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22158

Huari

*Test with the refrigerant R12
Conversion to R600a*

Report

Models of refrigerator tested:

**BCD-192G
(BCD-188)
(BCD-252G)
(BCD-195G)
(BCD-215)**

**Hangzhou
Huari Refrigerator Factory**

Date: 12. 1998

1 Summary

Hangzhou Huari Refrigerator Factory has finished the redesign of five models of refrigerators, converting refrigerant R12 to R600a based on UNIDO contract No.98/003. The refrigerators before and after conversion have been tested on the basis of China standard GB/T 8059.2-1995(equal to ISO 8187:1995). The test results fulfill the requirements of the national standard. According to the total data, the performances of the refrigerators supplied with R600a refrigerant have reached the same value compared to R12 and the production in small quantity is feasible.

2 Test Methodology

- 2.1 Huari has finished the refrigeration performance and the noise tests of the refrigerators using R12 as refrigerant following national standard GB/T 8059.2-1995.
- 2.2 Huari has also tested the refrigeration performance and the noise of the converted refrigerators using R600a as refrigerant following the national standard GB/T 8059.2-1995.
- 2.3 China National Light Industries Council, Hangzhou Branch for the Quality Supervision and Inspection of the Household Appliances has performed the noise test of refrigerator using R600a as refrigerant on the basis of national standard GB/T 8059.2-1995, to testify the veracity of the noise test performed by Huari.

2.4 Test Items

2.4.1 Cooling Speed Test ($t_a = 32^\circ\text{C}$, $T=3\text{h}$)

2.4.2 Running Test in high ambient temperature (storage temperature test, $t_a=32^\circ\text{C}$)

2.4.3 Running Test in low ambient temperature (storage temperature test, $t_a=16^\circ\text{C}$)

2.4.4 Energy consumption test ($t_a=25^\circ\text{C}$)

2.4.5 Freezing capacity test ($t_a=25^\circ\text{C}$)

2.4.6 Noise test of the running refrigerator in normal temperature.

3 The Conditions of Refrigerators Tested

3.1 The main technical parameters of unaltered refrigerators (see Table A and Table B)

Table A.

	unit	BCD-192G	BCD-252G	BCD-195G
Volume Cool./Fr.	l	102/90	147/105	130/65
R12 charging amount	g	120	135	125
Energy consumption	kWh/24h	1.15	1.30	1.10
Type of compressor		QD66	QD90	QD57
Noise	dB(A)	≤ 45	≤ 45	≤ 45

Table B.

	unit	BCD-215	BCD-188
Volume Cool./Fr.	l	150/65	123/65
R12 charging amount	g	120	110
Energy consumption	kWh/24h	1.10	1.00
Type of compressor		QD66	QD57
Noise	dB(A)	≤ 45	≤ 45

3.2 The main technical parameters of converted refrigerators (see Table C and Table D)

Table C.

	unit	BCD-192G	BCD-252G	BCD-195G
Volume Cool./Fr.	l	102/90	147/105	130/65
R600a charging amount	g	39	51	46
Energy consumption	kWh/24h	1.15	1.30	1.10
Type of compressor		ECS55CL P	ECS60C LP	QD88Y
Noise	dB(A)	≤42	≤42	≤42

Table D

	unit	BCD-215	BCD-188
Volume Cool./Fr.	l	150/65	123/65
R600a Charging amount	g	37	34
Energy consumption	kWh/24h	1.10	1.00
Type of compressor		QD100Y	QD88Y
Noise	dB(A)	≤42	≤42

4. R600a Conversion

4.1 Because the evaporators in the cooler are in the foaming, there is impossibility of leakage and accumulation. Moreover, the electrical control devices are installed in the cooler, therefore, the electrical structure needs no big change.

4.2 We converted and optimized the refrigeration system by ourselves; the optimizations included the capillary tube, the filter drier, and the evaporators both in the freezer and cooler as well as the other parts of the system. We have also selected the suitable compressor and optimized the charging amount of the refrigerant. The situation of optimization and adjustment are as below:

4.2.1 The design adjustment of BCD-192G

- a. The selected compressor is ECS55CLP (produced by Beijing Embraco Snowflake Compressor Company Ltd.) The nominal cooling capacity Q_0 is 161W(according to the standard ASHRAE) and the COP is 1.16.
- b. The optimized charging amount of refrigerant R600a is 39g.
- c. The length of capillary tube has been adjusted.

4.2.2 The design adjustment of BCD-252G

- a. The selected compressor is ECS60CLP (produced by Beijing Embraco Snowflake Compressor Company Ltd.) The nominal cooling capacity Q_0 is 180W (according to the standard ASHRAE), and the COP is 1.20.
- b. The optimized charging amount of refrigerant R600a is 51g.
- c. The length of capillary tube has been adjusted.

4.2.3 The design adjustment of BCD-195G

- a. The selected compressor is QD88Y (produced by Huangshi Dongbei Refrigeration Manufacture Group Co., Ltd.). The nominal cooling capacity Q_0 is 138W(according to the standard ASHRAE), and the COP is 1.20.
- b. The optimized charging amount of refrigerant R600a is 46g.
- c. The length of capillary tube has been adjusted.

4.2.4 The design adjustment of BCD-215

- a. The selected compressor is QD100Y (produced by Huangshi Dongbei Refrigeration Manufacture Group Co., Ltd.) The nominal cooling capacity Q_o is 152W (according to the standard ASHRAE), and the COP is 1.22.
- b. The optimized charging amount of refrigerant R600a is 37g.
- d. The length of capillary tube has been adjusted.

4.2.5 The design adjustment of BCD-188

- b. The selected compressor is QD88Y (produced by Huangshi Dongbei Refrigeration Manufacture Group Co., Ltd.) The nominal cooling capacity Q_o is 161W (according to the standard ASHRAE), and the COP is 1.20.
- b. The optimized charging amount of refrigerant R600a is 34g.
- c. The length of capillary tube has been adjusted.

5. Test Results

5.1 The refrigeration performance of unaltered refrigerators (With R12 as refrigerant)

- 5.1.1 The test results of BCD-192G see report No.98-233-1;
- 5.1.2 The test results of BCD-252G see report No.98- 242-1;
- 5.1.3 The test results of BCD-195G see report No.98-266-1;
- 5.1.4 The test results of BCD-215 see report No.98-268-1;
- 5.1.5 The test results of BCD-188 see report No.98-312-1;

5.2 The refrigeration performance of the converted refrigerators (with R600a as refrigerant)

- 5.2.1 The test results of BCD-192G see report No.98-233-2;
- 5.2.2 The test results of BCD-252G see report No.98-242-2;

- 5.2.3 The test results of BCD-195G see report No.98-266-2;
- 5.2.4 The test results of BCD-215 see report No.98-268-2;
- 5.2.5 The test results of BCD-188 see report No.98-312-2;

5.3 The noise test of the unaltered refrigerators (with R12 as refrigerant)

- 5.3.1 The test results of BCD-192G see report No.98-238-1;
- 5.3.2 The test results of BCD-252G see report No.98-247-1;
- 5.3.3 The test results of BCD-195G see report No.98-270-1;
- 5.3.4 The test results of BCD-215 see report No.98- 271-1;
- 5.3.5 The test results of BCD-188 see report No.98-316-1;

5.4 The noise test of the converted refrigerators (with R600a as refrigerant)

- 5.4.1 The test results of BCD-192G see report No.98-238-2 ;
- 5.4.2 The test results of BCD-252G see report No.98-247-2 ;
- 5.4.3 The test results of BCD-195G see report No.98-270-2 ;
- 5.4.4 The test results of BCD-215 see report No.98-271-2 ;
- 5.4.5 The test results of BCD-188 see report No.98-316-2 ;

6. Discussion of test results

- 6.1 According to the results of the cooling speed test and the storage temperature test, the performances of the refrigerators using refrigerant R12 and R600a are almost in the same value, that is, there is no great difference between them.
- 6.2 According to the results of the energy consumption test, the value of energy consumption has been reached using R600a is 3~5% lower than the value using R12. (BCD-215 and BCD-

195G are 5% lower and the other three are 3% lower).

- 6.3 According to the results of the freezing capacity test, the refrigerators using the two refrigerants have the similar performances.
- 6.4 According to the results of the noise test, the sound power level of the refrigerator using the refrigerant R600a is 1~2 dB (A) lower than the R12. (BCD-195G is 2dB(A) lower and the others are about 1dB(A) lower.)

7. Conclusion

The test results of the redesign show that, the five models of refrigerators have all met the refrigerator standard and can be put into production. In order to complete the CFCs-free project successfully, we will later focus on the following aspects:

- a. the adjustment of the production line
- b. the formulation of the technical rule
- c. the training of the works (especially on the products and the production safety)
- d. the management of safe production.

Hangzhou Huari Refrigerator Factory

Report of Refrigeration Performance Test

No. 98-233-1

Product	Refrigerator-Freezer	Model	BCD - 192G	Type of compressor	QD66	
Sample Number	1#: 80154785	2#: 80154773		Refrigerant	R12	
Goal of Test	To Compare refrigeration performance of R600a & R12			Basic of test	GB/T 8059.2-1995	
Sequence Number	Test Items	Ambient temperature	Standard and Requirement	Test results		Remark
				1	2	
1	Speed of Cooling	32°C	Continuous Running for 3h	tf ≤ -18°C	-28.6	-28.2
				tm ≤ 5°C	1.8	2.1
2	Storage Temperature	32°C	tif ≤ -18°C	tf =	-19.1	-18.8
			0°C ≤ tm ≤ 5°C	tm =	4.4	4.3
		16°C	tif ≤ -18°C	tf =	-20.0	-19.8
			0°C ≤ tm ≤ 5°C	tm =	3.7	3.5
3	Energy Consumption	25°C	tif ≤ -18°C	tf =	-19.4	-19.1
			0°C ≤ tm ≤ 5°C	tm =	4.5	4.7
			Rated power: 1.15 kWh/24h		1.12	1.09
4	Freezing Capacity	25°C	tif ≤ -18°C, 22h ≤ T ≤ 26h freezing load: 4.5 kg	23.42h	22.98h	tif: package temp. of freezing load test
				4.5	4.5	

Director: 王小平

Tester: 杨月萍

Date: Aug 26, 1998

Hangzhou Huari Refrigerator Factory

Report of Refrigeration Performance Test

No. 98-242-1

Product	Refrigerator-Freezer		Model	BCD - 252G	Type of compressor	QD90	
Sample Number	1#: 73116847		2#: 73116896		Refrigerant	R12	
Goal of Test	To Compare refrigeration performance of R600a & R12				Basic of test	GB/T 8059.2-1995	
Sequence Number	Test Items	Ambient temperature	Standard and Requirement		Test results		Remark
					1	2	
1	Speed of Cooling	32°C	Continuous Running for 3h	$tf \leq -18^\circ\text{C}$	-27.0	-27.5	
				$tm \leq 5^\circ\text{C}$	4.7	4.3	
2	Storage Temperature	32°C	$tif \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq tm \leq 5^\circ\text{C}$	$tf =$	-19.9	-20.3	
				$tm =$	2.3	3.2	
		16°C	$tif \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq tm \leq 5^\circ\text{C}$	$tf =$	-20.3	-20.7	
				$tm =$	3.5	3.3	
3	Energy Consumption	25°C	$tif \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq tm \leq 5^\circ\text{C}$ Rated power: 1.30 kWh/24h	$tf =$	-19.3	-19.6	
				$tm =$	4.9	4.3	
					1.20	1.22	
4	Freezing Capacity	25°C	$tif \leq -18^\circ\text{C}$, 22h $\leq T \leq 26$ h freezing load: 5.0 kg	23.30h	23.22h	tif: package temp. of freezing load test	
				5.0	5.0		

Director: 严州平

Tester: 杨月萍

Date: Aug 26, 1998

Hangzhou Huari Refrigerator Factory

Report of Refrigeration Performance Test

No. 98-266-1

Product	Refrigerator-Freezer	Model	BCD -195G	Type of compressor	QD57		
Sample Number	1#: 70010178		2#: 70010146		Refrigerant	R12	
Goal of Test	To Compare refrigeration performance of R600a & R12				Basic of test	GB/T 8059.2-1995	
Sequence Number	Test Items	Ambient temperature	Standard and Requirement		Test results		Remark
					1	2	
1	Speed of Cooling	32°C	Continuous Running for 3h	$tf \leq -18^\circ\text{C}$	-28.8	-28.6	
				$tm \leq 5^\circ\text{C}$	1.5	1.4	
2	Storage Temperature	32°C	$tif \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq tm \leq 5^\circ\text{C}$	$tf =$	-18.6	-18.6	
				$tm =$	4.2	4.4	
		16°C	$tif \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq tm \leq 5^\circ\text{C}$	$tf =$	-19.2	-19.0	
				$tm =$	3.5	3.6	
3	Energy Consumption	25°C	$tif \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq tm \leq 5^\circ\text{C}$ Rated power: 1.10 kWh/24h	$tf =$	-18.5	-18.4	
				$tm =$	4.6	4.7	
					1.10	1.14	
4	Freezing Capacity	25°C	$tif \leq -18^\circ\text{C}$, $22\text{h} \leq T \leq 26\text{h}$ freezing load: 3.0 kg	23.38h	23.07h	tif: package temp. of freezing load test	
				3.0	3.0		

Director: 王利平

Tester: 杨月萍

Date: Sep 25, 1998

Hangzhou Huari Refrigerator Factory

Report of Refrigeration Performance Test

No. 98-268-1

Product	Refrigerator-Freezer	Model	BCD - 215	Type of compressor	QD66	
Sample Number	1#: 52004036	2#: 52004018		Refrigerant	R12	
Goal of Test	To Compare refrigeration performance of R600a & R12			Basic of test	GB/T 8059.2-1995	
Sequence Number	Test Items	Ambient temperature	Standard and Requirement	Test results		Remark
				1	2	
1	Speed of Cooling	32°C	Continuous Running for 3h	$tf \leq -18^\circ\text{C}$	-27.5	-27.0
				$tm \leq 5^\circ\text{C}$	2.1	2.3
2	Storage Temperature	32°C	$tif \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq tm \leq 5^\circ\text{C}$	$tf =$	-18.9	-18.7
				$tm =$	4.0	4.2
		16°C	$tif \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq tm \leq 5^\circ\text{C}$	$tf =$	-21.7	-21.9
				$tm =$	2.2	2.3
3	Energy Consumption	25°C	$tif \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq tm \leq 5^\circ\text{C}$ Rated power: 1.1 kWh/24h	$tf =$	-18.6	-18.4
				$tm =$	4.5	4.5
					1.10	1.07
4	Freezing Capacity	25°C	$tif \leq -18^\circ\text{C}$, 22h $\leq T \leq 26$ h freezing load: 3.0 kg	23.38h	23.38h	tif: package temp. of freezing load test
				3.0	3.0	

Director: 王明平

Tester: 杨月萍

Date: Sep 25, 1998

Hangzhou Huari Refrigerator Factory Report of Refrigeration Performance Test

No. 98-312-1

Product	Refrigerator-Freezer	Model	BCD - 188	Type of compressor	QD57	
Sample Number	1#: 5i001135 2#: 51001147		Refrigerant		R12	
Goal of Test	To Compare refrigeration performance of R600a & R12			Basic of test	GB/T 8059.2-1995	
Sequence Number	Test Items	Ambient temperature	Standard and Requirement	Test results		Remark
				1	2	
1	Speed of Cooling	32°C	Continuous Running for 3h	tf ≤ -18°C	-27.1	-26.3
				tm ≤ 5°C	2.8	4.2
2	Storage Temperature	32°C	tif ≤ -18°C	tf =	-18.5	-18.4
			0°C ≤ tm ≤ 5°C	tm =	4.3	3.8
		16°C	tif ≤ -18°C	tf =	-18.9	-18.7
			0°C ≤ tm ≤ 5°C	tm =	3.1	3.7
3	Energy Consumption	25°C	tif ≤ -18°C	tf =	-19.0	-18.5
			0°C ≤ tm ≤ 5°C	tm =	4.7	4.6
			Rated power: 1.00 kWh/24h		0.99	0.96
4	Freezing Capacity	25°C	tif ≤ -18°C, 22h ≤ T ≤ 26h freezing load: 3.0 kg	23.84h	23.45h	tif: package temp. of freezing load test
				3.0	3.0	

Director: 王利平

Tester: 杨月萍

Date: Oct 19, 1998

Hangzhou Huari Refrigerator Factory

Report of Refrigeration Performance Test

No. 98-233-2

Product	Refrigerator-Freezer		Model	BCD - 192G	Type of compressor		ECS 55CLP
Sample Number	1#: 80156319 2#: 80156324				Refrigerant		R600a
Goal of Test	To Compare refrigeration performance of R600a & R12				Basic of test		GB/T 8059.2-1995
Sequence Number	Test Items	Ambient temperature	Standard and Requirement		Test results		Remark
					1	2	
1	Speed of Cooling	32°C	Continuous Running for 3h	tf ≤ -18°C	-27.4	-27.0	
				tm ≤ 5°C	4.7	4.5	
2	Storage Temperature	32°C	tif ≤ -18°C	tf =	-18.5	-18.4	
			0°C ≤ tm ≤ 5°C	tm =	4.8	4.6	
		16°C	tif ≤ -18°C	tf =	-19.2	-19.6	
			0°C ≤ tm ≤ 5°C	tm =	3.5	3.7	
3	Energy Consumption	25°C	tif ≤ -18°C	tf =	-19.1	-18.8	
			0°C ≤ tm ≤ 5°C	tm =	4.8	4.7	
			Rated power: 1.15 kWh/24h		1.06	1.04	
4	Freezing Capacity	25°C	tif ≤ -18°C, 22h ≤ T ≤ 26h freezing load: 4.5 kg		23.43h	23.84h	tif: package temp. of freezing load test
					4.5	4.5	

Director: 严明平

Tester: 杨月萍

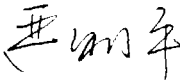
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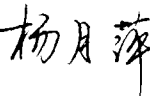
Hangzhou Huari Refrigerator Factory

Report of Refrigeration Performance Test

No. 98-242-2

Product	Refrigerator-Freezer	Model	BCD - 252G	Type of compressor	ECS60CLP		
Sample Number	1#: 73118527 2#: 73118546		Refrigerant		R600a		
Goal of Test	To Compare refrigeration performance of R600a & R12			Basic of test	GB/T 8059.2-1995		
Sequence Number	Test Items	Ambient temperature	Standard and Requirement		Test results		Remark
					1	2	
1	Speed of Cooling	32°C	Continuous Running for 3h	$tf \leq -18^{\circ}\text{C}$	-27.0	-27.5	
				$tm \leq 5^{\circ}\text{C}$	4.6	4.2	
2	Storage Temperature	32°C	$tif \leq -18^{\circ}\text{C}$	$tf =$	-19.9	-20.3	
			$0^{\circ}\text{C} \leq tm \leq 5^{\circ}\text{C}$	$tm =$	2.3	3.2	
		16°C	$tif \leq -18^{\circ}\text{C}$	$tf =$	-20.3	-20.7	
			$0^{\circ}\text{C} \leq tm \leq 5^{\circ}\text{C}$	$tm =$	3.5	3.3	
3	Energy Consumption	25°C	$tif \leq -18^{\circ}\text{C}$	$tf =$	-18.9	-19.2	
			$0^{\circ}\text{C} \leq tm \leq 5^{\circ}\text{C}$	$tm =$	4.9	4.5	
			Rated power: 1.30 kWh/24h		1.16	1.18	
4	Freezing Capacity	25°C	$tif \leq -18^{\circ}\text{C}$, 22h $\leq T \leq 26\text{h}$ freezing load: 5.0 kg	23.67h	23.43h	tif: package temp. of freezing load test	
				5.0	5.0		

Director: 

Tester: 

Date: Sep17, 1998

Hangzhou Huari Refrigerator Factory

Report of Refrigeration Performance Test

No. 98-266-2

Product	Refrigerator-Freezer		Model	BCD - 195G	Type of compressor	QD88Y	
Sample Number	1#: 70011512		2#: 70011518		Refrigerant	R600a	
Goal of Test	To Compare refrigeration performance of R600a & R12				Basic of test	GB/T 8059.2-1995	
Sequence Number	Test Items	Ambient temperature	Standard and Requirement		Test results		Remark
					1	2	
1	Speed of Cooling	32°C	Continuous Running for 3h	$tf \leq -18^\circ\text{C}$	-28.2	-28.0	
				$tm \leq 5^\circ\text{C}$	1.2	1.3	
2	Storage Temperature	32°C	$tif \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq tm \leq 5^\circ\text{C}$	$tf =$	-18.2	-18.1	
				$tm =$	4.0	4.2	
		16°C	$tif \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq tm \leq 5^\circ\text{C}$	$tf =$	-18.5	-18.4	
				$tm =$	3.6	3.4	
3	Energy Consumption	25°C	$tif \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq tm \leq 5^\circ\text{C}$ Rated power: 1.10 kWh/24h	$tf =$	-18.0	-18.1	
				$tm =$	4.8	4.7	
					1.05	1.04	
4	Freezing Capacity	25°C	$tif \leq -18^\circ\text{C}$, 22h $\leq T \leq$ 26h freezing load: 3.0 kg	23.30h	23.22h	tif: package temp.of freezing load test	
				3.0	3.0		

Director: 王利平

Tester: 杨月萍

Date: Oct 16, 1998

Hangzhou Huari Refrigerator Factory

Report of Refrigeration Performance Test

No. 98-268-2

Product	Refrigerator-Freezer	Model	BCD - 215	Type of compressor	QD-100Y	
Sample Number	1#: 52004259 2#: 52004233		Refrigerant		R600a	
Goal of Test	To Compare refrigeration performance of R600a & R12			Basic of test	GB/T 8059.2-1995	
Sequence Number	Test Items	Ambient temperature	Standard and Requirement	Test results		Remark
				1	2	
1	Speed of Cooling	32°C	Continuous Running for 3h	tf ≤ -18°C	-25.7	-26.3
				tm ≤ 5°C	2.7	2.6
2	Storage Temperature	32°C	tif ≤ -18°C 0°C ≤ tm ≤ 5°C	tf =	-18.4	-18.3
				tm =	3.7	4.5
		16°C	tif ≤ -18°C 0°C ≤ tm ≤ 5°C	tf =	-21.0	-21.3
				tm =	2.4	2.5
3	Energy Consumption	25°C	tif ≤ -18°C 0°C ≤ tm ≤ 5°C Rated power: 1.10 kWh/24h	tf =	-18.7	-18.2
				tm =	4.6	4.8
					1.05	1.01
4	Freezing Capacity	25°C	tif ≤ -18°C, 22h ≤ T ≤ 26h freezing load: 3.0 kg	23.15h	22.86h	tif: package temp. of freezing load test
				3.0	3.0	

Director:

Tester:

Date: Oct 16, 1998

Hangzhou Huari Refrigerator Factory

Report of Refrigeration Performance Test

No. 98-312-2

Product	Refrigerator-Freezer	Model	BCD - 188	Type of compressor	QD-88Y		
Sample Number	1#: 51001700	2#: 51001713		Refrigerant	R600a		
Goal of Test	To Compare refrigeration performance of R600a & R12			Basic of test	GB/T 8059.2-1995		
Sequence Number	Test Items	Ambient temperature	Standard and Requirement		Test results		Remark
					1	2	
1	Speed of Cooling	32°C	Continuous Running for 3h	$t_f \leq -18^\circ\text{C}$	-26.4	-26.0	
				$t_m \leq 5^\circ\text{C}$	4.3	4.5	
2	Storage Temperature	32°C	$t_{if} \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq t_m \leq 5^\circ\text{C}$	$t_f =$	-18.1	-18.2	
				$t_m =$	4.6	4.0	
		16°C	$t_{if} \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq t_m \leq 5^\circ\text{C}$	$t_f =$	-18.6	-18.5	
				$t_m =$	3.4	4.0	
3	Energy Consumption	25°C	$t_{if} \leq -18^\circ\text{C}$ $0^\circ\text{C} \leq t_m \leq 5^\circ\text{C}$ Rated power: 1.00 kWh/24h	$t_f =$	-18.3	-18.0	
				$t_m =$	4.9	4.9	
					0.95	0.93	
4	Freezing Capacity	25°C	$t_{if} \leq -18^\circ\text{C}$, 22h $\leq T \leq 26$ h freezing load: 3.0 kg	23.84h	23.45h	t _{if} : package temp. of freezing load test	
				3.0	3.0		

Director: 王明平

Tester: 杨月萍

Date: Nov 13, 1998

Hangzhou Huari Refrigerator Factory

Report of Performance Test

No. 98-238-1

Product	Refrigerator-Freezer	Model	BCD-192G	Type of compressor	QD66	
Sample Number	1#: 80154785	2#: 80154773		Refrigerant	R12	
Goal of Test	To Compare Performances of R600a & R12			Basic of test	GB/T 8059.2-1995	
Test Item	Standard and Requirement			Test Results		Remark
				1	2	
Noise Degree	Sound Power Level ≤ 45 dB (A)			40.8	41.0	

Director: 严利平

Tester: 杨月萍

Date: Aug 28, 1998

Hangzhou Huari Refrigerator Factory

Report of Performance Test

No. 98-247-1

Product	Refrigerator-Freezer	Model	BCD-252G	Type of compressor	QD90	
Sample Number	1#: 73116847 2#: 73116896		Refrigerant		R12	
Goal of Test	To Compare Performances of R600a & R12			Basic of test	GB/T 8059.2-1995	
Test Item	Standard and Requirement			Test Results		Remark
				1	2	
Noise Degree	Sound Power Level \leq 45 dB (A)			43.0	42.8	

Director: 严州平

Tester: 杨月萍

Date: Aug 28, 1998

Hangzhou Huari Refrigerator Factory

Report of Performance Test

No. 98-270-1

Product	Refrigerator-Freezer	Model	BCD-195G	Type of compressor	QD57	
Sample Number	1#: 70010178	2#: 70010146		Refrigerant	R12	
Goal of Test	To Compare Performances of R600a & R12			Basic of test	GB/T 8059.2-1995	
Test Item	Standard and Requirement			Test Results		Remark
				1	2	
Noise Degree	Sound Power Level \leq 45 dB (A)			40.4	41.8	

Director: 严如平

Tester: 杨月萍

Date: Sep 27, 1998

Hangzhou Huari Refrigerator Factory

Report of Performance Test

No. 98-271-1

Product	Refrigerator-Freezer	Model	BCD-215	Type of compressor	QD66	
Sample Number	1#:52004036	2#:52004018		Refrigerant	R12	
Goal of Test	To Compare Performances of R600a & R12			Basic of test	GB/T 8059.2-1995	
Test Item	Standard and Requirement			Test Results		Remark
				1	2	
Noise Degree	Sound Power Level $\leq 45\text{dB (A)}$			40.6	41.5	

Director: 严利军

Tester: 杨月萍

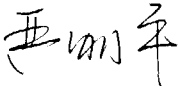
Date: Sep 27, 1998

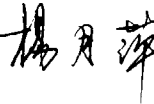
Hangzhou Huari Refrigerator Factory

Report of Performance Test

No. 98-316-1

Product	Refrigerator-Freezer	Model	BCD-188	Type of compressor	QD57	
Sample Number	1#: 51001135 2#: 51001147		Refrigerant		R12	
Goal of Test	To Compare Performances of R600a & R12			Basic of test	GB/T 8059.2-1995	
Test Item	Standard and Requirement			Test Results		Remark
				1	2	
Noise Degree	Sound Power Level \leq 45 dB (A)			41.5	41.8	

Director: 

Tester: 

Date: Oct 21, 1998

Hangzhou Huari Refrigerator Factory

Report of Performance Test

No. 98-238-2

Product	Refrigerator-Freezer	Model	BCD-192	Type of compressor	ECS 55CLP	
Sample Number	1#: 80156319	2#: 80156324		Refrigerant	R600a	
Goal of Test	To Compare Performances of R600a & R12			Basic of test	GB/T 8059.2-1995	
Test Item	Standard and Requirement			Test Results		Remark
				1	2	
Noise Degree	Sound Power Level \leq 42 dB (A)			39.5	39.9	

Director: 尹明平

Tester: 楊月萍

Date: Sep 19, 1998

Hangzhou Huari Refrigerator Factory

Report of Performance Test

No. 98-247-2

Product	Refrigerator-Freezer	Model	BCD-252G	Type of compressor	ECS60CLP	
Sample Number	1#: 73118527 2#: 73118546			Refrigerant	R600a	
Goal of Test	To Compare Performances of R600a & R12			Basic of test	GB/T 8059.2-1995	
Test Item	Standard and Requirement			Test Results		Remark
				1	2	
Noise Degree	Sound Power Level \leq 45 dB (A)			41.8	42.0	

Director: 王和平

Tester: 楊月萍

Date: Sep 19, 1998

Hangzhou Huari Refrigerator Factory

Report of Performance Test

No. 98-270-2

Product	Refrigerator-Freezer	Model	BCD-195G	Type of compressor	QD88Y	
Sample Number	1#: 7011512	2#: 7011518		Refrigerant	R600a	
Goal of Test	To Compare Performances of R600a & R12			Basic of test	GB/T 8059.2-1995	
Test Item	Standard and Requirement			Test Results		Remark
				1	2	
Noise Degree	Sound Power Level ≤ 42 dB (A)			39.7	38.6	

Director: 严明平

Tester: 杨月萍

Date: Oct 18, 1998

Hangzhou Huari Refrigerator Factory

Report of Performance Test

No. 98-271-2

Product	Refrigerator-Freezer	Model	BCD-215	Type of compressor	QD-100Y	
Sample Number	1#: 52004259	2#: 52004233		Refrigerant	R600a	
Goal of Test	To Compare Performances of R600a & R12			Basic of test	GB/T 8059.2-1995	
Test Item	Standard and Requirement			Test Results		Remark
				1	2	
Noise Degree	Sound Power Level \leq 42 dB (A)			39.7	40.0	

Director: 王利平

Tester: 杨月萍

Date: Oct 18, 1998

Hangzhou Huari Refrigerator Factory

Report of Performance Test

No. 98-316-2

Product	Refrigerator-Freezer	Model	BCD-188	Type of compressor	QD88Y	
Sample Number	1#:51001700	2#:51001713		Refrigerant	R600a	
Goal of Test	To Compare Performances of R600a & R12			Basic of test	GB/T 8059.2-1995	
Test Item	Standard and Requirement			Test Results		Remark
				1	2	
Noise Degree	Sound Power Level \leq 42 dB (A)			40.5	40.8	

Director: 王和平

Tester: 杨月萍

Date: Nov 15, 1998