



<b>TEST REPORT</b> <b>EN 14624:2012</b> <b>Performance of portable leak detectors and of room monitors for halogenated refrigerants</b>	
<b>Report</b>	
Report reference No.....	SCC(17)-60341A-10
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<b>Client</b>	
Name .....	Jiangsu Jingchuang Electronics Co., Ltd.
Address.....	No.1, Huangshan Rd., Tongshan Economic Development Zone, Xuzhou, Jiangsu, China
<b>Manufacturer:</b>	
Name .....	Jiangsu Jingchuang Electronics Co., Ltd.
Address .....	No.1, Huangshan Rd., Tongshan Economic Development Zone, Xuzhou, Jiangsu, China
<b>Test specification</b>	
Standard .....	BS EN 14624:2012
Test procedure .....	Commissioned inspection
Procedure deviation .....	N.A.
Non-standard test method .....	N.A.
<b>Test report form/blank test report</b>	
Test report form No.....	SCC14624
TRF modified by.....	CHINA CEPREI (SICHUAN) LABORATORY..
Master TRF.....	PS_INFO\2-ELS.MES\REPORTS\CCA
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<b>Test item</b>	
Type of test object .....	Halide Leak Detector
Trademark .....	<b>Elitech</b> <sup>®</sup>
Model and/or type reference.....	LD-100
Manufacturer.....	Jiangsu Jingchuang Electronics Co., Ltd.
Rating.....	DC4.5V
Equipment mobility.....	N.A.
Operating condition .....	N.A
Tested for IT power systems.....	No
IT testing, phase-phase voltage (V) ...	N.A.
Mass of equipment (kg) .....	N.A.
Protection against ingress of water.....	N.A.
<b>Testing</b>	
Date of receipt of test item.....	Jul.23, 2017
Date(s) of performance of test.....	Jul.23, 2017 – Jul.30, 2017
<b>Possible test case verdicts</b>	
Test case does not apply to the test object .....	N/A.
Test object was not evaluated for the requirements.:	N/E (Collateral standards only)
Test object does meet the requirement.....	P(Pass)
Test object does not meet the requirement.....	F(Fail)
<b>General remarks</b>	
"(see remark #)" refers to a remark appended to the report.	
"(see appended table)" refers to a table appended to the report.	
Throughout this report a comma is used as the decimal separator.	
The test results presented in this report relate only to the object tested.	
This report shall not be reproduced except in full without the written approval of the testing laboratory.	
<b>General descriptions</b>	
Brief description of the tested sample(s):	
Ambient temperature (22-24)°C   humidity:(55-58)%	
Complete test was conducted on <b>LD-100</b>	
All tests are carried out in according to the <b>BS EN 14624</b> and the test results meet the requirements specified in the above-mentioned standard	

Clause	Requirement-Test	Result-Remark	Verdict
<b>1</b>	<b>Scope</b>		<b>P</b>
	The purpose of this European Standard is to qualify the performance of portable sniffing leak detectors and room monitors for halogenated refrigerants. These leak detectors are designed for the detection of CFC, HCFC, HFC and PFC halogenated gases, and their detection limit is checked with a calibration leak or calibration gas.		P
<b>4</b>	<b>Symbols and abbreviations</b>	Comply with the requirements	P
<b>5</b>	<b>Type of portable leak detectors and room monitors</b>		P
	The types of detectors shown in Table 2 are concerned in this European Standard:	Pass Comply with the requirements	P
	Both the indicating leak detector and room monitor can be designed with thresholds: either one fixed threshold which is not adjustable or several fixed or adjustable thresholds.	Comply with the requirements	P
	Both the measuring leak detector and the room monitor comprise a scale and permit assigning of a measurement value to a gas concentration in the atmosphere.	Comply with the requirements	P
<b>6</b>	<b>General requirements for all portable leak detectors and room monitors</b>		<b>P</b>
6.1	Gas type		P
	The manufacturer shall specify the gas or the gas(es) that the leak detector is able to detect or measure.	CFCs, HCFCs, HFCs CH etc.	P
6.2	Capabilities		P
	Locating leak detectors or room monitors are single-gas or multi-gas measuring devices. They are selective or non-selective and shall be able to measure or indicate a concentration or leakage rate threshold of halogen gas.	Multi-gas measuring devices	P
	Selective locating detectors or room monitors shall be able to identify a specific halogen gas among other gases. Non-selective locating detectors or room monitors cannot identify a specific halogen gas among other gases but they shall detect all halogen gases present in a gas mixture as a sum value.	Pass Comply with the requirements	P
6.3	Output signal		P
	The indication or the measurement mode of the leak detector can be instantaneous or continuous and shall generate a signal (audible and/or visual) to indicate that a pre-set alarm level is exceeded (the signal alerts operators in charge of the leak tightness inspection or responsible for the supervision of the system charged with halogen gas).	Continuous Pass	P
6.4	Response time		P
	The manufacturer shall specify the response time for the output signal.	<3s	P

Clause	Requirement-Test	Result-Remark	Verdict
6.5	Recovery time (clean up time)		P
	The manufacturer shall specify the recovery time after the portable leak detector probe has been indicating the leakage rate of the largest refrigerant leak (upper detection limit).	3s	P
6.6	Repeatability		P
	For identical concentration values of a defined halogen gas, the leak detector or the room monitor shall give identical readings at repeated measurements within an uncertainty range specified by the manufacturer.	Pass	P
6.7	Calibration		P
	Checks/calibration, at least annually, shall be carried out in accordance with the manufacturer recommendations. For portable leak detectors a calibration leak shall be used. In the case of room monitors, a calibration gas shall be used.	Pass	P

<b>7</b>	<b>Specific requirements for locating portable leak detectors</b>		<b>P</b>
7.1	General		P
	Locating leak detectors shall be able to indicate a halogen leak in two different situations: first, when the detector probe is stationary in front of a leak, second, when the detector probe is moving in front of a leak.	Pass	P
7.2	Lowest detectable leakage rate threshold when the leak detector is stationary		P
	The leak detector with the probe held stationary in front of a leak at a distance of 3 mm shall give a visual or acoustical alarm indicating that the threshold value set equal to the leakage rate value has been exceeded. Testing conditions are detailed in 11.1.	Acoustical alarm.	P
7.3	Lowest detectable leakage rate threshold value when the detector probe is moving		P
	The detector probe, when moved across a leak passing at a speed of 2 cm/s and a distance of 3 mm in front of the leak exit, shall be able to repeatedly detect this leakage rate. Testing conditions are detailed in 11.1.	Pass Comply with the requirements	P
7.4	Leak detection in a contaminated environment		P
	The leak detector shall be able to compensate for a slowly varying contaminating concentration of the halogen refrigerant and retain its detection ability for leak location.	Pass	P

<b>8</b>	<b>Specific requirements for room monitors</b>		<b>N/A</b>
8.1	General		N/A
	Room monitors can be single-sensor or multi-sensor instruments. Requirements shall be verified for each sensor.		N/A
8.2	Lowest detectable concentration (lower detection limit)		N/A

Clause	Requirement-Test	Result-Remark	Verdict
	The manufacturer shall specify the lowest detectable concentration in parts per million (ppm).		N/A
8.3	Highest tolerable concentration (upper detection limit)		N/A
	The manufacturer shall specify the highest detectable concentration in parts per million (ppm) (this is the critical concentration which prevents the cell from recovering to its initial detection limit).		N/A
8.4	Upper and lower alarm thresholds		N/A
	The manufacturer shall specify the method to set upper and lower alarm thresholds, and the way the user can check them.		N/A
8.5	Response time for alarm trigger		N/A
	The manufacturer shall specify the response time.		N/A

<b>9</b>	<b>Calibration leaks</b>		<b>P</b>
9.1	General		P
	Two types of calibration leaks exist and are commercially available: capillary calibration leaks and membrane calibration leaks (permeation membrane). Industrial calibration leaks permit to verify the correct operation of on-site leak detectors. Industrial membrane or capillary calibration leaks shall be re-calibrated after a time recommended by the manufacturer. The accuracy of calibration leaks shall be specified by the manufacturer by a statement of uncertainty of the nominal leakage rate.	Pass Comply with the requirements	P
	Secondary standards: leaks calibrated with reference to the primary standard are used for the calibration of industrial calibration leaks and for the qualification of leak detectors in the test apparatus described in Clause 10.	Pass See the rated clause	P
9.2	Calibration gases		P
	A calibration gas consists of the target gas at a specified concentration e.g. R404A at 1000 ppm, in a carrier gas such as air or nitrogen and at a specified concentration uncertainty.	Pass	P
	Calibration gases are readily available in cylinders or may be produced in test chambers by injection of the target gas by syringe or by the use of calibrated mass flow controllers or equivalent.	Pass	P

<b>10</b>	<b>Test apparatus</b>		<b>P</b>
10.1	General		P
	R-134a is the reference refrigerant for measurements described in the following procedures. R-25 and R-32 are used for selectivity tests.	Test refrigerant : R-134a	P
10.2	Apparatus no. 1: detector probe stationary at the orifice of a calibration leak		P
	The apparatus comprises a calibration leak that is a secondary standard with $\pm 15\%$ uncertainty of its value.	Comply with the requirements	P

Clause	Requirement-Test	Result-Remark	Verdict
	The apparatus is located in a room where ambient temperature is (20 to 25) °C and relative humidity (30 to 70) % at atmospheric pressure.		P
	The alarm threshold of the leak detector is set to the nominal leakage rate value of the calibration leak in the test device.		P
10.3	Apparatus no. 2: detector probe moved with defined speed and distance in front of a calibration leak		P
	The apparatus comprises a calibration leak that is a secondary standard with uncertainty of $\pm 15$ % of its value.		P
	The detector probe is located on a sliding carriage or pivoting arm which can be moved from left to right and vice-versa in front of the leak exit at a speed adjustable between 1 cm/s and 3 cm/s, the distance adjustable in the range of 1 mm to 5 mm with a minimum deflection of approximately 10 cm (the dwell time offside the leak shall at least be equal to the recovery time).	Comply with the requirements	P
	The apparatus, see Figure 2, is located in a room where ambient temperature is (20 to 25) °C and relative humidity (30 to 70) % at atmospheric pressure. The alarm threshold of the leak detector is set to the nominal leakage rate value of the calibration leak in the test device.	Comply with the requirements	P
10.4	Apparatus no. 3: Chamber with monitored concentration		P
	A definite concentration of R-134a vapour is generated by a gas mixing device or e.g. by injection of a definite volume of R-134a with a syringe into a tight chamber of known volume containing synthetic air. To obtain a uniform concentration in the chamber the gas is mixed with a fan, which is switched off before every measurement.	Comply with the requirements	P

<b>11</b>	<b>Performance tests</b>		<b>P</b>
11.1	Performance test of locating leak detector		P
11.1.1	Test no. 1: Static detection		P
11.1.1.1	Detection limit		P
	The locating leak detector probe is placed at a distance of 3 mm $\pm$ 0,5 mm in front of the calibration leak of apparatus no. 1 during no longer than 10 s and the minimum leakage rate for triggering a respective alarm is determined. This test is repeated for various nominal values of leakage rates: 10 g/a, 5 g/a and 3 g/a until the detection limit is established. The leaks may have actual leakage rate values within $\pm 20$ % of the above nominal values.	Pass Comply with the requirements	P
11.1.1.2	Leak detector response time		P
	After each test, the leak detector is placed in clean ambient air and the response time (see 6.4) is measured.		P

Clause	Requirement-Test	Result-Remark	Verdict
	The test is repeated 10 times for each value of calibration leakage rate, and the readings given by the leak detector are recorded. The indication can be either an audible or visual alarm or a reading if the system is a measuring leak detector.	Pass <3s	P
11.1.1.3	Cross-sensitivity		P
	The test for detection limit is repeated with the interfering gases R-125 and R-32 at the minimum leakage rate or concentration threshold measured previously. The leak detector's reading for the interfering gases is recorded.	Comply with the requirements	P
11.1.2	Test no. 2: dynamic detection limit		P
	The leak detector probe is placed on apparatus no. 2 at a distance of $3 \text{ mm} \pm 0,5 \text{ mm}$ moving at a speed of $(2 \pm 0,2) \text{ cms}^{-1}$ . The leak detector signal is recorded during each passage in front of the leak orifice. The dynamic detection limit test is repeated 10 times in a sequence and the output signal is recorded each time. This test is repeated for various nominal values of leakage rates: 10 g/a, 5 g/a and 3 g/a until the detection limit is established. The leaks used may have values within $\pm 20 \%$ of the above nominal values.	Comply with the requirements	P
11.1.3	Test no. 3: detection limit in contaminated environment		P
	The apparatus no. 2 is placed in a chamber (apparatus no. 3) where the concentration of halogen refrigerant is the maximum concentration in ppm as specified by the manufacturer.	Comply with the requirements	P
	In the absence of such a specification the maximum concentration shall be 1000 ppm. A tolerance of $\pm 10 \%$ of the concentration is acceptable.		P
	The leak detector probe is located in the same chamber, the zeroing procedure of the leak detector as recommended by the manufacturer is applied and the dynamic detection limit is measured according to the same procedure as test no. 2.	Comply with the requirements	P
11.1.4	Test no. 4: recovery time		P
	The leak detector probe is placed in front of the largest leak as specified by the manufacturer for 10 s. If not specified by the manufacturer this leak shall be 50 g/a. The probe is then removed from the large leak and placed again in front of the apparatus no. 1 with the alarm trigger set to the detection limit. The recovery time is measured. This test is repeated five times.	Comply with the requirements	P
11.2	Performance tests of room monitor		N/A
11.2.1	General		N/A
	These tests are carried out in a room at atmospheric pressure where ambient temperature is $(20 \text{ to } 25) \text{ }^\circ\text{C}$ and relative humidity $(30 \text{ to } 70) \%$ .		N/A
11.2.2	Test a) to determine the upper and lower detection limits		N/A
	Each sensor of the room monitor is located in the test		N/A

Clause	Requirement-Test	Result-Remark	Verdict
	chamber (apparatus no. 3) or alternatively, without a chamber, calibration gas ( $\pm 5\%$ concentration uncertainty) may be delivered directly to each sensor in turn using a typical calibration kit as shown in Figure 3.		
11.2.3	Test b) to determine response time		N/A
	The alarm set points, one or more e.g. 100 ppm or 500 ppm, are specified by the manufacturer		N/A
	Each sensor of the room monitor is located in the test apparatus chamber (apparatus no. 3) or alternatively, without a chamber, calibration gas may be delivered directly to each sensor in turn using a typical calibration kit.		N/A
	The time to reach the alarm set point(s) or in the case of an indicating controller the time to display the specified values e.g. 50 % or 90 % of full scale is recorded.		N/A
11.2.4	Test c) to determine recovery time from exposure to a large concentration		N/A
	The maximum concentration in ppm as specified by the manufacturer and established in 11.2.1 above is generated in the chamber of apparatus no. 3 or delivered directly to the sensor using a typical calibration kit.		N/A
	In the absence of such a specification the maximum concentration shall be 1000 ppm. A tolerance of $\pm 10\%$ of the concentration is acceptable.		N/A
	The above tests should be repeated a minimum of 10 times and the results averaged.		N/A

12	Instrument characteristics and reporting of test results		P
12.1	Characteristics of locating leak detector		P
	- Static upper and lower detection limit for leakage rates: Upper and lower detection limits are stated if all out of 10 measurements at these limits according to the test in 11.1.1.1 have been repeatable. The static detection limits are expressed in g/a	Comply with the requirements	P
	- Dynamic detection limits: Upper and lower detection limits are stated if all out of 10 measurements at these limits according to the test in 11.1.2 have been repeatable. The static detection limits are expressed in g/a.		P
	- Detection limit in contaminated environment: Upper and lower detection limits are stated if all out of 10 measurements at these limits according to the test in 11.1.3 have been repeatable. The static detection limits are expressed in g/a.		P
	- Response time for leakage rates: The response time is stated according to test no. 1 (see 11.1.1.2).		P
	- Recovery time:		P



Clause	Requirement-Test	Result-Remark	Verdict
	The recovery time of the leak detector is stated according to test no. 4 (see 11.1.4).		
12.2	Characteristics of room monitors		N/A
	- Upper and lower detection limits for concentrations: Upper and lower detection limits are stated in the report according to the test a) in paragraph 11.2.2. The detection limits are expressed in ppm. The alarm set points, if any, are specified by the manufacturer in ppm.		N/A
	- Response time for concentrations: The response time is stated in the report according to test b) in paragraph 11.2.3 and is expressed in seconds.		N/A
	- Recovery time: The recovery time of the room monitor is stated in the report according to test c) (see 11.2.4) and is expressed in seconds.		N/A
	- Lifetime of the cell: The manufacturer's statement about the cell lifetime including both long exposures to low concentrations (in the range of 10 ppm) and unexpected exposures to high concentrations (in the range of 1000 ppm) is repeated in the report.		N/A

<b>13</b>	<b>Technical data</b>		<b>P</b>
13.1	Locating leak detectors		P
	The product data sheet shall specify the following technical data:	Pass Comply with the requirements	P
	- static upper and lower detection limits for the alarm triggers of locating leak detectors;		P
	- dynamic upper and lower detection limits for the alarm triggers of locating leak detectors.		P
13.2	Measuring leak detectors		P
	The product data sheet shall specify the following technical data:	Pass Comply with the requirements	P
	- static upper and lower detection limits for the indication of concentrations or leakage rate values by measuring leak detectors;		P
	- dynamic upper and lower detection limits for the indication of concentrations or leakage rate values by measuring leak detectors.		P
13.3	All portable leak detectors		P
	The product data sheet shall specify the following technical data:	Pass Comply with the requirements	P
	- response time;		P
	- zeroing time;		P

Clause	Requirement-Test	Result-Remark	Verdict
	- recovery time;		P
	- lower detection limit in halogen gas contaminated environment;		P
	- re-calibrating frequency;		P
	- directions for use;		P
	- safety instructions;		P
	- leak detector weight.		P
13.4	Room monitor		N/A
	The product data sheet shall specify the following technical data for concentration measurement:		N/A
	- upper and lower detection limits;		N/A
	- pre-set alarm point(s);		N/A
	- response time to the lower alarm set point or measurement value specified e.g. 50 % full scale;		N/A
	- response time to the upper alarm set point, if provided, or measurement value specified e.g. 90 % of full scale;		N/A
	- recovery time;		N/A
	- check/calibration frequency as specified in 6.7;		N/A
	- installation instruction including guidelines for sensor locations in the room to be controlled;		N/A
	- directions for use		N/A
	- safety instructions.		N/A

Photos of the sample



Picture 1

## **Notice**

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- 6. The test results presented in this report relate only to the object tested.**

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