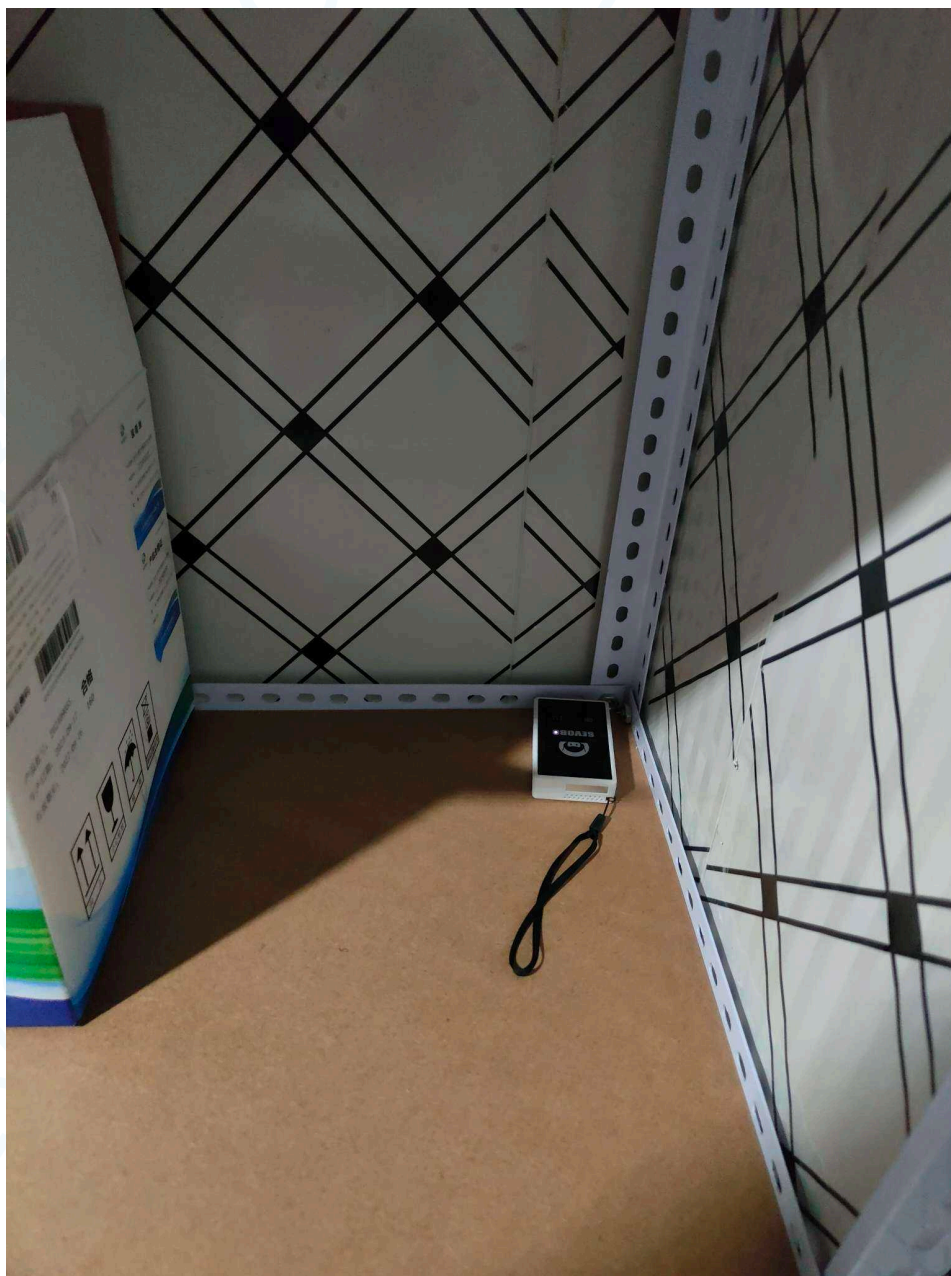


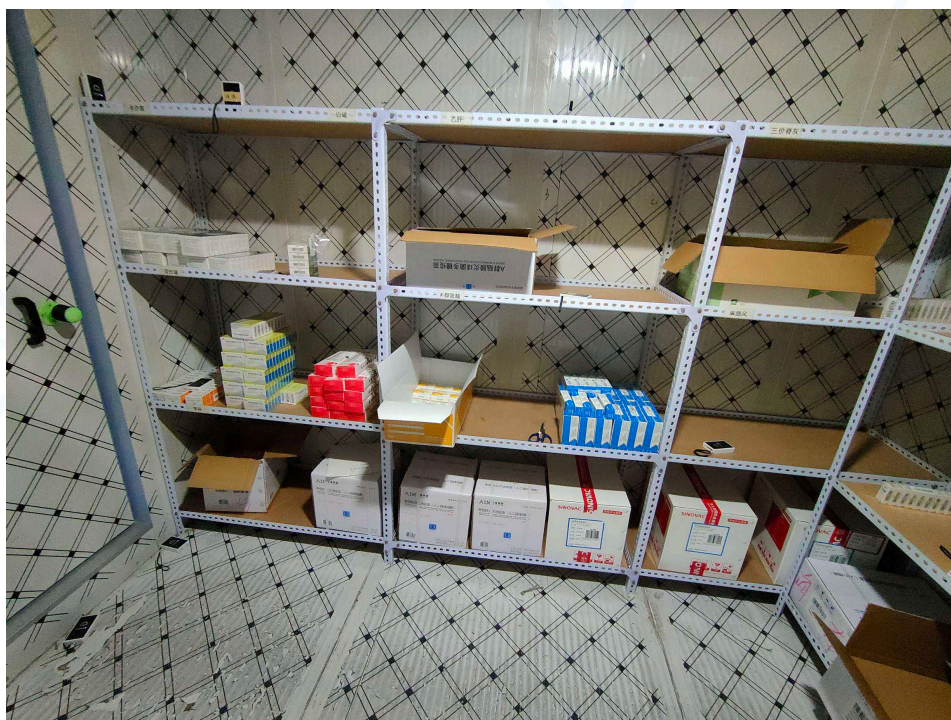
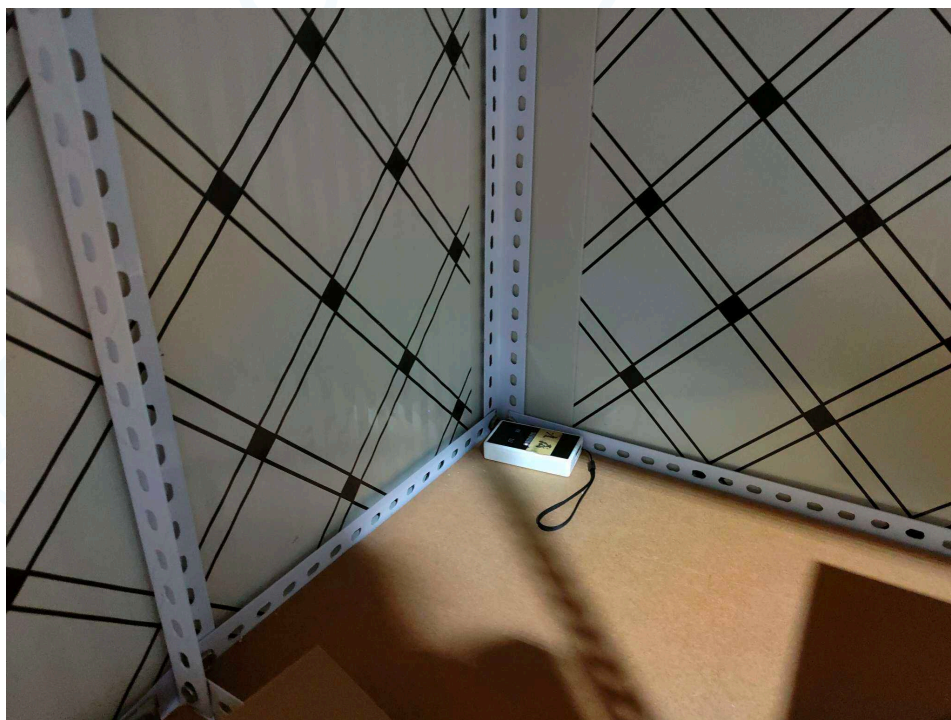




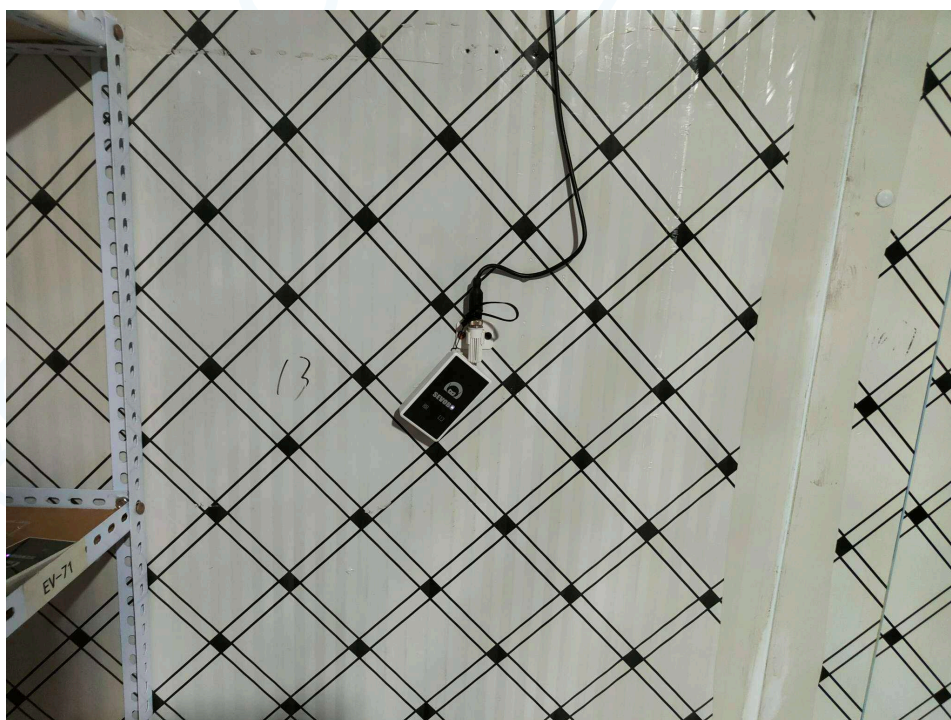




















6 验证实施前准备及检查

6.1 验证对象运行确认

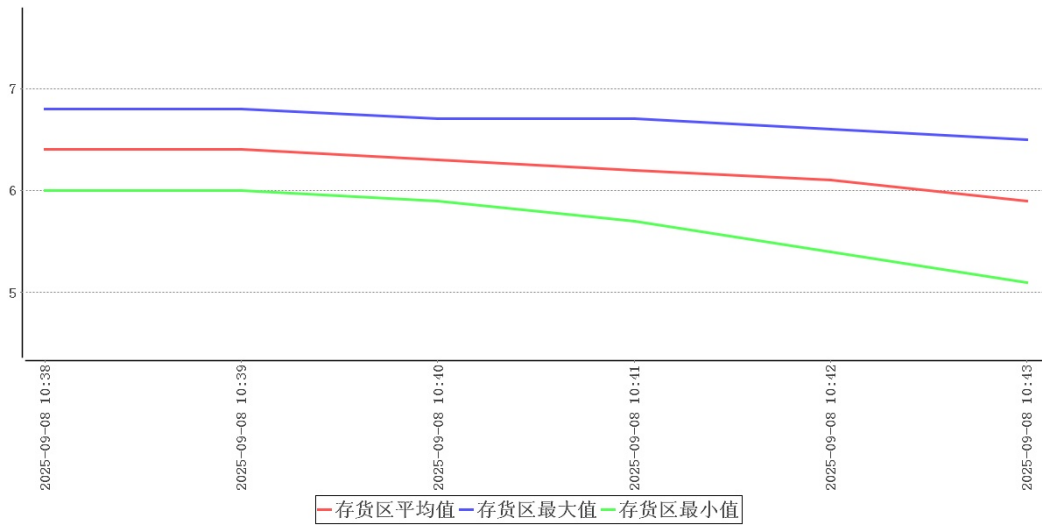
序号	检查项目	要求	结果
1	控制箱电源接通和关闭	制冷系统启动(停止)设备运行正常	合格
2	温度控制器及温湿度自动监测系统	a、可在允许范围内设定，自动调控温度 b、正常运行，可显示实际温度 c、能在规定的记录时段内正常记录温湿度变化的情况 d、温度异常时，自动报警系统开始工作	合格
3	照明灯	灯的开关正常	合格
4	密封门	开、关灵活，密封	合格

6.2 验证前准备及检查

序号	操作内容	操作标准	结果
1	制冷压缩机安装	a、安装正确，无缺损 b、制冷效果正常	合格
2	冷风机安装	a、安装正确，无缺损 b、制冷效果正常	合格
3	冷库门板	a、密封性能良好、开关灵活 b、安装牢固，无缝隙	合格
4	地板	安装牢固，无缝隙	合格

7 验证项目实施

7.1 风机工作状况

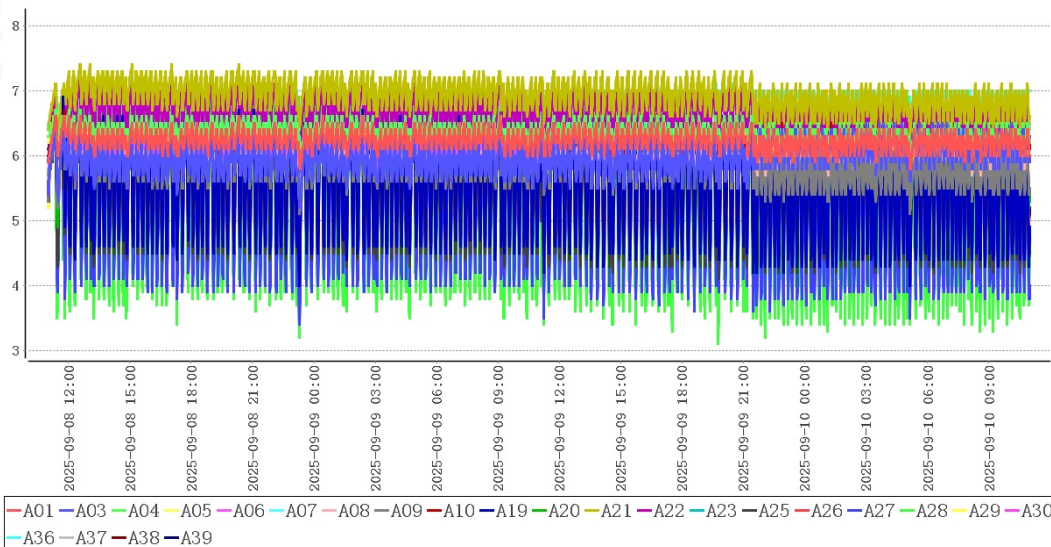


时间	均匀点位 平均值	所有点位 最大值	所有点位 最小值	环境温度	备注
2025-09-08 10:38	6.4	6.9	5.7	22.5	启动风机

在环境温度22.5℃~22.8℃情况下，关闭仓库门，开启风机1分钟后所有验证布点温度达到要求范围，建议日常使用时至少提前1分钟启动风机，随着环境温度变化，可适当增减启动时间。

7.2 温控设施设备运行参数及使用状况测试--参数测试

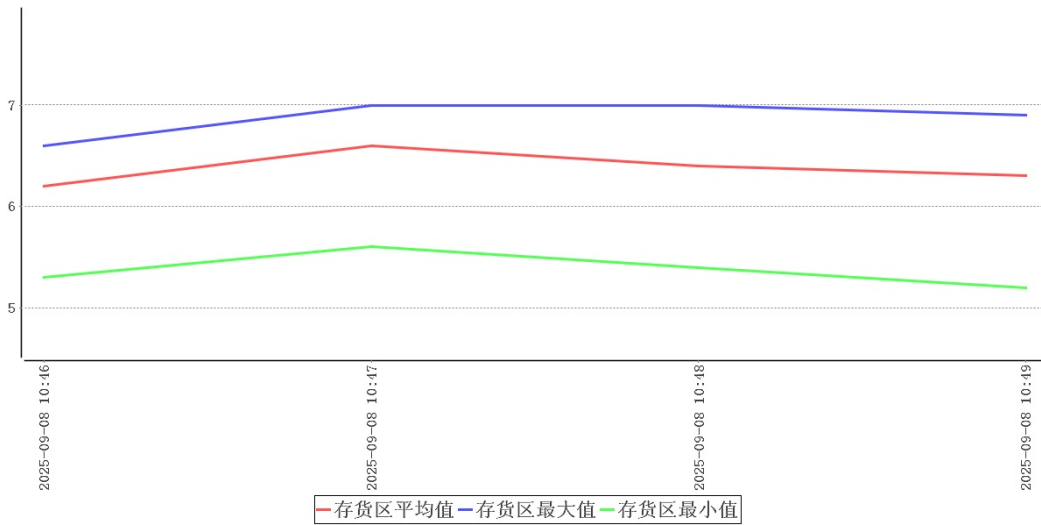
风机名称	设定启动	设定停止	检测启动	检测停止	结果
风机01					



测点	最大值	最小值	平均值
A01	6.6	5.8	6.2
A03	6.5	5.2	6.0
A04	6.7	6.1	6.4
A05	6.7	5.8	6.3
A06	6.5	5.7	6.2
A07	6.6	6.1	6.4
A08	6.5	5.5	6.0
A09	6.4	5.1	5.9
A10	6.7	5.7	6.3
A19	6.9	4.0	5.7
A20	6.7	4.8	5.9
A21	7.4	6.1	6.9
A22	7.2	5.7	6.6
A23	6.5	4.9	5.8
A25	6.5	4.1	5.5
A26	6.5	4.3	5.7
A27	6.6	3.4	5.3
A28	7.0	3.1	5.5
A29	6.5	4.0	5.4
A30	6.6	4.9	5.9
A36	7.1	6.4	6.9
A37	6.9	6.2	6.6
A38	6.7	6.0	6.4
A39	6.7	4.5	5.9

在当前设置的工作条件下，库内温度在3.1℃~7.4℃之间，符合2.0℃~8.0℃验证标准。

7.3 温控设施设备运行参数及使用状况测试—多组风机轮换



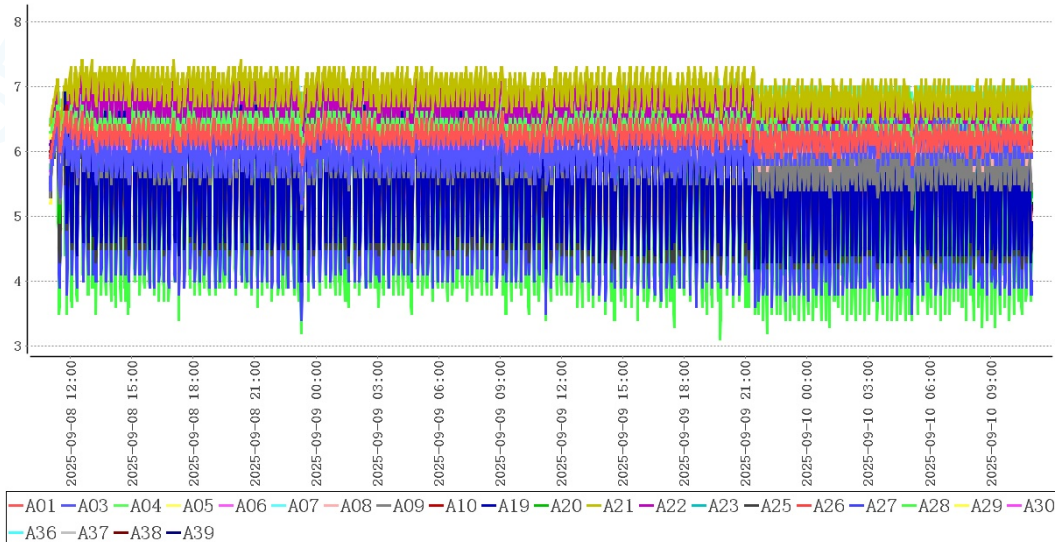
风机01启动时温度分布曲线

检测项目	规范要求	检测结果	结论
风机01启动	全部测点温度范围 (2.0~8.0) °C	5.2°C~7.0°C	合格

从上表可以看出：当风机01开启时，库内温度最高点为7.0°C，库内温度最低点为5.2°C，符合2.0°C~8.0°C验证标准。

7.4 温度分布特性测试

7.4.1 温度分布特性



(1)、温度偏差

温度偏差指温控设施设备稳定状态下，测试空间的中心点在规定时间内多次实测温度的平均值与温度设定值的差值, 计算公式: $\Delta t_d = t_d - t_0$

式中：

Δt_d ——温度偏差, 单位为摄氏度($^{\circ}\text{C}$)；

t_d ——温度设定值, 单位为摄氏度($^{\circ}\text{C}$)；

t_o ——中心点在规定时间内 n 次测量平均值, 单位为摄氏度($^{\circ}\text{C}$)

点位类型	测点	设定值(t_d)	平均值(t_o)
中心点	A01	5.0	6.2

温度偏差 $\Delta t_d = t_d - t_o = -1.2^{\circ}\text{C}$

(2)、均匀度

温度均匀度指温控设施设备稳定状态下, 测试空间各测点在规定时间内每次测量中实测最高温度与最低温度之差的算术平均值, 计算公式: $\Delta t_u = \Sigma (t_{imax} - t_{imin}) / n$

式中：

Δt_u ——温度均匀度, 单位为摄氏度($^{\circ}\text{C}$)；

t_{imax} ——各测点在规定时间内第 i 次测得的最高温度, 单位为摄氏度($^{\circ}\text{C}$)；

t_{imin} ——各测点在规定时间内第 i 次测得的最低温度, 单位为摄氏度($^{\circ}\text{C}$)。

n ——测量次数。

各测点最大值和最小值见附录A: 各测点极值表

均匀度 $\Delta t_u = \Sigma (t_{imax} - t_{imin}) / n = 2.0^{\circ}\text{C}$

(3)、波动度

温度波动度指温控设施设备稳定状态下, 测试空间的中心点在规定时间内多次实测最高温度与最低温度之差的一半, 计算公式: $\Delta t_f = \pm (t_{omax} - t_{omin}) / 2$

式中：

Δt_f ——温度波动度, 单位为摄氏度($^{\circ}\text{C}$)；

t_{omax} ——中心点在规定时间内 n 次测量中的最高温度, 单位为摄氏度($^{\circ}\text{C}$)；

t_{omin} ——中心点在规定时间内 n 次测量中的最低温度, 单位为摄氏度($^{\circ}\text{C}$)。

点位类型	测点	最大值(t_{omax})	最小值(t_{omin})
中心点	A01	6.6	5.8

波动度 $\Delta t_f = \pm (t_{omax} - t_{omin}) / 2 = 0.4^{\circ}\text{C}$

(4)、结论综述

点位类型	测点	最大值	最小值	平均值
中心点	A01	6.6	5.8	6.2
均匀布点	A03	6.5	5.2	6.0
	A04	6.7	6.1	6.4
	A05	6.7	5.8	6.3
	A06	6.5	5.7	6.2
	A07	6.6	6.1	6.4
	A08	6.5	5.5	6.0
	A09	6.4	5.1	5.9
	A10	6.7	5.7	6.3
出入口	A19	6.9	4.0	5.7
	A20	6.7	4.8	5.9
	A21	7.4	6.1	6.9
	A22	7.2	5.7	6.6
	A23	6.5	4.9	5.8
风机	A25	6.5	4.1	5.5
	A26	6.5	4.3	5.7
	A27	6.6	3.4	5.3
	A28	7.0	3.1	5.5
	A29	6.5	4.0	5.4
	A30	6.6	4.9	5.9
风向死角	A36	7.1	6.4	6.9
	A37	6.9	6.2	6.6
监测位置	A38	6.7	6.0	6.4
	A39	6.7	4.5	5.9
环境外温	A40	25.4	22.7	23.9

在库房空调或制冷系统温度控制参数符合设定要求、库房温度符合设定范围后，数据有效持续采集时间为48小时0分钟，在环境温度处于22.7℃~25.4℃情况下，库内各测点温度在3.1℃(A28)~7.4℃(A21)之间，未超出温控范围2.0℃~8.0℃。根据《GBT34399-2017医药产品冷链物流温控设施设备验证性能确认技术规范》附录A计算方法，温度偏差 $\Delta t_d = t_d - t_o = -1.2^\circ\text{C}$ 、波动度 $\Delta t_f = \pm (t_{\text{max}} - t_{\text{min}}) / 2 = 0.4^\circ\text{C}$ 、均匀度 $\Delta t_u = \Sigma (t_{\text{imax}} -$

timin) /n=2.0℃，可知偏差、均匀度、波动度各项数值不高于±3℃，符合国家标准要求。

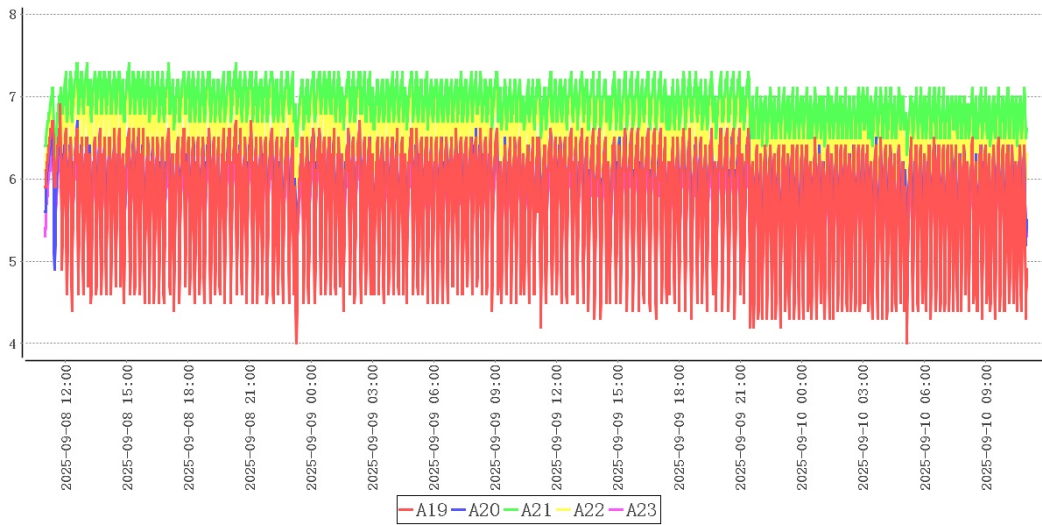
7.4.2 风机



测点	最大值	最小值	平均值
A25	6.5	4.1	5.5
A26	6.5	4.3	5.7
A27	6.6	3.4	5.3
A28	7.0	3.1	5.5
A29	6.5	4.0	5.4
A30	6.6	4.9	5.9

检测项目	规范要求	检测结果	结论
风机01附近温度均匀性	全部测点温度范围 (2.0~8.0)℃	3.1~7.0℃	合格

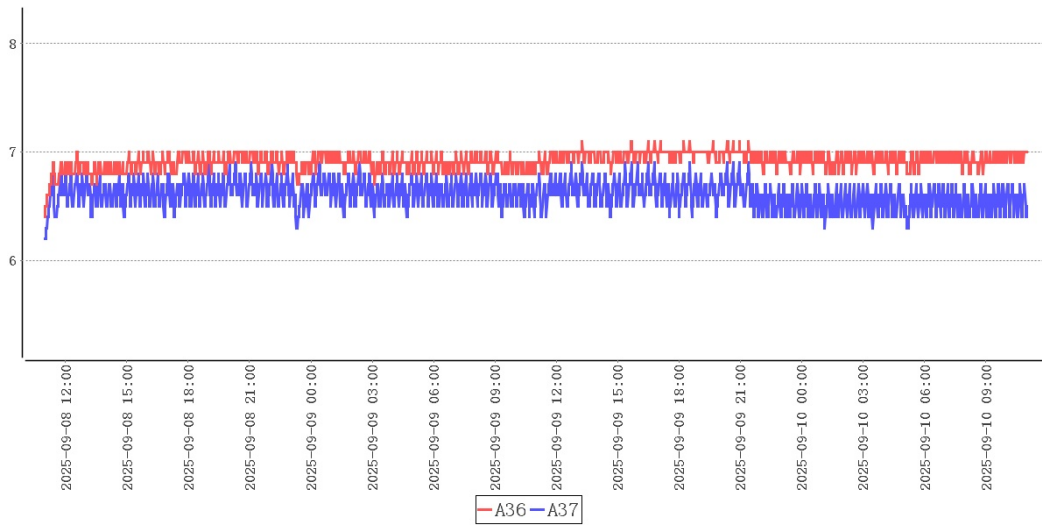
7.4.3 出入口



测点	最大值	最小值	平均值
A19	6.9	4.0	5.7
A20	6.7	4.8	5.9
A21	7.4	6.1	6.9
A22	7.2	5.7	6.6
A23	6.5	4.9	5.8

检测项目	规范要求	检测结果	结论
门01附近温度均匀性	全部测点温度范围 (2.0~8.0)℃	4.0~7.4℃	合格

7.4.4 风向死角



测点	最大值	最小值	平均值
A36	7.1	6.4	6.9
A37	6.9	6.2	6.6

检测项目	规范要求	检测结果	结论
风向死角附近温度均匀性	全部测点温度范围 (2.0~8.0)℃	6.2~7.1℃	合格

7.4.5 适宜存放的安全位置及区域

根据以上分析，该冷库中除个别温度易超标区域不适合存放药品外，其他区域皆可放置。

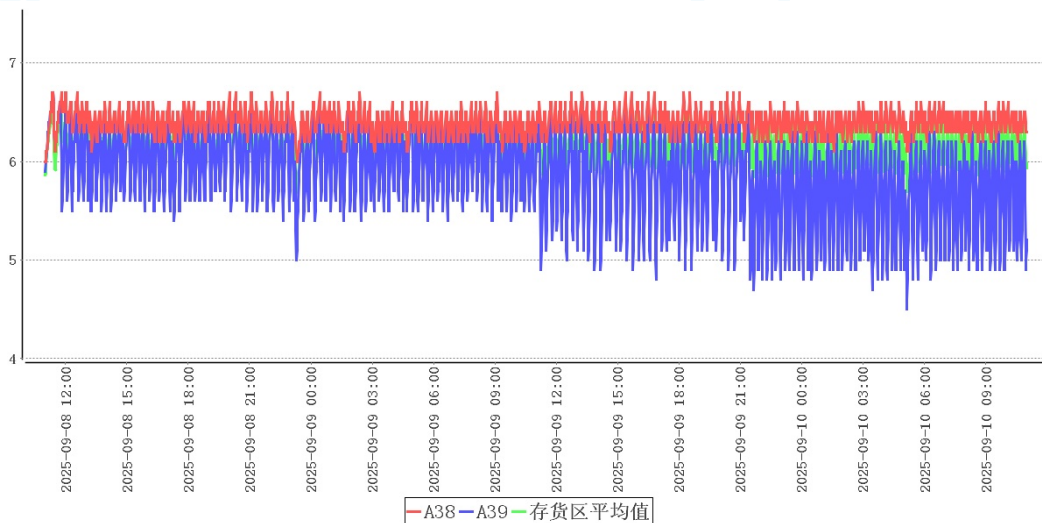
不适合存放药品的区域有：风机出口下沿下方0.3m以上空间, 门口1米空间范围内, 风向死角范围内。

7.5 温度自动监测设备安装位置确认

结合温度分布特性可得出以下表格：

冷点热点表

测点	最大值	最小值	平均值
A04(热点)	6.7	6.1	6.4
A38(热点)	6.7	6.0	6.4
A39(冷点)	6.7	4.5	5.9
货区点位	6.7	4.5	6.2



监测点位表

测点	最大值	最小值	平均值
A38	6.7	6.0	6.4
A39	6.7	4.5	5.9

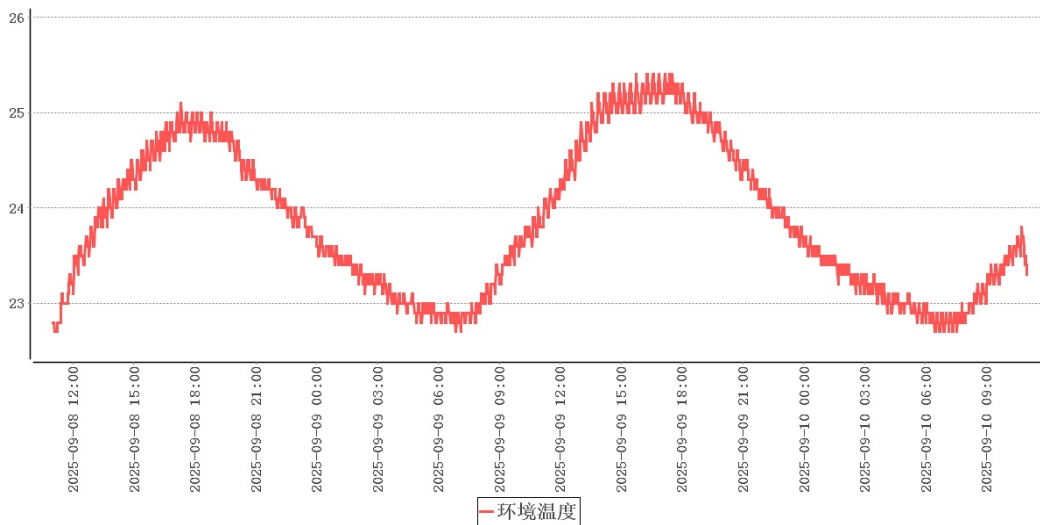
结合库内高温敏感区、低温敏感区分析，库内热点为A04、A38，库内冷点为A39。当前监测点位A38温度与热点温度在 $\pm 1.0^{\circ}\text{C}$ 准确度误差之内，符合监测点位设置要求。当前监测点位A39即冷点敏感区，符合监测点位设置要求。

7.6 开关门验证

7.7 设备故障或外部供电中断的状况下保温性能及变化趋势

7.8 本地区的高温或低温等极端外部环境条件下保温效果评估

外部温度	最大值	最小值	采集次数	平均值
仓库室外温度	25.4	22.7	2880次	23.9



本次验证实施期间库外温度 $22.7^{\circ}\text{C}\sim 25.4^{\circ}\text{C}$ ，非本地区高温/低温环境，建议在高温/低温环境下再次实施极热/极寒验证。

8 偏差处理

无

9 验证结论

序号	项目名称	结论
1	风机工作情况确认	在环境温度22.5℃~22.8℃情况下，关闭仓库门，开启风机1分钟后所有验证布点温度达到要求范围，建议日常使用时至少提前1分钟启动风机，随着环境温度变化，可适当增减启动时间。
2	本地区的高温或低温等极端外部环境条件下的温度保障能力确认	本次验证实施期间库外温度22.7℃~25.4℃，非本地区高温/低温环境，建议在高温/低温环境下再次实施极热/极寒验证。
3	温度监测系统配置的测点终端安装位置确认	结合库内高温敏感区、低温敏感区分析，库内热点为A04、A38，库内冷点为A39。当前监测点位A38温度与热点温度在±1.0℃准确度误差之内，符合监测点位设置要求。当前监测点位A39即冷点敏感区，符合监测点位设置要求。
4	温控设施设备运行参数及使用状况测试-参数测试	在当前设置的工作条件下，库内温度在3.1℃~7.4℃之间，符合2.0℃~8.0℃验证标准。
5	温度分布特性的测试与分析	在库房空调或制冷系统温度控制参数符合设定要求、库房温度符合设定范围后，数据有效持续采集时间为48小时0分钟，在环境温度处于22.7℃~25.4℃情况下，库内各测点温度在3.1℃(A28)~7.4℃(A21)之间，未超出温控范围2.0℃~8.0℃。根据《GBT34399-2017医药产品冷链物流温控设施设备验证性能确认技术规范》附录A计算方法，温度偏差 $\Delta t_d = t_d - t_o = -1.2^\circ\text{C}$ 、波动度 $\Delta t_f = \pm (t_{\text{max}} - t_{\text{min}}) / 2 = 0.4^\circ\text{C}$ 、均匀度 $\Delta t_u = \sum (t_{\text{imax}} - t_{\text{imin}}) / n = 2.0^\circ\text{C}$ ，可知偏差、均匀度、波动度各项数值不高于±3℃，符合国标要求。
6	温控设施设备运行参数及使用状况测试-多组风机轮换	当风机01开启时，库内温度最高点为7.0℃，库内温度最低点为5.2℃，符合2.0℃~8.0℃验证标准。
7	开门作业对库房温度分布的影响	门01开门测试共持续3分钟，在环境温度处于22.6℃~22.9℃情况下，各测点温度在2.8℃(A28)~7.3℃(A30)之间，未超出温控范围2.0℃~8.0℃。

序号	项目名称	结论
8	确定设备故障或外部供电中断的状况下库房保温性能及变化趋势	本次测试共进行18分钟，变化速率最快的点为A28，升温速率为0.222℃/分，由此速率可计算出此点再有1分钟就会达到温度上限8.0℃。因此外部温度23.2℃时，遇到异常情况时，需在19分钟内恢复供电，如不能及时恢复供电，需要对库内药品做转库处理。

10 风险防范及预防措施

11 附件

1. 详见验证数据汇总
2. 详见验证设备的校准证书（法定计量单位出具）复印件

12 报告确认

经验证小组审批，各项确认结果均符合标准要求，批准投入使用，特此声明。

确认项目名称：1号冷库常温满载验证

负责人 _____

合格证

CERTIFICATE



使用单位: 民和县疾病预防控制中心

验证对象: 1号冷库

验证日期: 2025年09月10日

验证结果: 合格

验证类型: 定期验证



北京世福宝科技有限公司

公司网址: <http://www.sevobo.com>

Beijing SEVOBO Technology Co., Ltd

公司地址: 北京市通州区马驹桥联东U谷西区11B

附录A: 各测点极值表

时间	所有点最大值 (timax)	所有点最小值 (timin)	timax-timin
2025-09-08 11:00:00			
2025-09-08 11:01:00			
2025-09-08 11:02:00			
2025-09-08 11:03:00			
2025-09-08 11:04:00			
2025-09-08 11:05:00			
2025-09-08 11:06:00			
2025-09-08 11:07:00			
2025-09-08 11:08:00			
2025-09-08 11:09:00			
2025-09-08 11:10:00			
2025-09-08 11:11:00			
2025-09-08 11:12:00			
2025-09-08 11:13:00			
2025-09-08 11:14:00			
2025-09-08 11:15:00			
2025-09-08 11:16:00			
2025-09-08 11:17:00			
2025-09-08 11:18:00			
2025-09-08 11:19:00			
2025-09-08 11:20:00			
2025-09-08 11:21:00			
2025-09-08 11:22:00			
2025-09-08 11:23:00			
2025-09-08 11:24:00			
2025-09-08 11:25:00			
2025-09-08 11:26:00			
2025-09-08 11:27:00			

时间	所有点最大值 (timax)	所有点最小值 (timin)	timax-timin
2025-09-08 11:28:00			
2025-09-08 11:29:00			
2025-09-08 11:30:00			
2025-09-08 11:31:00			
2025-09-08 11:32:00			
2025-09-08 11:33:00			
2025-09-08 11:34:00			
2025-09-08 11:35:00			
2025-09-08 11:36:00			
2025-09-08 11:37:00			
2025-09-08 11:38:00			
2025-09-08 11:39:00			
2025-09-08 11:40:00			
2025-09-08 11:41:00			
2025-09-08 11:42:00			
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2025-09-08 11:50:00			
2025-09-08 11:51:00			
2025-09-08 11:52:00			
2025-09-08 11:53:00			
2025-09-08 11:54:00			
2025-09-08 11:55:00			
2025-09-08 11:56:00			
2025-09-08 11:57:00			

时间	所有点最大值 (timax)	所有点最小值 (timin)	timax-timin
2025-09-08 11:58:00			
2025-09-08 11:59:00			
2025-09-08 12:00:00			
2025-09-08 12:01:00			
2025-09-08 12:02:00			
2025-09-08 12:03:00			
2025-09-08 12:04:00			
2025-09-08 12:05:00			
2025-09-08 12:06:00			
2025-09-08 12:07:00			
2025-09-08 12:08:00			
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2025-09-08 12:22:00			
2025-09-08 12:23:00			
2025-09-08 12:24:00			
2025-09-08 12:25:00			
2025-09-08 12:26:00			
2025-09-08 12:27:00			

时间	所有点最大值 (timax)	所有点最小值 (timin)	timax-timin
2025-09-08 12:28:00			
2025-09-08 12:29:00			
2025-09-08 12:30:00			
2025-09-08 12:31:00			
2025-09-08 12:32:00			
2025-09-08 12:33:00			
2025-09-08 12:34:00			
2025-09-08 12:35:00			
2025-09-08 12:36:00			
2025-09-08 12:37:00			
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2025-09-08 12:52:00			
2025-09-08 12:53:00			
2025-09-08 12:54:00			
2025-09-08 12:55:00			
2025-09-08 12:56:00			
2025-09-08 12:57:00			

时间	所有点最大值 (timax)	所有点最小值 (timin)	timax-timin
2025-09-08 12:58:00			
2025-09-08 12:59:00			
2025-09-08 13:00:00			
2025-09-08 13:01:00			
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2025-09-10 10:09:00			
2025-09-10 10:10:00			
2025-09-10 10:11:00			
2025-09-10 10:12:00			
2025-09-10 10:13:00			
2025-09-10 10:14:00			
2025-09-10 10:15:00			
2025-09-10 10:16:00			
2025-09-10 10:17:00			
2025-09-10 10:18:00			
2025-09-10 10:19:00			
2025-09-10 10:20:00			
2025-09-10 10:21:00			
2025-09-10 10:22:00			
2025-09-10 10:23:00			
2025-09-10 10:24:00			
2025-09-10 10:25:00			
2025-09-10 10:26:00			
2025-09-10 10:27:00			

时间	所有点最大值 (timax)	所有点最小值 (timin)	timax-timin
2025-09-10 10:28:00			
2025-09-10 10:29:00			
2025-09-10 10:30:00			
2025-09-10 10:31:00			
2025-09-10 10:32:00			
2025-09-10 10:33:00			
2025-09-10 10:34:00			
2025-09-10 10:35:00			
2025-09-10 10:36:00			
2025-09-10 10:37:00			
2025-09-10 10:38:00			
2025-09-10 10:39:00			
2025-09-10 10:40:00			
2025-09-10 10:41:00			
2025-09-10 10:42:00			
2025-09-10 10:43:00			
2025-09-10 10:44:00			
2025-09-10 10:45:00			
2025-09-10 10:46:00			
2025-09-10 10:47:00			
2025-09-10 10:48:00			
2025-09-10 10:49:00			
2025-09-10 10:50:00			
2025-09-10 10:51:00			
2025-09-10 10:52:00			
2025-09-10 10:53:00			
2025-09-10 10:54:00			
2025-09-10 10:55:00			
2025-09-10 10:56:00			
2025-09-10 10:57:00			

时间	所有点最大值 (t _{imax})	所有点最小值 (t _{imin})	t _{imax} -t _{imin}
2025-09-10 10:58:00			
2025-09-10 10:59:00			
2025-09-10 11:00:00			