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23029

UNIDO Contract No.: 01/088

Project No.: MP/CPR/00/059

Activity Code: 460D31

## **FINAL REPORT**

**Phasing Out ODS in the Production of Compressors  
at Jiangsu Baixue Electric Appliances Co.,  
People's Republic of China**

**Berva Co. Ltd., "f.a."  
Eger, Hungary  
14 December 2004**

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## 1. INTRODUCTION

The subject of this Project was phasing out ODs (CFCs) in the production of household refrigerator compressors at Jiangsu Baixue Electric Appliances Co. in China.

This activity included design modifications of different compressor types to make them suitable for the operation with HFC refrigerants. Because of compatibility purposes the use of other lubricating liquids – synthetic lubricants – became necessary. As a consequence of the use of new refrigerant and lubricant, to achieve the same or better technical parameters of compressors, significant changes in the production technology should be performed.

The steps of design and technological modifications and changes, the technical assistance given by Berva experts to Baixue engineers, and the results of trial production were presented in the 1st – 4th Progress Reports.

In this Final Report we wish to verify the suitability and applicability of the new compressor designs and the modified technology.

## 2. TESTS AND TEST REPORTS OF COMPRESSORS

According to the agreement between UNIDO and Berva the task was to modify the 1-1 biggest models of 3 compressor types (3 different designs) of the production company, Baixue Electric Appliances.

The codes of old and new designs are the following:

Code of old designs	Code of new designs
QD51L	QDH51G
QD80LA	QDH80G
QD126G	QDH126G

### Comparison of technical parameters of the old and new designs

	QD51L (CFC-12)	QDH51G (HFC-134a)	
		Target	Actual
Q <sub>0</sub> (watt)	128 -5%	128	138
COP	1.08	1.20	1.27
Noise dB(A)	40	40	38

	QD80LA (CFC-12)	QD80LA (HFC-134a)	
		Target	Actual
Q <sub>0</sub> (watt)	195 -5%	183	223
COP	1.14	1.30	1.50
Noise dB(A)	42	42	38

	QD126G (CFC-12)	QD126G (HFC-134a)	
		Target	Actual
Q <sub>0</sub> (watt)	385 -5%	331	328
COP	1.27	1.30	1.38
Noise dB(A)	50	50	45

Comparing the target and actual values of the above tables it can be seen that technical parameters achieved are acceptable.

Compressor tests were performed by competent Chinese authorities of Jiangsu Provincial Supervising and Testing Center for Products Quality.

Test Reports are attached as Appendix 1, 2, and 3. For Model QDH51G the TÜV Certificate is attached in Appendix 4.

### 3. EVALUATION OF THE MODIFIED TECHNOLOGY


The modifications and changes in technology due to the change of refrigerant and the quality improvement of the new compressor designs are satisfactory. The plant is suitable to produce 1 million compressors annually in the required quality. It was also confirmed by Chinese authorities during the Acceptance Meeting on 27 September 2004.

No more modification in the technology are necessary. According to the experience of trial production the technology is suitable for mass production.

### 4. EVALUATION OF THE PROJECT

According to the above mentioned details we can declare that the project was finished successfully.

The aim of the project was met, the CFCs were eliminated from household refrigerator compressor production at Jiangsu Baixue Electric Appliances Company.

  
 János Pusztai  
 Project Team Leader

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国质监验字10号 2000国认苏字Z0216号

(2004)SJDQ-WT0151

# 检 验 报 告

## Test Report

产 品 名 称 \_\_\_\_\_ 压缩机  
Product Name \_\_\_\_\_

规 格 型 号 \_\_\_\_\_ QDH51G  
Specifications \_\_\_\_\_

受 检 单 位 \_\_\_\_\_ 江苏白雪电器股份有限公司  
Unit being tested \_\_\_\_\_

检 验 类 别 \_\_\_\_\_ 委托检验  
Test Kind \_\_\_\_\_

江苏省产品质量监督检验中心所  
Jiangsu Provincial Supervising & Testing Center for Products Quality

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江苏省产品质量监督检验中心所  
Jiangsu Provincial Supervising & Testing Center for Products Quality

检 验 报 告  
Test Report

(2004)SJDQ-WT151

共 2 页 第 1 页

产品名称 Product Name	压缩机	规格型号 Specifications	QDH51G
受检单位 Unit being tested	江苏白雪电器股份有限公司	商 标 Brand	白雪
受检单位地址 Address of Unit being tested	常熟市白雪路	检验类别 Test Kind	委托检验
生产单位 Manufacturer	江苏白雪电器股份有限公司	样品等级 Grade	—
抽样地点 Sampling Location	—	送样日期 Receipt Date	2004-11-1
样品数量 Sample Quantity	1台	检测日期 Test Date	2004-11-1~2004-11-3
抽样基数 Sample Batch	—	生产日期/批号 Producing Date/Batch No.	2004.10
样品状态 Sample Description	完好		
检验依据 Test Standard(s)	GB/T 9098-1996 《电冰箱用全封闭型电动机--压缩机》 GB 4706.17-1996 《家用和类似用途电器的安全 电动机-压缩机的特殊要求》 QJ/AN 0201-2002 《QDL、QG、QDHC 全封闭型电动机——压缩机最终检验技术条件》 QJ/AN 0208-2004 《R134a 全封闭型电动机——压缩机整机、零部件残余水份含量验收技术条件》 QJ/AN 0209-2004 《R134a 全封闭型电动机——压缩机整机、零部件杂质含量验收技术条件》 说明书		
检验结论 Test Conclusion	样品经检验，所测项目符合 GB/T 9098-1996、GB 4706.17-1996、QJ/AN 0201-2002、QJ/AN 0208-2004、QJ/AN 0209-2004 标准和说明书规定的要求。  签发日期： Signature date		
备 注 Note			

审 批: 郭艳萍  
Approval

校 核: 潘毅  
Proofreader

主 检: 黄耀华  
Major tester

职 务: 主任检验员

职 务: 高级检验员

职 务: 检验员

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# 检 验 结 果

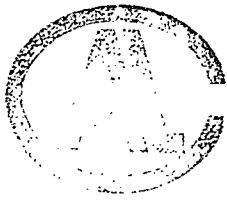
## Test Results

共 2 页 第 2 页

(2004)SJDQ-WT0151

序 号	检 验 项 目	单 位	技 术 要 求	检 验 结 果	单 项 评 价
1	制冷能力	——	实际制冷量应不小于名义值的95%。(额定值: 138 W)	103%	合格
2	制冷系数	——	不小于1.26	1.27	合格
3	输入功率	——	应不超过额定值的110%。(额定值: 109 W)	102%	合格
4	工作电流	——	应不超过额定值的110%。(额定值: 0.59A)	98%	合格
5	壳体温度	℃	不应超过80	63	合格
6	电机绕组温度	℃	不应超过120	99	合格
7	启动性能	——	升电压启动: 242V, 降电压启动: 170V各连续启动三次, 压缩机均应能正常工作。	符合	合格
8	残余水份含量	mg	不超过70	25	合格
9	残余杂质含量	mg	不超过30	11	合格
10	冷态电气强度	——	电机各绕组对机壳之间的绝缘应能承受频率50Hz、1800V、1mA试验电压1s, 应无闪络和击穿现象。	符合	合格
11	冷态绝缘电阻	MΩ	应大于100	> 500	合格
12	噪声	dB(A)	不应超过40	38	合格
13	振动	m/s <sup>2</sup>	应小于0.7	0.3	合格





认证(国)字(C0145)

国发监认字027号

共 4 页 第 1 页

No: WY-03-016

# 检 验 报 告

产品名称: 电动机-压缩机

检验类别: 委托检验

受检单位: -----

委托单位: 江苏白雪电器股份有限公司

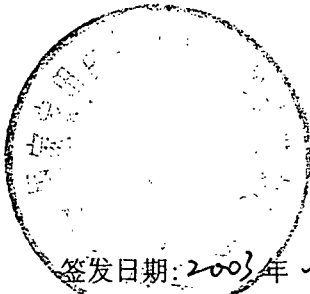
国家家用电器质量监督检验中心



国家家用电器质量监督检验中心  
检 验 报 告

报告编号:WY-03-016

共 4 页 第 2 页

产品名称	电动机-压缩机	型号规格	QDH80G
生产单位	江苏白雪电器股份有限公司	商 标	白雪
受检单位	----	样品等级	----
委托单位	江苏白雪电器股份有限公司	样品数量	1 台
检验类别	委托检验	抽样地点	----
样品来源	送样	抽样基数	----
样品编号	342-3176-1		
检验依据	GB/T 9098-1996		
<p>检验结论:</p> <p style="text-align: center;">受江苏白雪电器股份有限公司的委托, 对该厂生产的 QDH80G 型电动机-压缩机进行制冷量、输入功率、工作电流、性能系数、壳温及噪声检验, 所检项目符合标准要求。(以下空白)</p> <div style="text-align: center; margin-top: 100px;">  <p>签发日期: 2003 年 5 月 22 日</p> </div>			
主检:	董书强	审核:	曹宗峰
		批准:	金 利

## 样 品 描 述

## 电源性质

AC    DC    单相    三相

## 防触电保护类别

0类    0I类    I类    II类    III类

## 防潮(水)等级

普通型,    防溅型,    水密型

安装使用形式: 固定安装在其它位置

电动机: 工作电压为器具的额定电压的电动机

工作电压与器具的额定电压不同的电动机

辅助绕组带有电容器的电动机

定频压缩机

交流变频压缩机

带有过负载保护器:

过负载保护系统

自复位型

非自复位型

带有其他用于非正常工作保护的薄弱环节

带有程序控制器

本产品厂家声明制冷剂采用 R134a ,

但本报告对其制冷剂的毒性、易燃性、易爆性、对绝缘材料、润滑油的兼容性等都不作判断。

## 1、检验开始时对样品的确认

包装完好

PTC 启动器

重锤启动器

运转电容

启动电容

防触电保护外罩

外导线接线端子

附件齐全

其它

2、本次检验开始日期      2003年5月16日

    检验结束日期          2003年5月20日

3、本次检验没有偏离标准。

本次检验偏离标准。

    偏离的原因和偏离的情况:

报告编号: WY-03-016

共 4 页第 4 页

序号	检验项目	技术要求	标准值	检验结果	结论	
				342-3176-1		
1.	制 冷 量	在下表规定的试验温度条件下, 制冷量不应小于名义值 95%。 名义值      223                  W	212	223.29	合格	
		冷凝温度      54.4±0.3				
		蒸发温度      -23.3±0.2				
		过冷温度      32.2±0.3				
		吸气温度      32.2±3				
		环境温度      32.2±1				
2.	输入功率 W	实测输入功率值不应超过额定值的 115%。 额定值      149                  W	171	149	合格	
	工作电流 A	实测工作电流值不应超过额定值的 110%。 额定值      0.83                  A	0.91	0.82	合格	
3.	性能系数 (cop)	(1)在上表规定的试验温度条件下, 性能系数(c. o. p)应不小于表 1 规定的限值。 表 1	1.02	1.50	合格	
		气缸名义工作容积 cm <sup>3</sup>				8.0
		性能系数(c. o. p)W/W				1.02
4.	壳体温度 ℃	(1)压缩机壳体处于低压端的, 不应超过 95℃。 (2)压缩机壳体处于高压端的, 不应超过 115℃。	95	58.0	合格	
5.	噪 声	(1)压缩机运转时, 不应有异常声音。(A 计权) 声功率级噪声值应不大于表 3 规定的限值。 表 3	42	38.02	合格	
		气缸名义工作容积 cm <sup>3</sup>				8.0
		(A 计权) 声功率级噪声值 dB(A)				42

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国质监验字10号 2000经认苏字Z0218号

(2004)SJDQ-WT0152

# 检 验 报 告

## Test Report

产 品 名 称 \_\_\_\_\_ 压缩机  
Product Name \_\_\_\_\_

规 格 型 号 \_\_\_\_\_ QDH126G  
Specifications \_\_\_\_\_

受 检 单 位 \_\_\_\_\_ 江苏白雪电器股份有限公司  
Unit being tested \_\_\_\_\_

检 验 类 别 \_\_\_\_\_ 委托检验  
Test Kind \_\_\_\_\_

江苏省产品质量监督检验中心所  
Jiangsu Provincial Supervising & Testing Center for Products Quality

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**江苏省产品质量监督检验中心所**  
Jiangsu Provincial Supervising & Testing Center for Products Quality

**检 验 报 告**  
Test Report

(2004)SJDQ-WT152

共 2 页 第 1 页

产品名称 Product Name	压缩机	规格型号 Specifications	QDH126G
受检单位 Unit being tested	江苏白雪电器股份有限公司	商 标 Brand	白雪
受检单位地址 Address of Unit being tested	常熟市白雪路	检验类别 Test Kind	委托检验
生产单位 Manufacturer	江苏白雪电器股份有限公司	样品等级 Grade	—
抽样地点 Sampling Location	—	送样日期 Receipt Date	2004-11-1
样品数量 Sample Quantity	1台	检测日期 Test Date	2004-11-1~2004-11-3
抽样基数 Sample Batch	—	生产日期/批号 Producing Date/Batch No.	2004.10
样品状态 Sample Description	完好		
检验依据 Test Standard(s)	GB/T 9098-1996 《电冰箱用全封闭型电动机--压缩机》 GB 4706.17-1996 《家用和类似用途电器的安全 电动机-压缩机的特殊要求》 QJ/AN 0201-2002 《QDL、QG、QDHC 全封闭型电动机——压缩机最终检验技术条件》 QJ/AN 0208-2004 《R134a 全封闭型电动机——压缩机整机、零部件残余水份含量验收技术条件》 QJ/AN 0209-2004 《R134a 全封闭型电动机——压缩机整机、零部件杂质含量验收技术条件》 说明书		
检验结论 Test Conclusion	样品经检验，所测项目符合 GB/T 9098-1996、GB 4706.17-1996、QJ/AN 0201-2002、QJ/AN 0208-2004、QJ/AN 0209-2004 标准和说明书规定的要求。  <div style="text-align: right;">             签发日期： Signature date           </div>		
备 注 Note	<div style="text-align: right;">  </div>		

审 批: 郭艳萍

Approval

校 核: 潘孝俊

Proofreader

主 检: 黄耀华

Major tester

职 务: 主任检验员

职 务: 高级检验员

职 务: 检验员

# 检 验 结 果

## Test Results

(2004)SJDQ-WT0152

共 2 页 第 2 页

序号	检 验 项 目	单 位	技 术 要 求	检 验 结 果	单 项 评 价
1	制冷能力	——	实际制冷量应不小于名义值的95%。(额定值: 328 W)	101%	合格
2	制冷系数	——	不小于1.37	1.38	合格
3	输入功率	——	应不超过额定值的110%。(额定值: 240 W)	100%	合格
4	工作电流	——	应不超过额定值的110%。(额定值: 1.52A)	100%	合格
5	壳体温度	℃	不应超过80	72	合格
6	电机绕组温度	℃	不应超过120	105	合格
7	启动性能	——	升电压启动: 242V, 降电压启动: 170V各连续启动三次, 压缩机均应能正常工作。	符合	合格
8	残余水份含量	mg	不超过70	36	合格
9	残余杂质含量	mg	不超过30	15	合格
10	冷态电气强度	——	电机各绕组对机壳之间的绝缘应能承受频率50Hz、1800V、1mA试验电压1s, 应无闪络和击穿现象。	符合	合格
11	冷态绝缘电阻	MΩ	应大于100	>500	合格
12	噪声	dB(A)	不应超过50	45	合格
13	振动	m/s <sup>2</sup>	应小于1.6	0.7	合格

ZERTIFIKAT • CERTIFICATE • 認証証書 • CERTIFIKAT • CERTIFICADO • CERTIFICAT

Handwritten text at the top of the page, possibly a date or reference number.



# CERTIFICATE

No. B 04 07 53497 001

**Holder of Certificate:** **Jiangsu Baixue Electric Appliances Co., Ltd.**  
Baixue R.D.  
215500 Changshu/ Jiangsu  
People's Republic of China

**Certification Mark:**



**Product:** **Compressors**  
**Motor-compressor**

The product was tested on a voluntary basis and complies with the essential requirements.  
The certification mark shown above can be affixed on the product. See also notes overleaf.

**Test report no.:** 70222415001



**Date,** 2004-07-27

Page 1 of 3



**CERTIFICATE**

No. B 04 07 53497 001



**Model(s):**

**QDH51G, QDH43G, QDH35G,  
QDH28G; QDHC67G, QDHC51G**  
For model differences refer to Page 3

**Parameters:**

Rated voltage:	AC 220-240V
Rated frequency:	50Hz
Degree of Protection:	IP 00

**Tested  
according to:**

EN 60335-2-34/A11:2004

**Production  
Facility(ies):**

53497

**CERTIFICATE**  
**No. B 04 07 53497 001**



The following models will be covered by above certificate:

Model differences:

Low back pressure single phase hermetic reciprocating refrigerating compressors, with external starting device and protector, tested with Annex AA.

QDH51G: basic model, refrigerant R134a, nominal capacity is 118W.

QDH43G: additional model, with different motor, R134a, nominal capacity is 103W.

QDH35G: additional model, with different motor, R134a, nominal capacity is 83W.

QDH28G: additional model, with different motor, R134a, nominal capacity is 68W.

QDHC67G: additional model, use same motor with QDH43G's, but use refrigerant R600a, nominal capacity 100W

QDHC51G: additional model, with different motor, R600a, nominal capacity is 76W.

All other materials and internal parts are same.

15370013



# EC Attestation of Conformity

No.: APL 04 07 53497 001

Jiangsu Baixue Electric Appliances Co., Ltd.  
Baixue R.D.  
215500 Changshu/ Jiangsu  
People's Republic of China

Product: House work and household appliances  
Motor-compressor

Model: QDH51G, QDH43G, QDH35G,  
QDH28G; QDHC67G, QDHC51G  
For model differences refer to enclosure 1

Parameters: Rated voltage: AC 220-240V  
Rated frequency: 50Hz  
Degree of Protection: IP 00

The equipment complies with the principal protection requirements of the Low Voltage Directive (Directive 73/23/EEC amended by 93/68/EEC relating to electrical equipment designed for use within certain voltage limits) based on a voluntary test.

This attestation applies only to the particular sample of the product provided for testing and certification. The detailed test results and all standards used as well as the operation mode are listed in

Test report no.: 70222415001  
Test standards: EN 60335-2-34/A11:2004

This attestation is released with the above mentioned attestation number by TÜV PRODUCT SERVICE and has been issued and remain valid in conjunction with TÜV-Mark Certificate B 04 07 53497 001. It does not permit the use of a TÜV PRODUCT SERVICE certification mark.

After preparation of the necessary technical documentation as well as the conformity declaration the CE marking as shown below can be affixed on the equipment. Other relevant Directives have to be observed.



Department: TECC211/Qian  
Date: 07-27-2004

