






TEST REPORT

Report No.:	SF201300546	Page 1 of 11
Client:	PHAROBIT CO., LIMITED	
Address:	#428 Doosan Venturedigm #126-1, Pyungchon-dong, Dongan-gu, Anyang-si, Gyunggi-do, Korea	
Sample Description:	LED Personal Distress Signal Lantern	
Model:	PAF-100	
Test Location:	GUANGZHOU GRG METROLOGY & TEST CO., LTD. GRGT'S Safety Lab	
Test Specification:	IEC 60529:2001 <i>Degrees of protection provided by enclosures (IP Code)</i>	
Test Date:	2013-08-26~2013-08-27	
Test Result:	Test item passed the test specification-IP67	
Tested By:	Reviewed By:	
Jacky Chen	Zeming Zhang	
		
Date: 2013-08-27	Date: 2013-08-27	
Other Aspects:		
N.A		
Abbreviations: ok / P = passed; fail / F = failed; n.a. / N = not applicable		
The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced except in full, without the written approval of GRGT.		

TEST REPORT IEC 60529:2001 Degrees of protection provided by enclosures (IP Code)	
Report reference No.:	SF201300546
Date of issue	2013-08-27
Laboratory	GUANGZHOU GRG METROLOGY & TEST CO., LTD.
Address	163 Pingyun Road West of Huangpu Avenue Tianhe District Guangzhou City, 510656, P. R. China
Testing location.....:	as above
Applicant	PHAROBIT CO., LIMITED
Address	#428 Doosan Venturedigm #126-1, Pyungchon-dong, Dongan-gu, Anyang-si, Gyunggi-do, Korea
Standard.....:	IEC 60529: 2001
Test Result.....	The a. m. test item passed
Test procedure	CB/CCA
Procedure deviation.....:	IP67
Non-standard test method.....:	N. A.
Test Report Form No..... :	IECEN60529A
Test Report Form(s) Originator	IMQ
Master TRF	Dated 2006-06
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Number of pages (Report).....:	7
Number of pages (Attachments)	4
Test item description	LED Personal Distress Signal Lantern
Trade Mark	N/A
Manufacturer	PHAROBIT CO., LIMITED
Model/Type reference	PAF-100
Ratings	DC7.4V, Battery: IC Protected 2600mAh

IEC 60529-2001

Clause	Requirement + Test	Result - Remark	Verdict
11	General requirements for tests		P
11.1	Atmospheric conditions for water or dust tests		P
	The recommended atmospheric conditions during the tests are as follow:		-
	Temperature range: 15°C to 35°C	25°C	P
	Relative humidity: 25% to 75%	58%	P
	Air pressure: 86 kPa to 106kPa	101kPa	P

13	TESTS FOR PROTECTION AGAINST SOLID FOREIGN OBJECTS INDICATED BY THE FIRST CHARACTERISTIC NUMERAL		P
13.4	Dust test for first characteristic numerals 5 and 6		P
	The test is made using a dust chamber incorporating the basic principles shown in figure 2 where by the powder circulation pump may be replaced by other means suitable to maintain the talcum powder in suspension in a closed test chamber. The talcum powder used shall be able to pass through a square-meshed sieve the nominal wire diameter of which is 50 µm and the nominal width of a gap between wires 75µm. The amount of talcum powder to be used is 2 kg per cubic metre of the test chamber volume. It shall not have been used for more than 20 tests.		P
	Enclosures are of necessity in one of two categories		--
	Category 1: Enclosures where the normal working cycle of the equipment causes reductions in air pressure within the enclosure below that of the surrounding air, for example, due to thermal cycling effects.	See 13.6.1, IP6X	P
	Category 2: Enclosures where no pressure difference relative to the surrounding air is present.		N
	Category 1 enclosures: The enclosure under test is supported inside the test chamber and the pressure inside the enclosure is maintained below the surrounding atmospheric pressure by a vacuum pump. The suction connection shall be made to a hole specially provided for this test. If not otherwise specified in the relevant product standard, this hole shall be in the vicinity of the vulnerable parts.	See below	P
	If it is impracticable to make a special hole, the suction connection shall be made to the cable inlet hole. If there are other holes (for example, more cable inlet holes or drain-holes) these shall be treated as intended for normal use on site.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The object of the test is to draw into the enclosure, by means of depression, a volume of air 80 times the volume of the sample enclosure tested without exceeding the extraction rate of 60 volumes per hour. In no event shall the depression exceed 2 kPa (20 mbar) on the manometer shown in figure 2.	See below	P
	If an extraction rate of 40 to 60 volumes per hour is obtained the duration of the test is 2 h.		N
	If, with a maximum depression of 2 kPa (20 mbar), the extraction rate is less than 40 volumes per hour, the test is continued until 80 volumes have been drawn through, or a period of 8 h has elapsed.	20 mbar, less than 40 volumes per hour, 8 h	P
	Category 2 enclosures:	Category 1 enclosures	N
	The enclosure under test is supported in its normal operating position inside the test chamber, but is not connected to a vacuum pump. Any drain-hole normally open shall be left open for the duration of the test. The test shall be continued for a period of 8 h.		N
	Category 1 and category 2 enclosures:	Category 1 enclosures	N
	– testing of individually enclosed sections of the enclosure.		N
	– testing of representative parts of the enclosure, comprising components such as doors, ventilation openings, joints, shaft seals, etc., in position during test;		N
	– testing of a smaller enclosure having the same full-scale design details.		N
	In the last two cases, the volume of air to be drawn through the enclosure under test shall be the same as for the whole enclosure in full scale.		N
13.6	Special conditions for first characteristic numeral 6	IP6X	P
13.6.1	Test conditions for first characteristic numeral 6		P
	The enclosure shall be deemed category 1, whether reductions in pressure below the atmospheric pressure are present or not.	Category 1 enclosures	P
13.6.2	Acceptance conditions for first characteristic numeral 6	See below	P
	The protection is satisfactory if no deposit of dust is observable inside the enclosure at the end of the test.	No deposit of dust	P

14	TESTS FOR PROTECTION AGAINST WATER INDICATED BY THE SECOND CHARACTERISTIC NUMERAL		P
14.1	Test means		P
	The test means and the main test conditions are given in Tab. VIII.	See below	P
	Tab. VIII-8 Test means and main test conditions for the tests for protection against water		—

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Clause	Requirement + Test	Result - Remark	Verdict
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	Second charact. numeral	Test means	Water flow rate	Duration of test	Test conditions	P
	0	No test required	—	—	—	N
	1	Drip box Fig.3 Enclosure on turntable	1 mm/min	10 min	14.2.1	N
	2	Drip box Fig.3 Enclosure in 4 fixed positions of 15° tilt	3 mm/min	2,5 min for each position of tilt	14.2.2	N
	3	Oscillating tube Fig. 4 Spray ± 60° from vertical, distance max. 200 mm or Spray nozzle Fig. 5 Spray ± 60° from vertical	0,07 l /min ± 5% per hole, multiplied by number of holes 10 l /min ± 5%	10 min 1 min/m ² at least 5 min	14.2.3 a) 14.2.3 b)	N
	4	As for numeral 3 Spray ± 180° from vertical	As for numeral 3		14.2.4	N
	5	Water jet hose nozzle Fig. 6 Nozzle 6,3 mm diameter, distance 2,5m to 3 m	12,5 l /min ± 5%	1 min/m ² at least 3 min	14.2.5	N
	6	Water jet hose nozzle Fig. 6 Nozzle 12,5 mm diameter, distance 2,5 m to 3 m	100 l /min ± 5%	1 min/m ² at least 3 min	14.2.6	N
	7	Immersion tank Water-level on enclosure: 0,15 m above top 1 m above bottom	—	30 min	14.2.7	P
	8	Immersion tank Water-level: by agreement	—	by agreement	14.2.8	N
14.2	Test conditions					—
	Test means and main test conditions are given in Tab. VIII.			See below		P
	Details concerning compliance of degrees of protection – in particular for second characteristic numerals 5/6 (water jets) and numerals 7/8 (immersion) – are given in Clause 6.			IPX7		P
	The tests are conducted with fresh water.					P
	During the tests for IPX1 to IPX6 the water temperature should not differ by more than 5 K from the temperature of the specimen under test.					N
	If the water temperature is more than 5 K below the temperature of the specimen a pressure balance shall be provided for the enclosure.					N
	For IPX7 details of the water temperature are given in 14.2.7.			See clause 14.2.7		P
	During the test, the moisture contained inside the enclosure may partly condense. The dew which may thus deposit shall not be mistaken for an ingress of water.					P

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Clause	Requirement + Test	Result - Remark	Verdict
	For the purpose of the tests, the surface area of the enclosure is calculated with a tolerance of 10%.		P
	Adequate safety precautions should be taken when testing the equipment in the energized condition		P
14.2.7	Test for second characteristic numeral 7: temporary immersion between 0,15 and 1 m		P
	The test is made by completely immersing the enclosure in water in its service position as specified by the manufacturer so that the following conditions are satisfied:		P
	a) the lowest point of enclosures with a height less than 850 mm is located 1000 mm below the surface of the water;		P
	b) the highest point of enclosures with a height equal to or greater than 850 mm is located 150 mm below the surface of the water;		N
	c) the duration of the test is 30 min;	30 min	P
	d) the water temperature does not differ from that of the equipment by more than 5 K.		P
	However, a modified requirement may be specified in the relevant product standard if the tests are to be made when the equipment is energized and/or its parts in motion		N
14.3	Acceptance conditions		P
	After testing in accordance with the appropriate requirements of 14.2.1 to 14.2.8 the enclosure shall be inspected for ingress of water.	No water enters the sample after the test	P
	It is the responsibility of the relevant Technical Committee to specify the amount of water which may be allowed to enter the enclosure and the details of a dielectric strength test, if any.		P
	In general, if any water has entered, it shall not:		—
	be sufficient to interfere with the correct operation of the equipment or impair safety;	No water enters the sample after the test	N
	deposit on insulation parts where it could lead to tracking along the creepage distances;		N
	reach live parts or windings not designed to operate when wet;		N
	accumulate near the cable end or enter the cable if any.		N
	If the enclosure is provided with drain-holes, it should be proved by inspection that any water which enters does not accumulate and that it drains away without doing any harm to the equipment.		N
	For enclosures without drain-holes, the relevant product standard shall specify the acceptance conditions if water can accumulate to reach live parts		N

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Clause	Requirement + Test	Result - Remark	Verdict
14	TESTS FOR PROTECTION AGAINST WATER INDICATED BY THE SECOND CHARACTERISTIC NUMERAL		P
14.2.5	Test for second characteristic numeral 5 with the 6,3 mm nozzle		N
	The test is made by spraying the enclosure from all practicable directions with a stream of water from a standard test nozzle as shown in figure 6		N
	internal diameter of the nozzle 6,3 mm		N
	delivery rate: 12,5 L/min±5 %		N
	Water pressure: to be adjusted to achieve the specified delivery rate		N
	core of the substantial stream: circle of approximately 40 mm diameter at 2.5 m distance from nozzle;		N
	test duration per square metre of enclosure surface area likely to be sprayed: 1 min: minimum test duration 3 min		N
	Distance from nozzle to enclosure surface: 2,5 m and 3 m		N
14.3	Acceptance conditions		P
	After testing in accordance with the appropriate requirements of 14.2.1 to 14.2.8 the enclosure shall be inspected for ingress of water.		P
	It is the responsibility of the relevant technical committee to specify the amount of water which may be allowed to enter the enclosure and the details of a dielectric strength test, if any.		N
	In general, if any water has entered, it shall not: be sufficient to interfere with the correct operation of the equipment or impair safety; deposit on insulation parts where it could lead to tracking along the creepage distances; reach live parts or windings not designed to operate when wet; accumulate near the cable end or enter the cable if any.		N
	If the enclosure is provided with drain-holes, it should be proved by inspection that any water which enters does not accumulate and that it drains away without doing any harm to the equipment.		N
	For enclosures without drain-holes, the relevant product standard shall specify the acceptance conditions if water can accumulate to reach live parts.		N

List of test equipment used:

N O.	Name of equipment	Type of equipment	Apparatus NO.	Calibration due date
1	Dust test box	SC-500	2008-G228	2014-02-23
2	Tape measure	10m	AG2012-D036	2014-01-23
3	Stopwatch	SW8019	2008-D250	2014-05-01
4	IPX7 test equipment	SH8019B	2008-G230	2014-02-03

Photos of the product



Photo of the IP6X Test Configuration

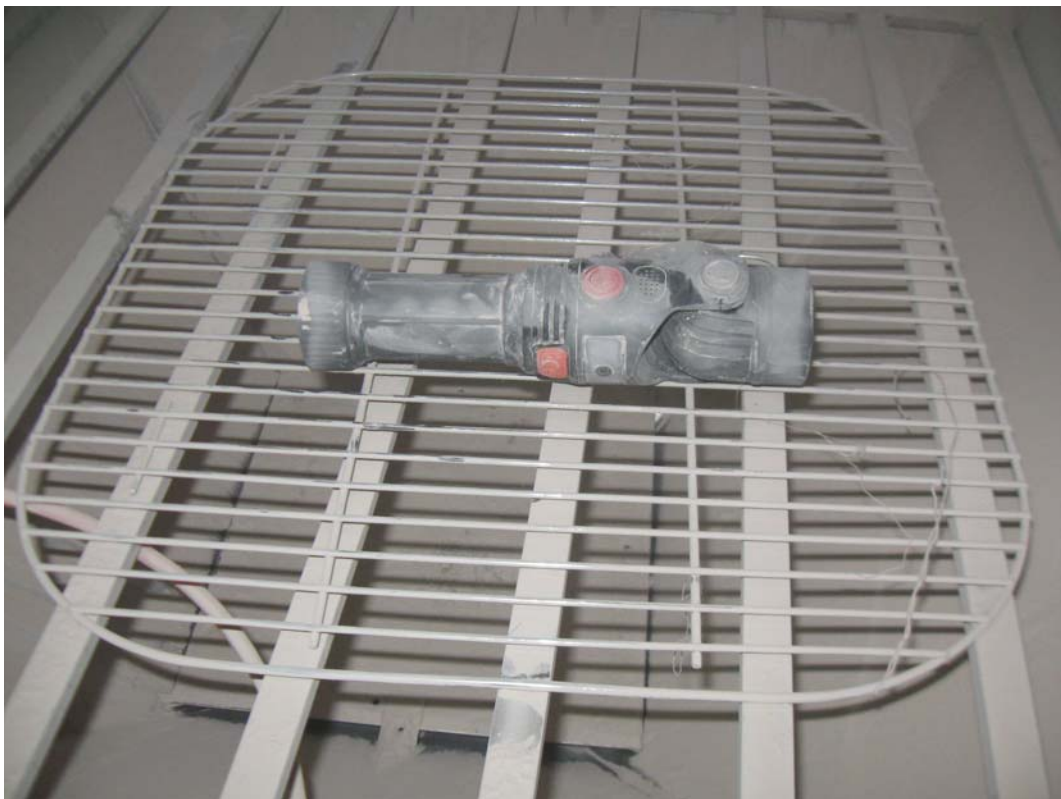


Photo of the IP6X Test Configuration



Photo of the IP6X Test Configuration



Photo of the IPX7 Test Configuration



Photo of the IPX7 Test Configuration



Photo of the IPX7 Test Configuration

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