1、Seal test

1.1 By doing seal test on the seal test bed, compress air into the inside of heater by 250kpa, and keep it with 60s.

2、Vibration test

Test temperature：5℃~35℃、relative humidity≤90%（under 25℃）

2.1 Do seal test according to regulation 1.1.

2.2 On the vibration test bed, inject normal temperature water into the heater and seal it, then fix the heater on the test bed like mounting it on a real car. Fix the acceleration sensor on the under pan of the vibration bed, this vibration bed should vibrate as a sine wave. The frequency, acceleration and vibration direction should be according to table 1. After this test, do seal test again according to regulation 1.1.

2.3 After seal test, change the frequency, acceleration and vibration direction according to table 1, and do vibration test again. After this test, do seal test again according to regulation 1.1.

Table 1 conditions of vibration test

application	frequency.hz	acceleration，m/s^2	direction	times
Passenger car	22	±25	Vertical, front and back	In each direction 1.0×10^6
Commercial car	22	±25	Vertical, front and back	

3、Seal test under low temperature

Apply to heater with plastic tanks and rubber seals.

3.1 do seal test according to regulation 1.1.

3.2 Inject anti freezing with freezing temperature of -45℃ into the inside of radiator, and put radiator into the -40℃ of low temperature box, like on a real car. After 12 hours, get the radiator out and let all anti freezing out within 10 min. After this test, do seal test again according to regulation 1.1.

4、test the resistance of high temperature

4.1 do seal test according to regulation 1.1.

4.2 on the property test bed of cold & hot pressure cycle, inject 50% ethylene glycol and 50% water（volume），medium temperature is 130℃±5℃，add pressure of 130kpa，under temperature of 60℃~80℃，do the resistance test of high temperature for 72 hours，After this test, do seal test again according to regulation 1.1.

5、seal test for high & low temperature exchange

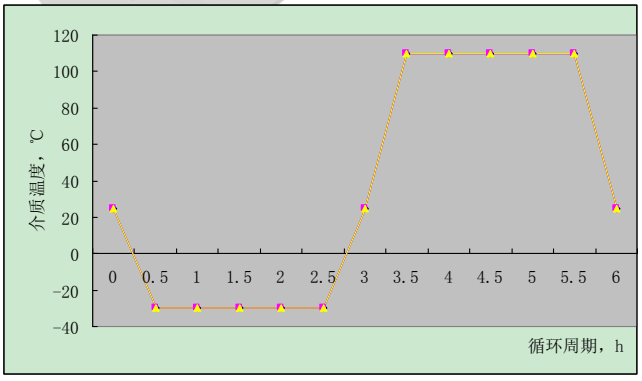
Apply to heater with plastic tanks and rubber seals.

5.1 do seal test according to regulation 1.1.

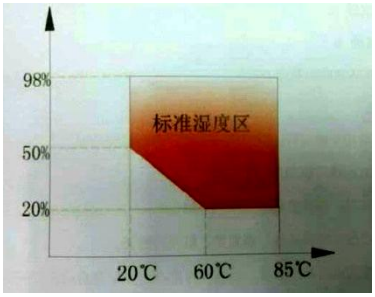
5.2 mix the anti freezing with freezing temperature of -45℃, ethylene glycol and water, according to the proportion of 3：4：3.

5.3 inject the solution into the inside of heater and seal it，do the test by 12 times, according to the temperature cycle of normal→-30℃（keep for 2 hours）→normal →110℃（keep for 2 hours）→normal（in table 1）. After the test, do seal test according to regulation 1.1.

Graph 1



5.4 humidity range：20%～98%RH(reference to the temperature and humidity range in table 2)

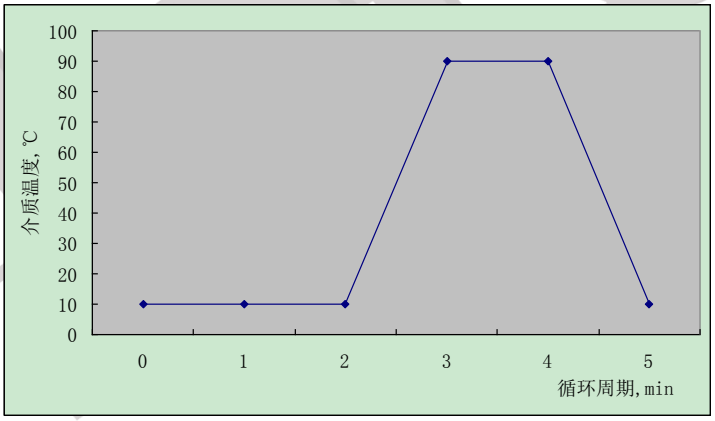


6、property test of cold & hot cycle

6.1 do seal test according to regulation 1.1.

6.2 inject 50% ethylene glycol and 50% water（volume）， add pressure 120kpa±10kpa to the commercial car heater，or pressure 150kpa±10kpa to the passenger car heater, do cycle of temperature exchange by 2000 times as 10℃→90℃→10℃（in table 1），frequency is 15 times/h. After the test, do seal test according to regulation 1.1.

Graph 3



7、outside corrosion property test

7.1 concentration of saline solution is（5±1）%（weight）：mix it according to 5±1% sodium chloride and 95% water（attention：PH should be 7±0.5）.

7.2 do the test according to table 2.

Table 2

	Temperature of test box	Temperature of saturated bottle	condition	time	result
heater	35±2	47±	Continuous mist spray	8h	Non-oxidation
component				16h	Non-oxidation