



1. **EC-TYPE EXAMINATION CERTIFICATE**

2. **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres Directive 94/9/EC**

3. EC-Type Examination Certificate Number: **ITS09ATEX16407X**

4. Equipment or Protective System: **FD-410Ex Fog Detector**

5. Manufacturer: **Pharos Marine Ltd**

6. Address: **6 Steyning Way, Hounslow, Middlesex, TW4 6DL**

7. This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8. Intertek Testing and Certification Limited, notified body number 0359 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.


The examination and test results are recorded in confidential Intertek Report 10047186, parts A1 and B1, dated 14 September 2010.

9. Compliance with the Essential Health and Safety Requirements has been assured by compliance with standards EN60079-0:2009 and EN60079-1:2007 except in respect of those requirements referred to at item 18 of the Schedule.

10. If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

11. This EC-Type examination certificate relates only to the design and construction of the specified equipment or protective system in accordance to the directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12. The marking of the equipment or protective system shall include the following:-

 II 2 G Ex d IIB T6 T<sub>A</sub> -40°C to +53°C Gb



**F. Moss**  
Certification Officer  
17 September 2010

**Intertek Testing & Certification Limited**  
Deeside Lane, Chester, CH1 6DD  
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Registered No 3272281 Registered Office: 25 Savile Row London W1X 1AA

This certificate may only be reproduced in its entirety and without any change, schedule included and is subject to Intertek Testing and Certification Conditions for Granting Certification.



13. SCHEDULE
14. EC-TYPE EXAMINATION CERTIFICATE NUMBER ITS09ATEX16407X
15. Description of Equipment or Protective System

The FD-410Ex is a single station visibility device that operates on the backscatter principle in which the intensity of reflected light from a modulated infrared light beam is used to determine the density of a sample of the local fog mass two to ten metres in front of the fog detector. The greater the intensity of the backscatter, the denser (e.g. more opaque) the local fog mass, as the visibility range through a fog mass is inversely proportional to the fog density. The modulated nature of the infrared light source enables the fog detector to operate in daylight, or under any lighting conditions. A built-in signal filtering system prevents premature activation by any external moving reflective objects. The FD-410Ex Fog Detector allows the user to calibrate the relay trip points to reflect local fog visibility conditions.

The flameproof housing, complete with flanged mounting boss are precision cast in Stainless Steel. Positioned at the front of the unit are two circular glass windows. Mounted directly behind each window is a "Fresnel" lens that is optically coupled to a support ring and barrel focusing assembly, designed to provide a degree of adjustment during factory alignment. Rubber seals are fitted to all housing joint surfaces to prevent ingress.

The housing consists of a main case assembly with a front cover assembly containing the two cemented window assemblies. The front cover assembly forms a flanged flamepath with the main case assembly and is secured via 22 x M5x0.8 socket head fasteners. Two M20x1.5 threaded entries are provided in the side of the enclosure for cable connection via suitably certified entry devices. The front cover assembly is fitted with the light pipe assembly forming an M12x1.0 threaded flamepath.

Both internal and external earthing points are provided.

Enclosure dimensions (excluding light pipe, hood and handles): H = 175mm, L = 595mm, W = 275mm.

16. Report Number:  
Intertek Report 10047186, parts A1 and B1, dated 14 September 2010.

17. CONDITIONS OF CERTIFICATION:

- (a). Special Conditions for safe use

No modifications must be made to the flamepaths of the unit without consultation of the drawings listed below.

For securing cover to main case use only M5x0.8 socket head fasteners with yield stress  $\geq 450\text{N/mm}^2$ .

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13. SCHEDULE

14. EC-TYPE EXAMINATION CERTIFICATE NUMBER ITS09ATEX16407X

(b). Conditions For Use (Routine Tests)

A routine overpressure test in accordance with EN 60079-1:2007 shall be carried out on each cemented light pipe assembly at a pressure of  $\geq 13.41$ bar for a period of at least 10s and must be recorded. There shall be no leakage through the cement and no deformation or damage to the light pipe assembly.

18. Essential Health and Safety Requirements (EHSR's)

The relevant EHSR's have been identified and assessed in Intertek Report 10047186 part C1 dated 14 September 2010.

19. Drawings and Documents

Number	Title	Issue	Date
Zd75009	FD-410Ex	2	23/9/09
Xd75060	FD-410Ex Main Casting Drilling	2	22/10/09
Xd75062	FD-410Ex Front Cover	2	23/10/09
Xd75067	FD-410Ex Window	1	8/4/04
Xd75068	FD-410Ex Window Retaining Ring	2	26/10/09
Xd75056	FD-410Ex Front Panel Assembly	2	1/3/04
Xc77089	FD-410 Pilot Light Tube Mk2	A	14/7/10
Xc77090	FD-410 Pilot Light Mk2 Assembly	B	14/7/10
Xc77086	FD-410 Pilot Light End Cap Mk2	B	14/7/10
Wc77088	FD-410 Split Spacer	A	14/07/10
Wc77087	FD-410 Pilot Light Collar	A	14/07/10
Wc50191	FD-410 Ex Nameplate	2	16/6/10

*This Certificate is for the exclusive use of Intertek's client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this Certificate. Only the Client is authorized to permit copying or distribution of this Certificate and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek.*

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# IECEX Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit [www.iecex.com](http://www.iecex.com)

Certificate No.:  issue No.:  Certificate history:

Status:

Date of Issue:  Page 1 of 3

Applicant: **Pharos Marine Ltd**  
6 Steyning Way  
Hounslow  
Middlesex  
TW4 6DL  
United Kingdom

Electrical Apparatus: **FD-410Ex Fog Detector**  
Optional accessory:


Type of Protection: **Flameproof**

Marking: **Ex d IIB T6 Ta -40°C to +53°C Gb**

Approved for issue on behalf of the IECEx Certification Body: **P Moss**

Position: **Certification Officer**

Signature:  
(for printed version)

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**6th Oct 2010.**

Date:

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:  
**Intertek Testing & Certification Limited**  
ITS House, Cleeve Road,  
Leatherhead,  
Surrey, KT22 7SB  
United Kingdom





# IECEx Certificate of Conformity

Certificate No.: IECEx ITS 10.0038X

Date of Issue: 2010-10-06

Issue No.: 0

Page 2 of 3

Manufacturer: **Pharos Marine Ltd**  
6 Steyning Way  
Hounslow  
Middlesex  
TW4 6DL  
United Kingdom

**Manufacturing location(s):**

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

**STANDARDS:**

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

**IEC 60079-0 : 2007-10** Explosive atmospheres - Part 0: Equipment - General requirements  
Edition: 5

**IEC 60079-1 : 2007-04** Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"  
Edition: 6

*This Certificate does not indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

**TEST & ASSESSMENT REPORTS:**

*A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in*

Test Report:

GB/ITS/ExTR10.0051/00

Quality Assessment Report:

GB/ITS/QAR10.0017/00



# IECEx Certificate of Conformity

Certificate No.: IECEx ITS 10.0038X

Date of Issue: 2010-10-06

Issue No.: 0

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## Schedule

### EQUIPMENT:

*Equipment and systems covered by this certificate are as follows:*

The FD-410Ex is a single station visibility device that operates on the backscatter principle in which the intensity of reflected light from a modulated infrared light beam is used to determine the density of a sample of the local fog mass two to ten metres in front of the fog detector. The greater the intensity of the backscatter, the denser (e.g. more opaque) the local fog mass, as the visibility range through a fog mass is inversely proportional to the fog density. The modulated nature of the infrared light source enables the fog detector to operate in daylight, or under any lighting conditions. A built-in signal filtering system prevents premature activation by any external moving reflective objects. The FD-410Ex Fog Detector allows the user to calibrate the relay trip points to reflect local fog visibility conditions. The flameproof housing, complete with flanged mounting boss are precision cast in Stainless Steel. Positioned at the front of the unit are two circular glass windows. Mounted directly behind each window is a "Fresnel" lens that is optically coupled to a support ring and barrel focusing assembly, designed to provide a degree of adjustment during factory alignment. Rubber seals are fitted to all housing joint surfaces to prevent ingress. The housing consists of a main case assembly with a front cover assembly containing the two cemented window assemblies. The front cover assembly forms a flanged flamepath with the main case assembly and is secured via 22 x M5x0.8 socket head fasteners. Two M20x1.5 threaded entries are provided in the side of the enclosure for cable connection via suitably certified entry devices. The front cover assembly is fitted with the light pipe assembly forming an M12x1.0 threaded flamepath. Both internal and external earthing points are provided. Enclosure dimensions (excluding light pipe, hood and handles): H = 175mm, L = 595mm, W = 275mm.

### CONDITIONS OF CERTIFICATION: YES as shown below:

#### (a). Special Conditions for safe use

1. No modifications must be made to the flamepaths of the unit without consultation of the drawings listed in IECEx Test Report Cover GB/ITS/ExTR10.0051/00.
2. For securing cover to main case use only M5x0.8 socket head fasteners with yield stress  $\geq 450\text{N/mm}^2$ .

#### (b). Routine Tests

A routine overpressure test in accordance with IEC 60079-1:2007 shall be carried out on each cemented light pipe assembly at a pressure of  $\geq 13.41\text{bar}$  for a period of at least 10s and must be recorded. There shall be no leakage through the cement and no deformation or damage to the light pipe assembly.

## Test Verification of Conformity

On the basis of the tests undertaken, the sample(s) of the below product have been found to comply with the requirements of the referenced specifications at the time the tests were carried out.

**Applicant Name & Address** : Pharos Marine Ltd  
Steyning Way  
Hounslow  
TW4 6DL

**Product(s) Tested** : Fog Detector

**Ratings and Principal Characteristics** : IP66  
MATERIAL: W-75060R SS316L Stainless Steel

**Model(s)** : FD-410

**Relevant Standard(s)/Specification(s)** : EN60529:1992 + A1:2000

**Verification Issuing Office Name & Address** : Intertek Testing & Certification Limited  
Deeside Lane, Chester, CH1 6DD, UK. +44 (0)1244 882590

**Verification/Report Number(s)** : 10 047716

**NOTE** : This verification is part of the full test report(s) and should be read in conjunction with it.

This Verification is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this Verification. Only the Client is authorized to copy or distribute this Verification. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results referenced from this Verification are relevant only to the sample tested. This Verification by itself does not imply that the material, product, or service is or has ever been under an Intertek certification programme.



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Signature

**Name:** Peter Rawlinson BEng (Hons) CEng MIET  
**Position:** European Business Manager - Hazloc  
**Date:** 19 10 2010