

TEST REPORT**IEC 60529: Edition 2.2, 2013-08****Degrees of protection provided by enclosures (IP Code)**

Report reference No. : 1515673STO-001

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Date of issue..... : 24 August 2015

Contents : 9 pages

Testing laboratory

Name..... : Intertek Semko AB

Address : Box 1103, SE-164 22 Kista, Sweden

Testing location : as above

Test date..... : 19-24 August 2015

Client

Name..... : FLIR Systems AB

Address : Box 7376, SE-187 15 Täby, Sweden

Test specification

Standard : IEC 60529: Edition 2.2, 2013-08

Specified IP-code : **IP67**

TRF date. : -

Equipment Under Test (EUT)

Type of test object : IR Camera

Model..... : AX8

Trademark : FLIR

Serial no. and/or type reference. : 71201517 dust and 71201528 water

Manufacturer : FLIR Systems AB

Rating(s)..... : -

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Possible test case verdicts:

Test case does not apply to the test object.....: N(Not Applicable)

Test object does meet the requirement.....: P(Pass)

Test item does not meet the requirement: F(Fail)

Test case has not been checked: —

General remarks:

"(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 point is used as the decimal separator.

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

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General description:

- **Tested without any plugs or other means at the connectors**
- **The sealing at the lid is provided with sealing compound**
- **The metal plate at the bottom is gloued to the enclosure**



Picture 1: EUT, IR camera AX8



Picture 2: EUT, IR camera AX8

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|-------------|--|---|----------|
| 10 | Marking. | | |
| | Marking | | N |
| 11 | General requirement for tests. | | |
| 11.1 | Tests should be carried out under the standard atmospheric conditions described in IEC 68-1 | | P |
| 11.2 | Test samples shall be in a clean and new condition. | | P |
| | The relevant product standard shall specify details such as: The number of samples to be tested; | | N |
| | -conditions for mounting, assembling and positioning of the samples; | | P |
| | -the pre-conditioning, if any, which is to be used; | | N |
| | -whether to be tested energized or not; | | N |
| | -whether to be tested with its parts in motion or not; | | N |
| 11.5 | Empty enclosures | | |
| | If the enclosure is tested without equipment inside, the manufacturer shall ensure that after the electrical equipment is enclosed the enclosure meets the declared degree of protection of the final product. | | N |
| 12 | Tests for protection against access to hazardous parts indicated by the first characteristic numeral. | | |
| | Test conditions for IP 0X: | No test required | N |
| | Test conditions for IP 1X: The sphere of 50 mm Ø | | N |
| | Test conditions for IP 2X: The jointed test finger may penetrate up to its 80 mm length, but adequate clearance shall be kept. | | N |
| | Test conditions for IP 3X: The test rod of 2,5 mm Ø shall not penetrate and adequate clearance shall be kept. | | N |
| | Test conditions for IP 4X: The test wire of 1,0 mm Ø shall not penetrate and adequate clearance shall be kept. | | N |
| | Test conditions for IP 5X: Same as above. | | N |
| | Test conditions for IP 6X: Same as above. | The test wire (Ø 1 mm) did not penetrate the enclosure and adequate clearance was kept. | P |

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|--------------------------------|--|-------------------------|----------------------|---|----------|
| 13 | Tests for protection against solid foreign objects indicated by the first characteristic numeral. | | | | |
| First, characteristic numeral. | Test means (object probes and dust chamber) | Test force | Test conditions, see | | N |
| 0 | No test required | - | - | | N |
| 1 | Rigid sphere without handle or guard $50_0^{+0,05} \text{ mm}$ diameter. | $50 \text{ N} \pm 10\%$ | 13.2 | | N |
| 2 | Rigid sphere without or guard $12,5_0^{+0,2} \text{ mm}$ diameter. | $30 \text{ N} \pm 10\%$ | 13.2 | | N |
| 3 | Rigid steel rod $2,5_0^{+0,05} \text{ mm}$ diameter with edges free from burrs | $3 \text{ N} \pm 10\%$ | 13.2 | | N |
| 4 | Rigid steel wire $1,0_0^{+0,05} \text{ mm}$ diameter with edges free from burrs. | $1 \text{ N} \pm 10\%$ | 13.2 | | N |
| 5 | Dust chamber, with or without underpressure | - | 13.4+13.5 | | N |
| 6 | Dust chamber, with underpressure | - | 13.4+13.6 | 8 hours in dust chamber with underpressure. | P |
| 13.3 | Acceptance conditions for the first characteristic numeral 6. The protection is satisfactory if no deposit of dust is observable inside the enclosure at the end of test. | | | No ingress of dust in the EUT. | P |

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| | | | |
|-----------|--|---|----------|
| 14 | Tests for protection against water indicated by the second characteristic numeral. | | |
| 14.2.0 | No test required | | N |
| 14.2.1 | Test for second characteristic numeral 1 with a drip box. | | N |
| 14.2.2 | Test for second characteristic numeral 2 with a drip box. | | N |
| 14.2.3 | Test for second characteristic numeral 3 with an oscillating tube or spray nozzle. | | N |
| 14.2.4 | Test for second characteristic numeral 4 with oscillating tube or spray nozzle. | | N |
| 14.2.5 | Test for second characteristic numeral 5 with a 6.3-mm nozzle, tested with a spraying nozzle. | | N |
| 14.2.6 | Test for second characteristic numeral 6 with a 12.5-mm nozzle | | N |
| 14.2.7 | Test for second characteristic numeral 7: | Immersion tank water-level on enclosure: 1 m above bottom Duration: 30 min | P |
| 14.2.8 | Test for second characteristic numeral 8: Continuous immersion subject to agreement. | | N |
| 14.2.9 | Test for second characteristic numeral 9: High-pressure and temperature water jet | | N |
| 14.3 | Acceptance conditions for IPX7: The protection is satisfactory if any water has entered, it shall not be sufficient to interfere the correct operation or impair the safety of the equipment. | Ingress of very small water drops at the joint of the bottom metal plate and the plastic enclosure. No impact of the functionality since the metal plate is heated during use. | P |
| 15. | Tests for protection against access to parts indicated by the additional letter. | | N |

SUMMARY OF ENCAPSULATION TESTS ACCORDING TO IEC 60 529: 2013

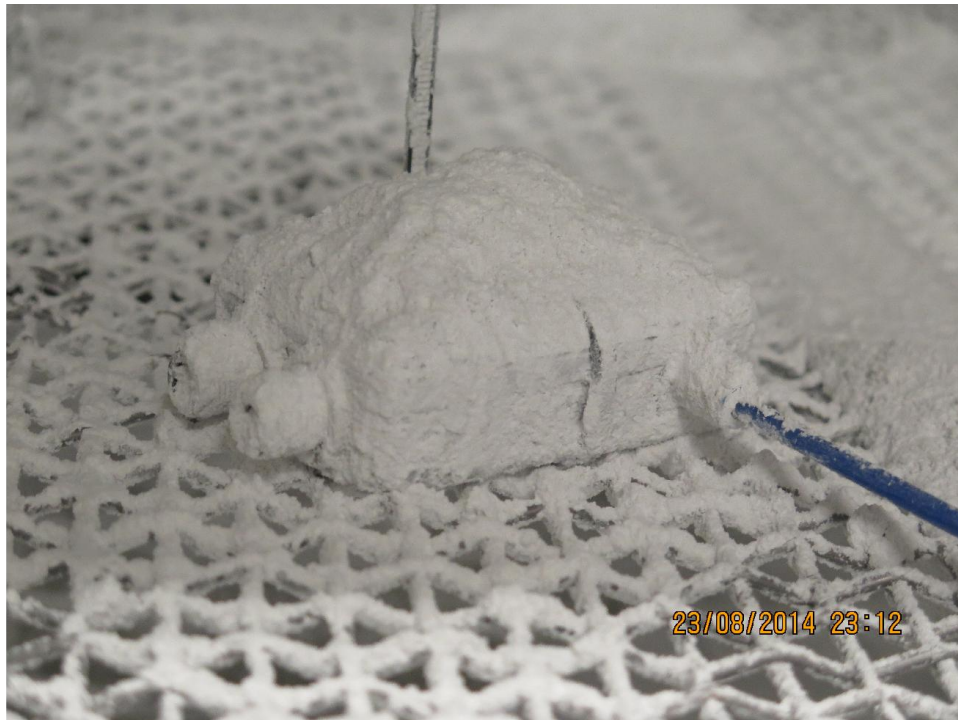
Conclusion of the IP67 test: PASS

The result of the test was in compliance with the requirements in the standard IEC 60 529 Ed 2.2: (2013)

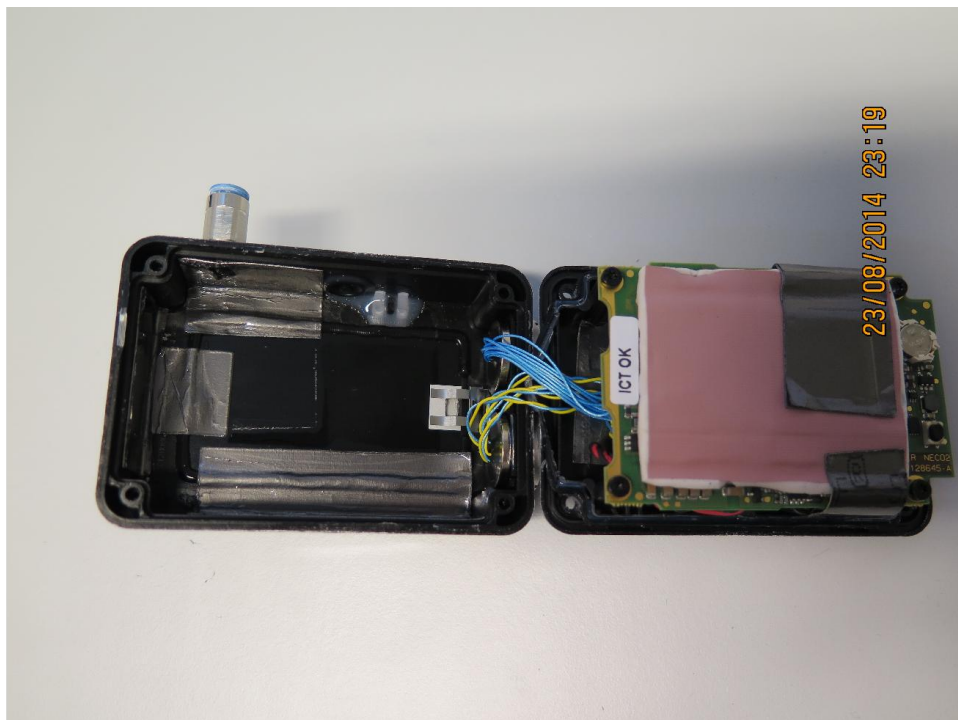


Picture 3: EUT inside the dust chamber (IP6X test)

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Picture 4: EUT after the dust test (IP6X test)

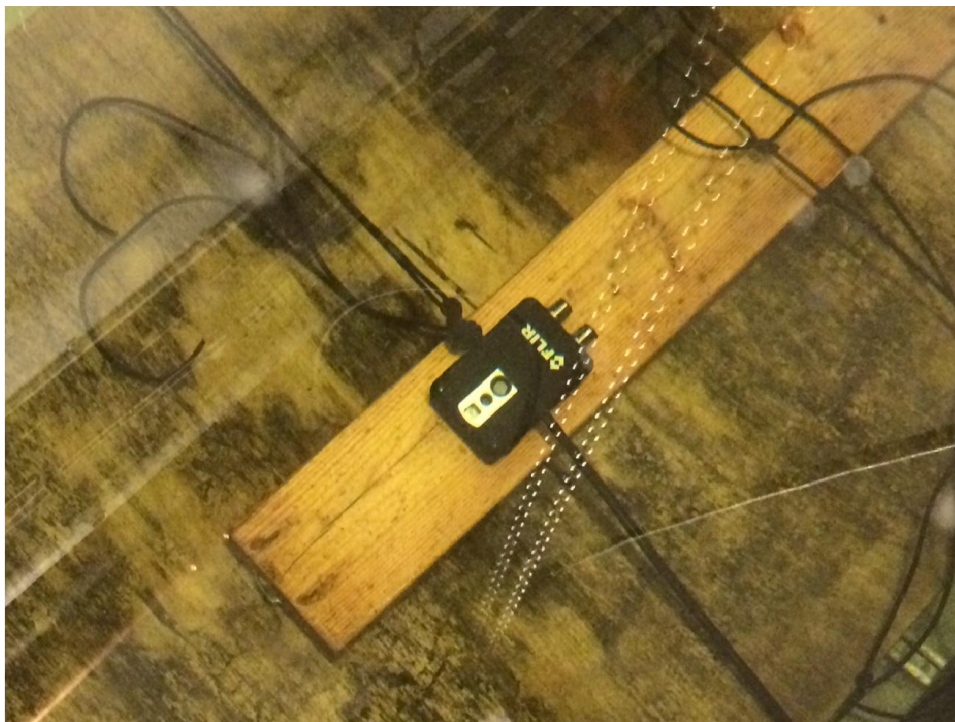


Picture 5: No dust inside EUT after IP6X test

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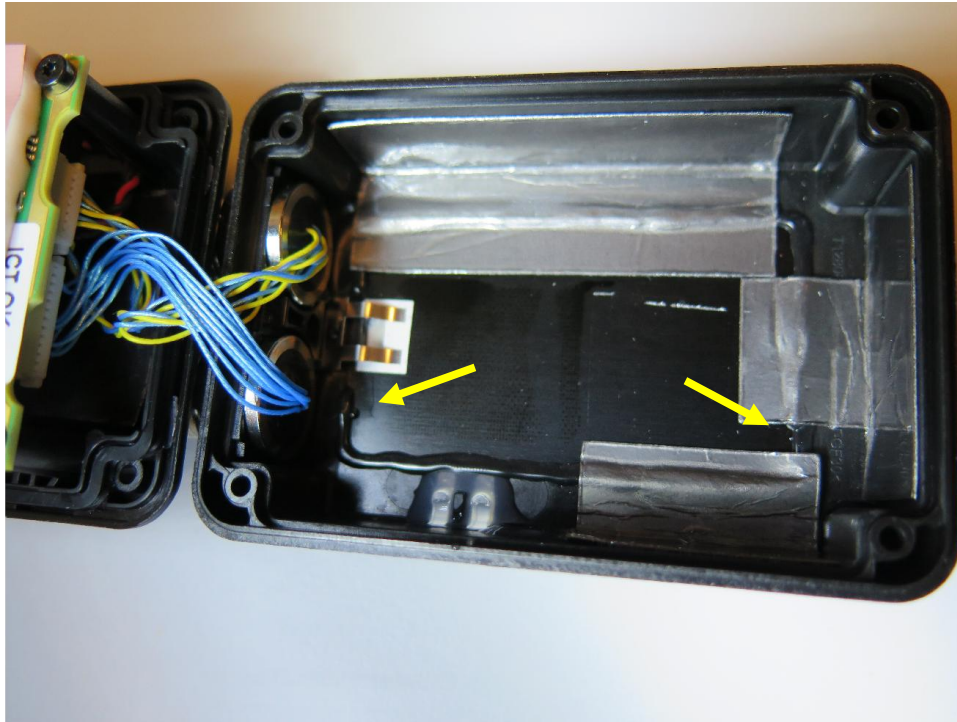


Picture 6: No dust inside EUT after IP6X test



Picture 7: EUT during water test (IPX7)

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Picture 8: Very small water drops inside EUT after IPX7 test



Picture 9: No ingress of water at the IR interface