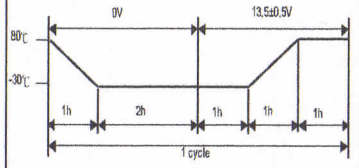
DESIGN VERIFICATION PLAN AND REPORT

Revised Date: 2
Print Date: 08Y-04-07

System: Cooling system	Assembly	Program	Design Engineer: Tire Supplier:
Subsystem: Cooling fan assembly	Component: Part name : JMF-SD12-10B Part number : SHROUD ASSY	Latest Design Level	Concurred:

Test/Name Source	Acceptance Criteria	Test and Requirement Source	Design Level Tested	Test Responsibility	Sample Size	Start Timing Sched.	Actual	Completion Timing Sched.	Actual	Test Results
General Character (1~8)	According to drawing specification	According to drawing specification(Test Voltage 12V)	PTW	Lin.shijie	8	2008/2/15	2008/2/15	2008/2/15	2008/2/15	R-CAB-B01E Pass
Insulation resistance Test(1~8)	1MΩ ↑	500 V High Impedance Tester	PTW	Lin.shijie	8	2008/2/15	2008/2/15	2008/2/15	2008/2/15	R-CAB-B01E Pass
Noise test(1~8)	75dB ↓	Microphone from motor 1m(Test Voltage 12V)	PTW	Lin.shijie	8	2008/2/15	2008/2/15	2008/2/15	2008/2/15	R-CAB-B01E Pass
Over Voltage Test(1)	(1) Airflow、rpm、Current should below initial value to be ±10%. (2) Mechanical electrical characteristics must were not Exceptional. (3) Insulation resistance:1MΩ ↑.	16.5 ± 0.5V 1minute.	PTW	Lin.shijie	1	2008/2/15	2008/2/15	2008/2/15	2008/2/15	R-CAB-B02E Pass
Salt Spray Test(2)	(1) Airflow、rpm、Current should below initial value to be ±10%. (2) Mechanical electrical characteristics must were not Exceptional. (3) Insulation resistance:1MΩ ↑.	According JIS Z 2371 to practice 120Hr.Rusty spot 5%max.	PTW	Lin.shijie	1	2008/2/20	2008/2/20	2008/2/25	2008/2/25	R-CAB-B03E Pass
Low Temperature Operating Test(3)	(1) Airflow、rpm、Current should below initial value to be ±10%. (2) Mechanical electrical characteristics must were not Exceptional.	After located in environment temperature -30℃,supply 8V±0.5V within 5min, Then should qualify for General Character.	PTW	Lin.shijie	1	2008/2/21	2008/2/21	2008/2/21	2008/2/21	R-CAB-B04E Pass
Temperature Raise(3)	Bracket axle center should below 40 ℃ of temperature raise.	Voltage 13.5V Environment Temperature 80 ℃	PTW	Lin.shijie	1	2008/2/22	2008/2/22	2008/2/22	2008/2/22	R-CAB-B05E Pass

Test/Name Source	Acceptance Criteria	Test and Requirement Source	Design Level Tested	Test Responsibility	Sample Size	Start Timing Sched.	Actual	Completion Timing Sched.	Actual	Test Results
Durability Test(4)	(1) Airflow、Revolution、Current ±10%↓. (2) Electrical characteristics were not exceptional. (3) Insulation resistance:1MΩ↑.	95±5℃ Environment、Voltage 14V±0.5V、200 Hr.	PTW	Lin.shijie	1	2008/3/24	2008/3/24	2008/4/1	2008/4/1	R-CAB-B11E Pass
Vibation Test(5)	(1)Airflow、Revolution、Current ±10%↓. (2) Electrical characteristics was not exceptional. (3) Insulation resistance:1MΩ↑	Voltage 13.5V±0.5V、55Hz、10G、Z direction、8Hr。	PTW	Lin.shijie	1	2008/2/25	2008/2/25	2008/2/25	2008/2/25	R-CAB-B07E Pass
Temperature Cycle Test(6)	(1)Airflow、Revolution、Current ±10%↓. (2) Electrical characteristics were not exceptional. (3) Insulation resistance:1MΩ↑.	According below illustration to practice 10cycle 60 Hr。 	PTW	Lin.shijie	1	2008/3/31	2008/3/31	2008/4/3	2008/4/3	R-CAB-B12E Pass
Normal Temperature Lock Test (7)	NO IGNITION.	Motor&Fan Assembly、Fan Locking Operating Voltage 12V. Environment Temperature: Normal Temperature.	PTW	Lin.shijie	1	2008/3/3	2008/3/3	2008/3/3	2008/3/3	R-CAB-B09E Pass

TEST REPORT

		REPORT NUMBER	R-CAB-B01E
PRRT NUMBER	JMF-SD12-10B	PART NAME	SHROUD ASSY
		REPORT DATE	2008/02/15
		TEST DATE	2008/02/15
TEST NAME	Airflow、Noise、Insulation resistance Test	TEST LOCATION	Wind Tunnel Equipment
PURPOSE	Check Zhong Chuan Cooling Fan General Character	Approved / Authorized / Authorized / Prepared / By	

I. TEST SAMPLE:

SHROUD ASSY

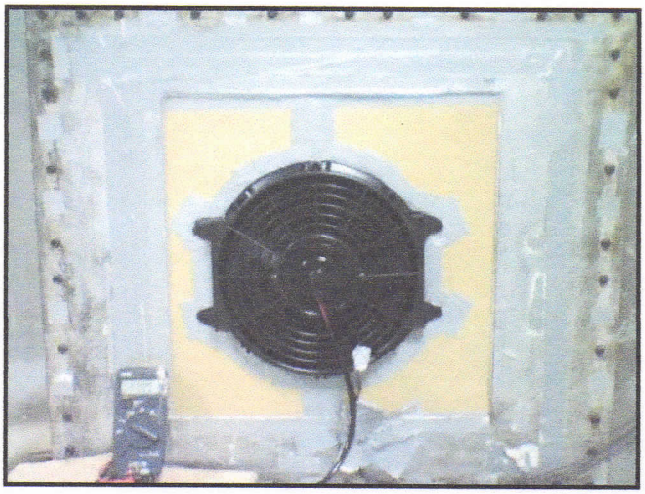
	PART NAME	SUPPLIER
PART	Motor	ZHONG CHUAN (JMF-SD12-001)
	FAN	ZHONG CHUAN (ϕ=230 mm ; 10 leaf)

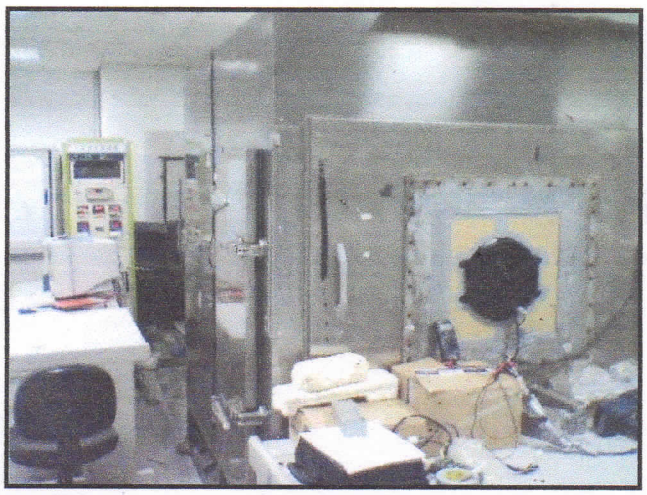
II. TEST CONDITION:

1. Airflow test : According to drawing specification (Test Voltage 12V)。
2. Noise test : Microphone from motor 1m(Test Voltage 12V)。
3. Insulation resistance Test : 500 V High Impedance Tester。

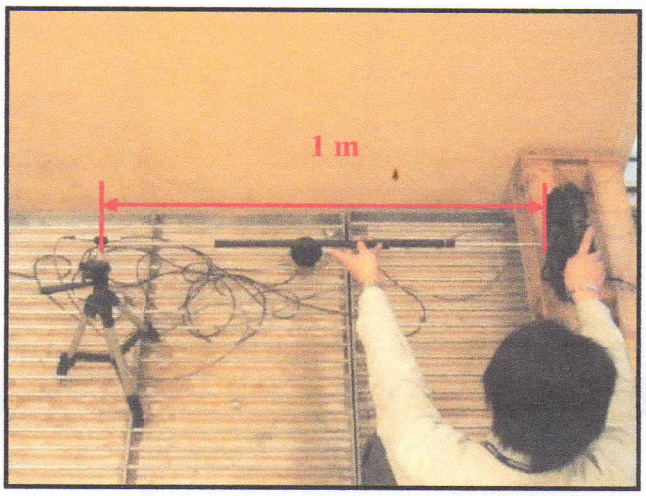
III. TEST RESULT:

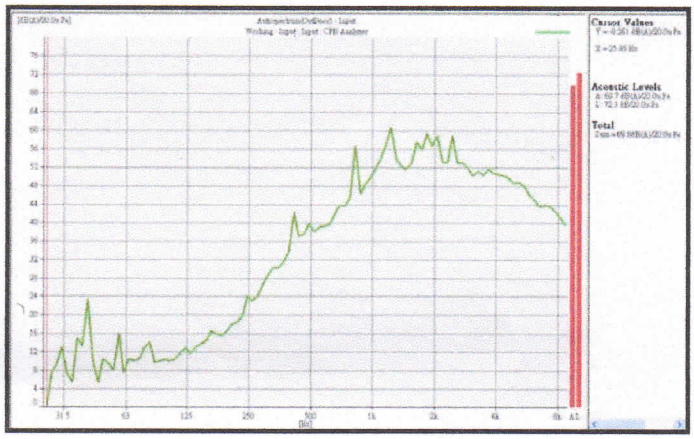
Test Voltage 12V	Max Airflow (m^3/min)	Max Static Pressure (mmAq)	R.P.M. (rpm)	Current (A)	Noise (dB)	Insulation resistance 1MΩ↑
1	9.97	10.22	2424	4.44	70.2	∞
2	9.91	10.03	2405	4.38	69.8	∞
3	10.31	10.47	2448	4.64	70.4	∞
4	10.11	10.32	2434	4.51	70.3	∞
5	9.92	10.07	2409	4.40	70.1	∞
6	9.93	10.06	2411	4.41	70.1	∞
7	10.07	10.24	2424	4.46	70.2	∞
8	9.98	10.07	2411	4.40	70.0	∞



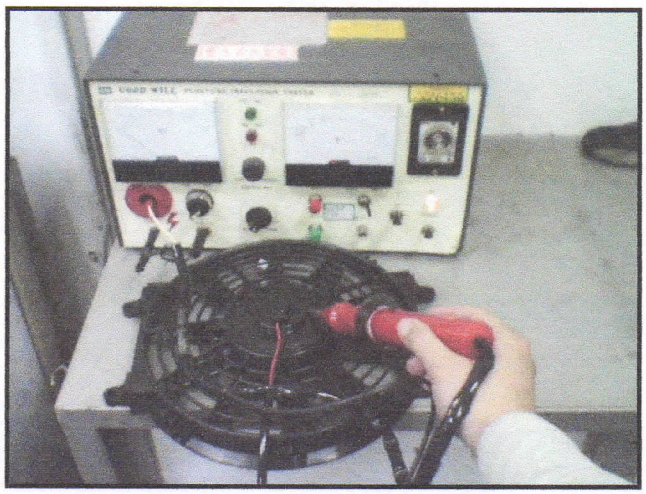


(Airflow Test)





(Noise Test)



(Insulation resistance Test)

IV. CONCLUSION:

The data collection of the general characteristic, compare with the characteristic after durability tested .

TEST REPORT		REPORT NUMBER R-CAB-B02E
PRRT NUMBER JMF-SD12-10B	PART NAME SHROUD ASSY	REPORT DATE 2008/02/15
		TEST DATE 2008/02/15
TEST NAME Over Voltage Test		TEST LOCATION Wind Tunnel Equipment
PURPOSE Check Zhong Chuan Cooling Fan Over Voltage Operating Test		Approved / Authorized / Authorized / Prepared / By

I. TEST SAMPLE:

SHROUD ASSY

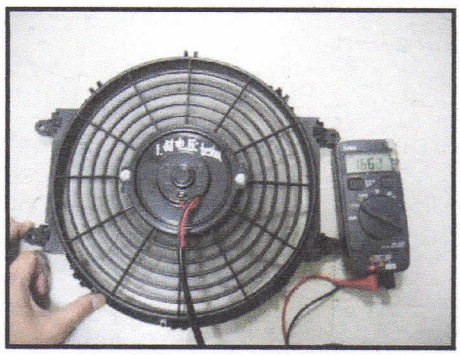
	PART NAME	SUPPLIER
PART	Motor	ZHONG CHUAN (JMF-SD12-001)
	FAN	ZHONG CHUAN (ϕ =230 mm ; 10 leaf)

II. TEST CONDITION:

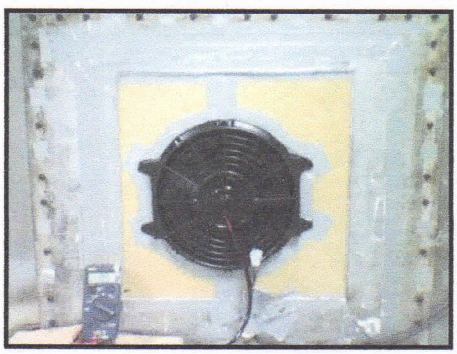
1. 16.5 ± 0.5V 1minute.
   Evaluation Standard:
   (1) Airflow、rpm、Current should below initial value to be ±10%.
   (2) Mechanical electrical characteristics must were not Exceptional.
   (3) Insulation resistance:1MΩ ↑.

III. TEST RESULT:

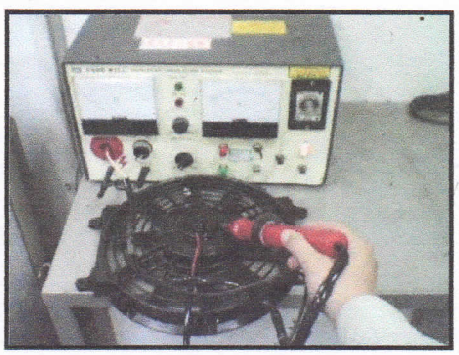
Test Voltage 12V	Max Airflow (m^3/min)	Max Static Pressure (mmAq)	R.P.M. (rpm)	Current (A)	Electrical character	Insulation resistance
Before	9.97	10.22	2424	4.44	—	—
After	9.92	10.18	2418	4.41	No Exceptional	∞
Differ %	DN 0.5%	DN 0.4%	DN 0.3%	DN 0.7%		



(Over Voltage Test)



(Airflow Test)



(Insulation resistance Test)

IV. CONCLUSION:

All tests meet the specification.

TEST REPORT

PRRT NUMBER JMF-SD12-10B	PART NAME SHROUD ASSY	REPORT NUMBER R-CAB-B03E	
		REPORT DATE 2008/02/25	
		TEST DATE 2008/02/20~25	
TEST NAME Salt Spray Test		TEST LOCATION Wind Tunnel Equipment	
PURPOSE Check Zhong Chuan Cooling Fan Salt Spray Test		Approved / Authorized / Authorized / Prepared / By	

I. TEST SAMPLE:

SHROUD ASSY

	PART NAME	SUPPLIER
PART	Motor	ZHONG CHUAN (JMF-SD12-001)
	FAN	ZHONG CHUAN (ϕ=230 mm ; 10 leaf)

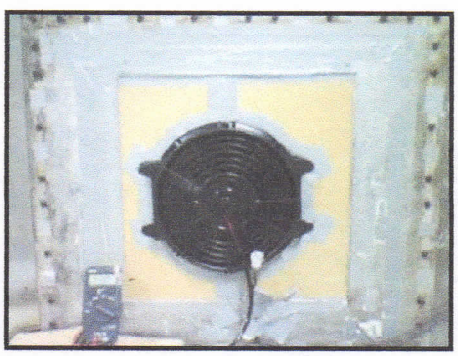
II. TEST CONDITION:

1. According JIS Z 2371 to practice 120Hr.Rusty spot 5%max.
2. Airflow test : According to drawing specification (Test Voltage 12V) ◦
   Evaluation Standard:
   (1) Airflow、rpm、Current should below initial value to be ±10%.
   (2) Mechanical electrical characteristics must were not Exceptional.
   (3) Insulation resistance:1MΩ↑.

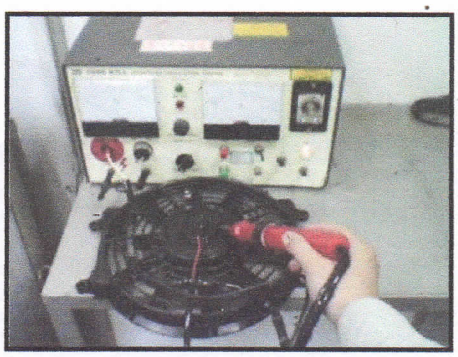
III. TEST RESULT:

Test Voltage 12V	Max Airflow (m^3/min)	Max Static Pressure (mmAq)	R.P.M. (rpm)	Current (A)	Electrical character	Insulation resistance
Before	9.91	10.03	2405	4.38	---	---
After	9.98	10.20	2406	4.43	No Exceptional	∞
Differ %	UP0.7%	UP 1.7%	UP 0.1%	UP 1.1%		

(Salt Spray Test)



(Airflow Test)



(Insulation resistance Test)

IV. CONCLUSION:

All tests meet the specification. But feel the operating noise more large after the Salt Spray Test .

TEST REPORT		REPORT NUMBER R-CAB-B04E
PRRT NUMBER JMF-SD12-10B	PART NAME SHROUD ASSY	REPORT DATE 2008/02/21
		TEST DATE 2008/02/21
TEST NAME Low Temperature Operating Test		TEST LOCATION Wind Tunnel Equipment
PURPOSE Check Zhong Chuan Cooling Fan Low Temperature Operating Test		Approved / Authorized / Authorized / Prepared / By

I. TEST SAMPLE:

SHROUD ASSY

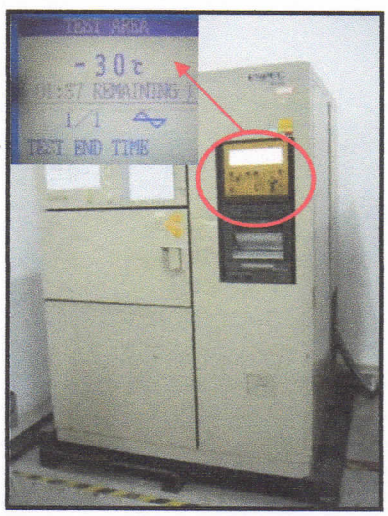
	PART NAME	SUPPLIER
PART	Motor	ZHONG CHUAN (JMF-SD12-001)
	FAN	ZHONG CHUAN (ϕ=230 mm ; 10 leaf)

II. TEST CONDITION:

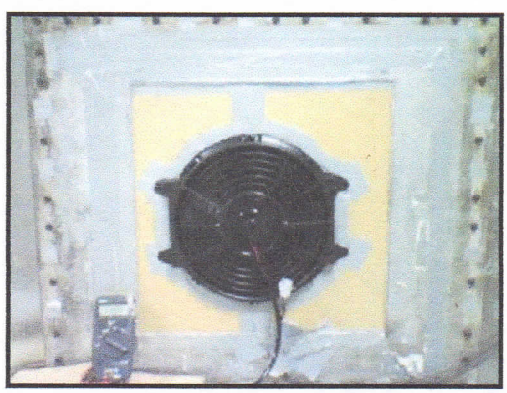
1. After located in environment temperature -30℃,supply 8V±0.5V within 5min, Then should qualify for General Character.
   Evaluation Standard:
   (1) Airflow、rpm、Current should below initial value to be ±10%.
   (2) Mechanical electrical characteristics must were not Exceptional.

III. TEST RESULT:

Test Voltage 12V	Max Airflow (m^3/min)	Max Static Pressure (mmAq)	R.P.M. (rpm)	Current (A)	Electrical character
Before	10.31	10.47	2448	4.64	---
After	10.29	10.43	2445	4.61	No Exceptional
Differ %	DN 0.2%	DN 0.4%	DN 0.1%	DN 0.7%	



(Low Temperature Operating Test)



(Airflow Test)

IV. CONCLUSION:

All tests meet the specification.

TEST REPORT		REPORT NUMBER R-CAB-B05E
PRRT NUMBER JMF-SD12-10B	PART NAME SHROUD ASSY	REPORT DATE 2008/02/22
		TEST DATE 2008/02/22
TEST NAME TEMPERATURE RAISE		TEST LOCATION Wind Tunnel Equipment
PURPOSE Check Zhong Chuan Cooling Fan Temperature Raise		Approved / Authorized / Authorized / Prepared / By

I. TEST SAMPLE:

SHROUD ASSY

	PART NAME	SUPPLIER
PART	Motor	ZHONG CHUAN (JMF-SD12-001)
	FAN	ZHONG CHUAN (ϕ=230 mm ; 10 leaf)

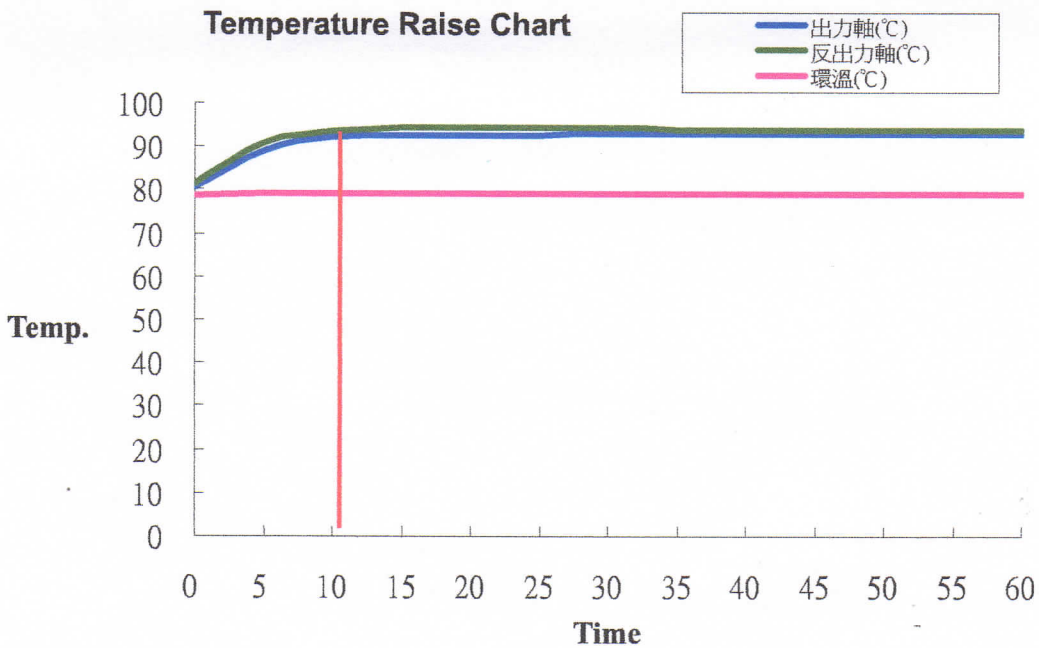
II. TEST CONDITION:

Voltage 13.5V Environment Temperature 80 ℃

Evaluation Standard:

Bracket axle center should below 40 ℃ of temperature raise.

III. TEST RESULT:



IV. CONCLUSION:

Bracket axle center to arrive at saturation temperature 94℃ , temperature raise 14℃, conform to the specification required.

TEST REPORT		REPORT NUMBER R-CAB-B07E				
PRRT NUMBER JMF-SD12-10B	PART NAME SHROUD ASSY	REPORT DATE 2008/02/25				
		TEST DATE 2008/02/25				
TEST NAME VIBRATION TEST		TEST LOCATION Wind Tunnel Equipment				
PURPOSE Check Zhong Chuan Cooling Fan Vibration Test		Approved	Authorized	Authorized	Prepared	By

I. TEST SAMPLE:

SHROUD ASSY

	PART NAME	SUPPLIER
PART	Motor	ZHONG CHUAN (JMF-SD12-001)
	FAN	ZHONG CHUAN (ϕ=230 mm ; 10 leaf)

II. TEST CONDITION:

Voltage 13.5V±0.5V、55Hz、10G、Z direction、8Hr。

Evaluation Standard:

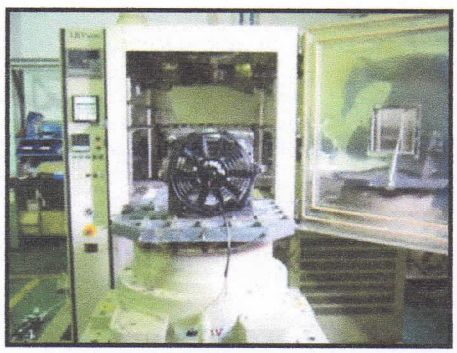
(1) Airflow、Revolution、Current ±10%↓.

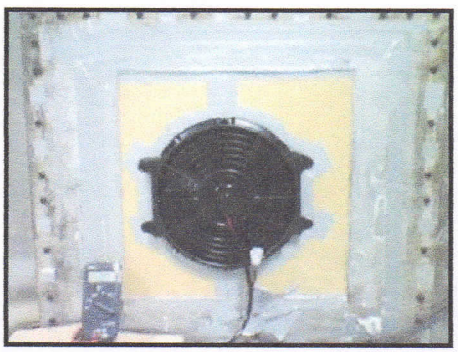
(2) Electrical characteristics was not exceptional.

(3) Insulation resistance:1MΩ↑

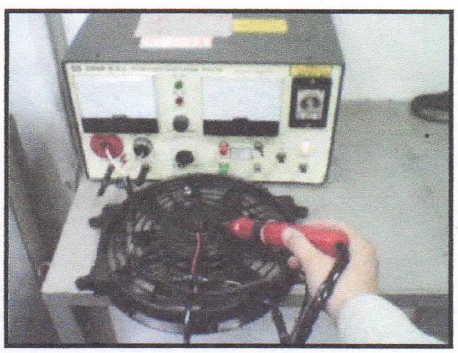
III. TEST RESULT:

Test Voltage 12V	Max Airflow (m^3/min)	Max Static Pressure (mmAq)	R.P.M. (rpm)	Current (A)	Electrical character	Insulation resistance
Before	9.92	10.07	2409	4.40	---	---
After	9.67	9.89	2346	4.14	No Exceptional	∞
Differ %	DN2.5%	DN 1.8%	DN 2.6%	DN 6.0%		

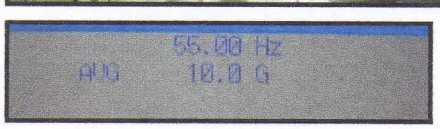




(Airflow Test)



(Insulation resistance Test)



(VIBRATION TEST)

IV. CONCLUSION:

All tests meet the specification.

TEST REPORT

PRRT NUMBER: JMF-SD12-10B	PART NAME: SHROUD ASSY	REPORT NUMBER: R-CAB-B09E	
		REPORT DATE: 2008/03/03	
		TEST DATE: 2008/03/03	
TEST NAME: Normal Temperature Lock Test		TEST LOCATION: Wind Tunnel Equipment	
PURPOSE: Check Zhong Chuan Cooling Fan Normal Temperature Lock Test		Approved / Authorized / Authorized / Prepared / By	

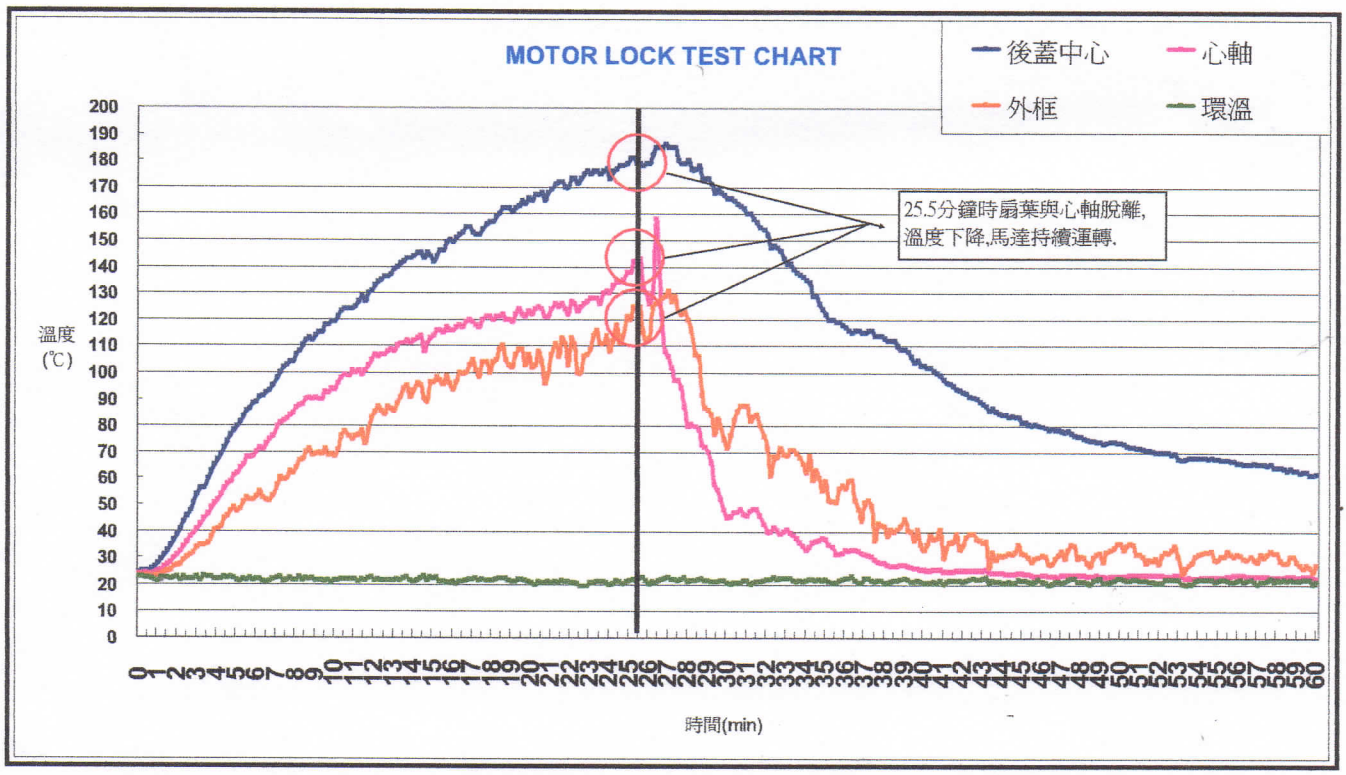
I. TEST SAMPLE:
SHROUD ASSY

	PART NAME	SUPPLIER
PART	Motor	ZHONG CHUAN (JMF-SD12-001)
	FAN	ZHONG CHUAN (ϕ=230 mm ; 10 leaf)

II. TEST CONDITION:

Motor&Fan Assembly、Fan Locking Operating Voltage 12V.
Environment Temperature: Normal Temperature.
Evaluation Standard: NO IGNITION.

III. TEST RESULT:



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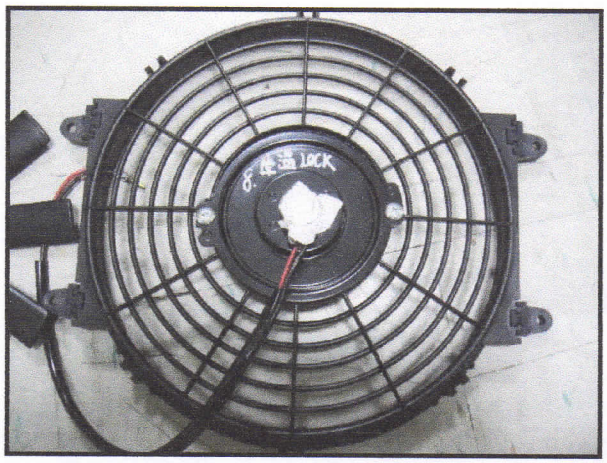
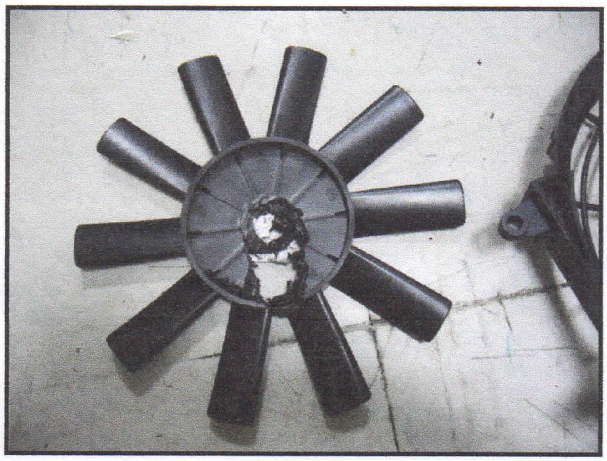
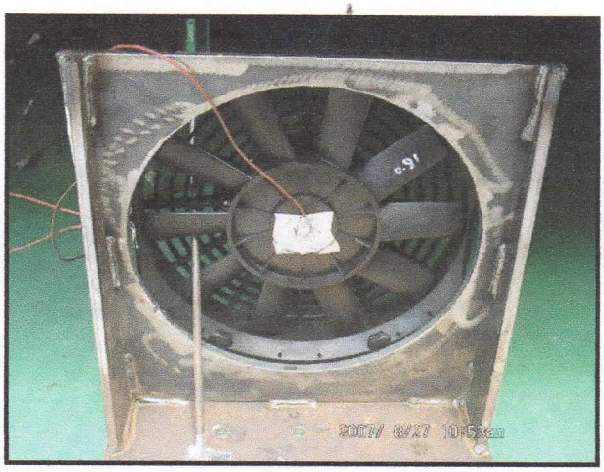
Temp.position	Axle center	Motor casing	Shroud case
Max. temp.(℃)	143.0	181.0	131.0

TEST ITEM	Evaluation Standard	RESULT
Normal temp. LOCK	NO IGNITION	NO IGNITION







(Normal temp. LOCK)

IV. CONCLUSION:

In test process approximately when 20 minutes has the happen burning unusual smell, 25.5 minutes time fan and the axle center are depart from the motor, The motor is also depart from with the shroud , After the motor is depart from restricts the temperature drop , The motor revolves to continue (But has the noise) , Conforms to the standard requirement after above test , Non-ignition happen , Therefore not in security anxiety.

TEST REPORT		REPORT NUMBER R-CAB-B11E
PRRT NUMBER JMF-SD12-10B	PART NAME SHROUD ASSY	REPORT DATE 2008/04/02
		TEST DATE 2008/03/24~04/01
TEST NAME Durability Test		TEST LOCATION Wind Tunnel Equipment
PURPOSE Check Zhong Chuan Cooling Fan Durability Test		Approved / Authorized / Authorized / Prepared / By

I. TEST SAMPLE:

SHROUD ASSY

	PART NAME	SUPPLIER
PART	Motor	ZHONG CHUAN (JMF-SD12-001)
	FAN	ZHONG CHUAN (ϕ=230 mm ; 10 leaf)

II. TEST CONDITION:

95±5℃ Environment、Voltage 14V±0.5V， 200 Hr.

Evaluation Standard:

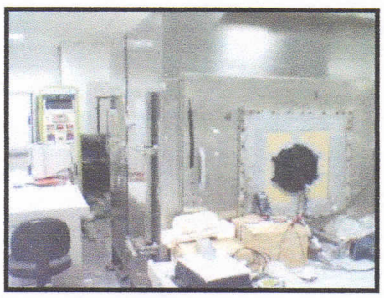
(1) Airflow、Revolution、Current ±10%↓.

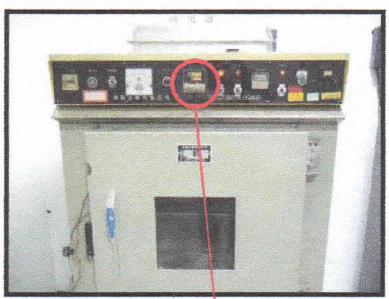
(2) Electrical characteristics were not exceptional.

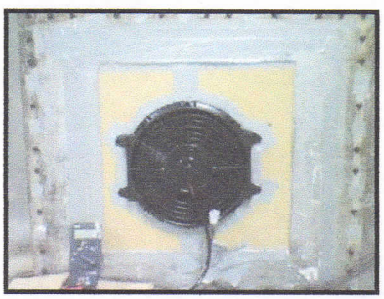
(3) Insulation resistance:1MΩ↑.

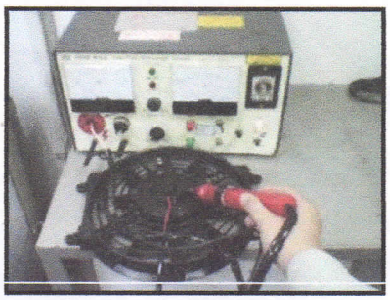
III. TEST RESULT:

Test Voltage 12V	Max Airflow (m^3/min)	Max Static Pressure (mmAq)	R.P.M. (rpm)	Current (A)	Electrical character	Insulation resistance
Before	10.26	10.41	2438	4.58	---	---
After	10.78	10.96	2565	4.78	No Exceptional	∞
Differ %	UP5.1%	UP 5.3%	UP 5.2%	UP 4.4%		









(Airflow Test) (Insulation resistance Test) (Durability Test)

IV. CONCLUSION: All tests meet the specification.

TEST REPORT

		REPORT NUMBER	R-CAB-B12E
PRRT NUMBER	JMF-SD12-10B	PART NAME	SHROUD ASSY
		REPORT DATE	2008/04/07
		TEST DATE	2008/03/31~04/03
TEST NAME	TEMPERATURE CYCLE TEST	TEST LOCATION	Wind Tunnel Equipment
PURPOSE	Check Zhong Chuan Cooling Fan Temperature Cycle Test	Approved / Authorized / Authorized / Prepared / By	

I. TEST SAMPLE:
SHROUD ASSY

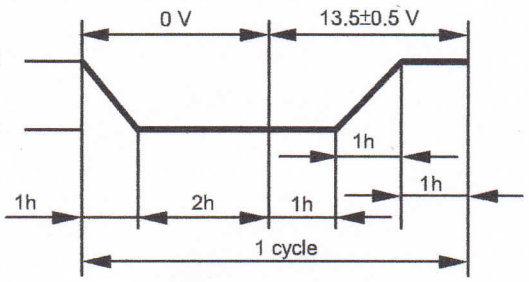
	PART NAME	SUPPLIER
PART	Motor	ZHONG CHUAN (JMF-SD12-001)
	FAN	ZHONG CHUAN (ϕ=230 mm ; 10 leaf)

II. TEST CONDITION:

According right illustration to practice
10cycle 60 Hr。

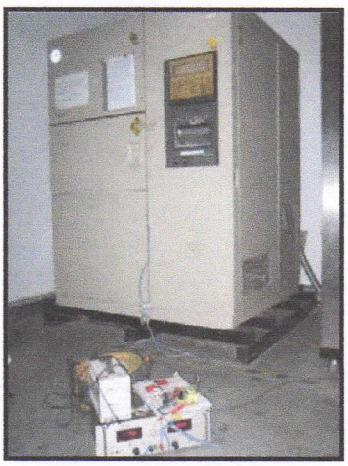
Evaluation Standard:

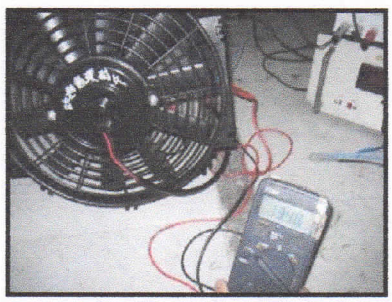
(1) Airflow、Revolution、Current ±10%↓.
(2) Electrical characteristics were not exceptional.
(3) Insulation resistance:1MΩ↑.

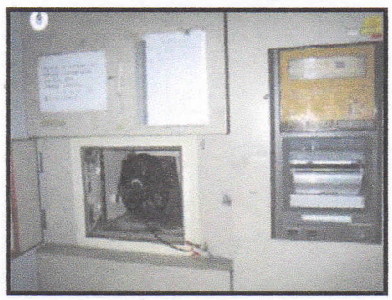


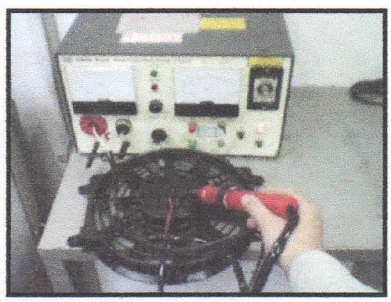
III. TEST RESULT:

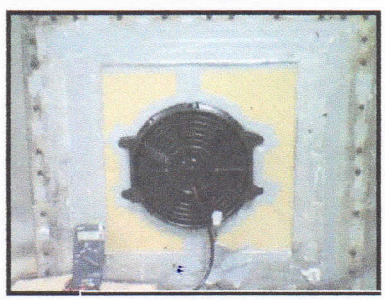
Test Voltage 12V	Max Airflow (m^3/min)	Max Static Pressure (mmAq)	R.P.M. (rpm)	Current (A)	Electrical character	Insulation resistance
Before	10.34	10.50	2502	4.69	---	---
After	10.66	10.81	2574	4.88	No Exceptional	∞
Differ %	UP3.1%	UP 3.0%	UP 2.9%	UP 4.0%		











(Temperature Cycle Test) (Airflow Test)

IV. CONCLUSION:

All tests meet the specification.