

# CESI

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Capitale sociale 8.550.000 €  
interamente versato  
Codice fiscale e numero  
iscrizione CCIAA 00793580150

Registro Imprese di Milano  
Sezione Ordinaria  
N. R.E.A. 429222  
P.I. IT00793580150

Schema di certificazione

# CESI-ATEX

Il CESI è stato autorizzato dal governo italiano ad operare quale organismo di certificazione di apparecchi e sistemi destinati a essere utilizzati in atmosfera potenzialmente esplosiva con D.M. 1/3/1983, D.M. 19/6/1990, D.M. 20/7/1998 e D.M. 27/8/2000 e D.M. 02/02/2006

ATEX 03-02 - 1

# CERTIFICATE



## TYPE EXAMINATION CERTIFICATE

- [1] [2] **Equipment intended for use in potentially explosive atmospheres**  
**Directive 94/9/EC**
- [3] Type Examination Certificate number:  
**CESI 09 ATEX 047 X**
- [4] Equipment: **Multistage centrifugal underwater electrical pumps series '4" EX'**
- [5] Manufacturer: **Officine di Trevi S.a.s.**
- [6] Address: **SS n. 3 Flaminia, km. 145  
06032 Trevi - PG**
- [7] This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
- [8] CESI certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design of equipment intended for use in potentially explosive atmospheres given in Annex II to the European Union Directive 94/9/EC of 23 March 1994.  
The examination and test results are recorded in confidential report n. EX- A9023616.
- [9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with:  
**EN 60079-0: 2006 EN 60079-18: 2004 EN 13463-1: 2009 EN 13463-5: 2003**
- [10] If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.
- [11] This TYPE EXAMINATION CERTIFICATE relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.
- [12] The marking of the equipment shall include the following:

II 2G Ex s mb c II T6

or

II 2G Ex s mb c II T5

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Date 20th August 2009 - Translation issued on August 20th 2009

Prepared  
Tiziano Cola

Verified  
Mirko Balaz

Approved  
Fiorenzo Bregani

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**CESI** S.p.A.  
Divisione Energia  
"Area Tecnica Certificazione"  
Il Responsabile

[13]

## Schedule

[14]

TYPE EXAMINATION CERTIFICATE n. CESI 09 ATEX 047 X

[15] **Description of equipment**

Multistage centrifugal underwater electrical pumps series '4" EX', are multi-impeller vertical axis electric pumps for use in areas with possible presence of explosive atmospheres, due to gases, vapors or mist, for the following scopes:

- emptying sumps,
- draining flooded places,
- raising water from wells, pools and basins,
- industrial waterworks,
- draining sewage and cesspool systems.

*Electric pumps series '4" EX' are not suitable for pumping flammable liquids.*

The electric pumps in subject are formed by an electric motor (4 possible powers), placed in the lower part of the equipment, surmounted by the hydraulic part constituted of a multistage centrifugal pump (11 different families) having an impellers and diffusers number changeable from model to model. In the lower part of the motor, protected by a special bored disk, is positioned a rubber set of bellows which assures equal pressure between external liquid and internal motor oil, nullifying the strain of the structure at any depth.

The two-poles electric motor can be made single-phase or three-phases winding. In the case of a single-phase winding, the power has to be supplied using a condenser, having the characteristics shown on the marking plate, placed in safe area and wired by a skilled electrician.

The types of protection, adopted against the explosion risk, refers to different parts of the apparatus: the mechanical protection "c" is applied to the hydraulic part, the electrical protection "mb" to the electric connections inside the motor and the round cable entry, the special protection "s" to the oil soaked electric motor. The usage of three thermal switches (one out of three logic) guarantees the temperature class in any situation of use.

Electric pumps subject of this certificate are identified by the following codes (e.g. ALPHA EX 13):

FF EX nn

Identification of the electric pump family:

THETA	OMEGA	BETA
CROMA	SIGMA	ASTRA
GAMMA	IOTA	VENERE
KAPPA	ALPHA	

Stages number of the hydraulic part depending on the pumps family, as shown in the table:

family	Models n.	Stages number of the hydraulic part																			
		6	8	9	10	11	12	13	14	16	17	18	19	20	22	24	26	27	28	34	37
THETA	2																✓				✓
CROMA	3												✓				✓				✓
GAMMA	3									✓				✓			✓				
KAPPA	4				✓						✓					✓				✓	
OMEGA	3					✓								✓			✓				
SIGMA	3		✓			✓							✓								
IOTA	3	✓		✓			✓														
ALPHA	4			✓				✓					✓			✓					
BETA	2			✓					✓												
ASTRA	4						✓							✓					✓	✓	
VENERE	4			✓						✓			✓					✓			

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## Schedule

[14]

TYPE EXAMINATION CERTIFICATE n. CESI 09 ATEX 047 X

[15] Description of equipment (continue)

### Equipment characteristics

*Single-phase motor (with the starting condenser to be installed in safe area):*

Rated power supply voltage      230 V~

*Three-phases motor:*

Rated power supply voltage      400 V~ (star connection)

230 V~ (triangle connection)

Rated voltage on each phase      230 V~

Rated power supply frequency    50 Hz

*Powers and electric motors types:*

Electric pump family	Motors number	Motor power [kW]			
		0.75 (1CV)	1.10 (1.5CV)	1.50 (2CV)	2.20 (3CV)
THETA	2	✓	✓		
CROMA	3	✓	✓	✓	
GAMMA	3	✓	✓	✓	
KAPPA	4	✓	✓	✓	✓
OMEGA	3		✓	✓	✓
SIGMA	3		✓	✓	✓
IOTA	3		✓	✓	✓
ALPHA	4	✓	✓	✓	✓
BETA	2			✓	✓
ASTRA	4	✓	✓	✓	✓
VENERE	4	✓	✓	✓	✓

*Maximum rated currents of the motors power supply (3= three phases; 2= two phases; Y, Δ= star and triangle):*

Electric pump family	Maximum rated current for each motor type and power supply [A]										
	1 CV			1.5 CV			2 CV			3 CV	
	3Y	3Δ	2	3Y	3Δ	2	3Y	3Δ	2	3Y	3Δ
THETA			6			8.7			/		
CROMA	2.1	3.6	6.4			9.2					/
GAMMA			6.4			9.7					
KAPPA			5.9			9.0					
OMEGA				3.4	5.9	9.0					
SIGMA			/			9.1	4.8	8.2			
IOTA						9.1					
ALPHA	2.1	3.6	6.6			9.5				6.0	10.4
BETA			/			/					
ASTRA	2.1	3.6	5.3	3.4	5.9	9.0					
VENERE			6.3			9.3					

Insulation class

F

Duty type

:

S1 (continuous at constant load)

::

S4 (20 cycles per hour maximum)

Rated speed

2850 turns per minute

Maximum density of the pumped fluid

1200 kg/m<sup>3</sup>

Temperature of the pumped fluid

-20°C ÷ +40°C (above the freezing point)

Ingress protection

IP68

Maximum depth for the use

10 bar (100 m in water: 1000 kg/m<sup>3</sup>)

120 m with flat power supply cable

Temperature class:

:

T6 (with intervention temperature of the protection at 75°C ± 5%)

::

T5 (with intervention temperature of the protection at 80°C ± 5% or at 85°C ± 5%)

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## Schedule

[14]

TYPE EXAMINATION CERTIFICATE n. CESI 09 ATEX 047 X

[16] Report n. EX- A9023616

### *Routine tests*

The manufacturer shall carry out the routine tests prescribed at paragraph 27 of the EN 60079-0 standard and at paragraph 9 of the EN 60079-18 standard.

### *Descriptive documents (prot. EX- A9023622)*

Technical note constructive characteristics, doc. 2006/01-01_0-00EX NT rev. 0 (18 sheets)	dated	2009/06/22
Technical note performance characteristics, doc. 2006/01-01_1-00EX NT rev. 0 (4 sheets)	dated	2009/06/22
Technical note performance characteristics, doc. 2006/01-01_2-00EX NT rev. 0 (4 sheets)	dated	2009/06/22
Technical note performance characteristics, doc. 2006/01-01_3-00EX NT rev. 0 (4 sheets)	dated	2009/06/22
Technical note performance characteristics, doc. 2006/01-01_4-00EX NT rev. 0 (4 sheets)	dated	2009/06/22
Technical note performance characteristics, doc. 2006/01-01_5-00EX NT rev. 0 (4 sheets)	dated	2009/06/22
Technical note performance characteristics, doc. 2006/01-01_6-00EX NT rev. 0 (4 sheets)	dated	2009/06/22
Technical note performance characteristics, doc. 2006/01-01_7-00EX NT rev. 0 (4 sheets)	dated	2009/06/22
Technical note performance characteristics, doc. 2006/01-01_8-00EX NT rev. 0 (4 sheets)	dated	2009/06/22
Technical note performance characteristics, doc. 2006/01-01_9-00EX NT rev. 0 (4 sheets)	dated	2009/06/22
Technical note performance characteristics, doc. 2006/01-01_10-00EX NT rev. 0 (4 sheets)	dated	2009/06/22
Technical note performance characteristics, doc. 2006/01-01_11-00EX NT rev. 0 (4 sheets)	dated	2009/06/22
Use instructions, doc. 2006/01-01_1-00EX IU rev. 0 (21 sheets)	dated	2009/06/22
Use instructions, doc. 2006/01-01_2-00EX IU rev. 0 (21 sheets)	dated	2009/06/22
Use instructions, doc. 2006/01-01_3-00EX IU rev. 0 (21 sheets)	dated	2009/06/22
Use instructions, doc. 2006/01-01_4-00EX IU rev. 0 (21 sheets)	dated	2009/06/22
Use instructions, doc. 2006/01-01_5-00EX IU rev. 0 (21 sheets)	dated	2009/06/22
Use instructions, doc. 2006/01-01_6-00EX IU rev. 0 (21 sheets)	dated	2009/06/22
Use instructions, doc. 2006/01-01_7-00EX IU rev. 0 (21 sheets)	dated	2009/06/22
Use instructions, doc. 2006/01-01_8-00EX IU rev. 0 (21 sheets)	dated	2009/06/22
Use instructions, doc. 2006/01-01_9-00EX IU rev. 0 (21 sheets)	dated	2009/06/22
Use instructions, doc. 2006/01-01_10-00EX IU rev. 0 (21 sheets)	dated	2009/06/22
Use instructions, doc. 2006/01-01_11-00EX IU rev. 0 (21 sheets)	dated	2009/06/22
Manufacturer declaration, doc. 2006/01-01-00-EX DCH rev. 0 (2 sheets)	dated	2009/06/22
EHSR analysis, doc. 2006/01-01-00-EX RESS rev. 0 (16 sheets)	dated	2009/06/22
Risk analysis, doc. 2006/01-01-00-EX AR II rev. 0 (16 sheets)	dated	2009/06/22
Drawing n. 2006/01-01_1-00-EX DWG rev. 0	dated	2009/06/22
Drawing n. 2006/01-01_2-00-EX DWG rev. 0 (2 sheets)	dated	2009/06/22
Drawing n. 2006/01-01_3-00-EX DWG rev. 0	dated	2009/06/22
Drawing n. 2006/01-01_4-00-EX DWG rev. 0 (2 sheets)	dated	2009/06/22
Drawing n. 2006/01-01_5-00-EX DWG rev. 0	dated	2009/06/22
Drawing n. 2006/01-01_6-00-EX DWG rev. 0	dated	2009/06/22
Drawing n. 2006/01-01_7-00-EX DWG rev. 0	dated	2009/06/22
Drawing n. 2006/01-01_8-00-EX DWG rev. 0	dated	2009/06/22
Drawing n. 2006/01-01_9-00-EX DWG rev. 0	dated	2009/06/22
Drawing n. 2006/01-01_10-00-EX DWG rev. 0	dated	2009/06/22
Drawing n. 2006/01-01_11-00-EX DWG rev. 0	dated	2009/06/22
Drawing n. 2006/01-01_12-00-EX DWG rev. 0	dated	2009/06/22
Drawing n. 2006/01-01_13-00-EX DWG rev. 0	dated	2009/06/22
Drawing n. 2006/01-01_14-00-EX DWG rev. 0	dated	2009/06/22
Drawing n. 2006/01-01_15-00-EX DWG rev. 0	dated	2009/06/22
Drawing n. 2006/01-01_16-00-EX DWG rev. 0	dated	2009/06/22
Drawing n. 2006/01-01_17-00-EX DWG rev. 0	dated	2009/06/22
Data sheets of the used materials (39 sheets)		

One copy of all documents is kept in CESI files.

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## Schedule

[14]

TYPE EXAMINATION CERTIFICATE n. CESI 09 ATEX 047 X

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[17] Special conditions for safe use (X)

- The permanently connected supplying cable shall be properly protected against the risk of mechanic damage. The connection of the cable terminals shall be made in a safe area or adopting one of the types of protection indicated in the EN 60079-0 standard and in compliance with the in force installation rules.
- The electric pump, motor and hydraulic part, shall remain completely submerged during operation.
- Mount a flow switch in safe area or adopting an adequate protection (protection modes provided by the standard EN 60079-0) which disconnects the motor in case the flow rate goes below 5 l/min.
- The electric pump must be protected with a suitable magnetothermic circuit-breaker which shall cut the supply also in case the current of one phase is interrupted.
- The pump shall operate in the standing position or slightly leaning, 45 degrees at the most.
- In case of intervention of the thermal protection, unless the external reason which caused the overheating is well known, before using the pump again, it shall be sent to the manufacturer or its authorized centre which will check oil level and quality.
- In case of repeated interventions of the thermal protection, the equipment is to be considered not suitable for the kind of usage.
- The pump cannot be used in case signs of leakage of the inner oil are noticed outside the pump.

[18] Essential Health and Safety Requirements

Assured by standards fulfilment, manufacturer's risk evaluation and compliance to the safety instructions furnished with the equipment.



**EXTENSION n. 01/14**

to EC-Type Examination Certificate CESI 09 ATEX 047 X

**Equipment:** Multistage centrifugal underwater electrical pumps series '4" EX', 'ID 4" EX' and '316 4" EX'  
**Manufacturer:** Officine di Trevi S.a.s.  
**Address:** SS n. 3 "Flaminia", km. 145  
 I-06032 Trevi - PG  
 Italy

**Admitted variations**

- Updating of the reference standards:  
**EN 60079-0 (2012), EN 60079-18 (2009), EN 13463-5 (2011),  
 EN 13463-1 (2009), (\*) EN 60079-6 (2007), (\*) EN 60079-7 (2007);**
  - The standards written in the first row have been updated since first emission of this certificate, the ones in the second row are the same used for the original certificate.
  - (\*) The requirements of these standards have not been thoroughly fulfilled but combined in order to have a protection level suitable for category 2G (EPL Gb).
- Addition of the new series '**ID 4" EX**' and '**316 4" EX**':
  - Series "**ID ..**" uses a different type of elastomer and is suitable also for pumping hydrocarbons;
  - Series "**316 ..**" has the stainless steel parts made of AISI 316 instead of AISI 304 of the other series;
- Addition of two new powers for the electric motors:  
**0.37 kW (0.5 CV) e 0.55 kW (0.75 CV);**
- Addition of new materials for the hydraulic parts;
- According to the new standards the marking has been changed and the "s" protection erased:

II 2G Ex mb c IIC T6 Gb  
 or  
 II 2G Ex mb c IIC T5 Gb

This extension and annexed descriptive documents must be annexed to the EC-Type Examination Certificate CESI 09 ATEX 047 X.

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**Date** 28/07/2014 - Translation issued on July 28<sup>th</sup> 2014

**Prepared**  
Tiziano COLA

**Verified**  
Mirko BALAZ

**Approved**

Fiorenzo BREGANI

**CESI S.p.A.**

Testing & Certification Division  
Business Area Certification

Responsabile,  
  
Fiorenzo Bregani

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**PRD N. 018B**  
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC  
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

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## EXTENSION n. 01/14

to EC-Type Examination Certificate CESI 09 ATEX 047 X

### Description of equipment

Multistage centrifugal underwater electrical pumps, series '4" EX', 'ID 4" EX' and '316 4" EX', are multi-impeller electric pumps for use in areas with possible presence of explosive atmospheres, due to gases, vapours or mists, for the following scopes:

- emptying sumps,
- draining flooded places,
- raising water from wells, pools and basins,
- industrial waterworks,
- draining sewage and cesspool systems,
- pumping hydrocarbons (only series ID 4" EX).

The electric pumps in subject are formed by an electric motor (having the former 4 possible powers plus 2 new ones), placed in the lower part of the equipment, surmounted by the hydraulic part constituted by a multistage centrifugal pump (11 different families) having different numbers of impellers and diffusers according to the model. In the lower part of the motor, above a special bored disk which protects it from washing, there is a rubber bellows which uniforms internal motor oil pressure to external liquid pressure, nullifying the strain of the structure at any depth.

The types of protection, adopted against the explosion risk, refer to different parts of the apparatus: the mechanical protection "c" is applied to the hydraulic part, the electrical protection "mb" to the electric connections inside the motor and the round cable entry, a special protection, obtained by combining partial "e" and "o" types, is applied to the oil-immersed electric motor.

The usage of three thermal switches with manual reset (one per phase, one out of three logic) guarantees the temperature class also in case of malfunctioning.

The windings of the two-poles electric motor can be made as single-phase or three-phases. In the case of a single-phase winding, the power has to be supplied using a capacitance - having the characteristics shown on the marking plate - placed in safe area and connected by a skilled electrician.

Electric pumps subject of this certificate are identified by the following codes (e.g. ID ALPHA EX 13):

- <Family> EX <nn>** (Standard series, *the same of the original certificate*)  
**316 <Family> EX <nn>** (New series: *Standard models having the stainless steel parts made of steel AISI 316*)  
**ID <Family> EX <nn>** (New series: *Models suitable for pumping hydrocarbons*)

### > <Family>

Identification of the 11 electric pump families (the same of the original certificate):

THETA	OMEGA	BETA
CROMA	SIGMA	ASTRA
GAMMA	IOTA	VENERE
KAPPA	ALPHA	

### > <nn>

Number of stages of the hydraulic part, equal to the number of impellers (*changes from the original certificate are highlighted*):

family	models n.	6	8	9	10	11	12	13	14	16	17	18	19	20	22	24	26	27	28	34	37
THETA	4							✓					✓				✓				✓
CROMA	5		✓					✓					✓				✓				✓
GAMMA	3							✓					✓				✓				
KAPPA	4				✓					✓					✓						✓
OMEGA	3					✓					✓				✓						
SIGMA	3		✓			✓				✓											
IOTA	3	✓		✓			✓														
ALPHA	5	✓		✓				✓			✓					✓					
BETA	3	✓		✓				✓													
ASTRA	4						✓							✓					✓		✓
VENERE	4			✓					✓			✓						✓			

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## EXTENSION n. 01/14

to EC-Type Examination Certificate CESI 09 ATEX 047 X

### Equipment characteristics

Single-phase motor (with the starting condenser to be installed in safe area):

Rated power supply voltage 230 V~

Three-phases motor:

Rated power supply voltage 400 V~ (star connection)  
230 V~ (triangle connection)

Rated voltage on each phase 230 V~

Rated power supply frequency 50 Hz

Rated powers of the motors installed for the different pumps families (changes from the original certificate are highlighted):

Electric pump family	Motors types	Power [kW]					
		(0.5 CV) 0.37	(0.75 CV) 0.55	(1 CV) 0.75	(1.5 CV) 1.10	(2 CV) 1.50	(3 CV) 2.20
THETA	4	✓	✓	✓	✓		
CROMA	5	✓	✓	✓	✓	✓	
GAMMA	3			✓	✓	✓	
KAPPA	4			✓	✓	✓	✓
OMEGA	3				✓	✓	✓
SIGMA	3				✓	✓	✓
IOTA	3				✓	✓	✓
ALPHA	5		✓	✓	✓	✓	✓
BETA	3				✓	✓	✓
ASTRA	4			✓	✓	✓	✓
VENERE	4			✓	✓	✓	✓

Maximum rated currents (2= two phases; 3Y, 3Δ= three phases star and triangle connection, changes from the original certificate are highlighted):

Electric pump family	Maximum rated current [A]																
	Motor 0.5 CV			Motor 0.75 CV			Motor 1 CV			Motor 1.5 CV			Motor 2 CV			Motor 3 CV	
	3Y	3Δ	2	3Y	3Δ	2	3Y	3Δ	2	3Y	3Δ	2	3Y	3Δ	2	3Y	3Δ
THETA	1.5	2.6	3.8	1.9	3.3	5.5			6			8.7	/				
CROMA			4.9			5.6	2.1	3.6	6.4			9.2			12.5		/
GAMMA									6.4			9.7			12.9		
KAPPA									5.9	3.4	5.9	9.0			12.1		
OMEGA												9.0			12.7		
SIGMA								/				9.1	4.8	8.2	11.7		
IOTA												9.1			10.8		
ALPHA				1.9	3.3	5.6	2.1	3.6	6.6			9.5			12.0	6.0	10.4
BETA								/		3.4	5.9	9.5			12.0		
ASTRA							2.1	3.6	5.3	3.4	5.9	9.0			11.1		
VENERE									6.3			9.3			11.5		

Insulation class

F

Duty type

S1 (continuous at constant load)  
S4 (20 cycles per hour maximum)

Rated speed

2850 turns per minute

Maximum density of the pumped fluid

1200 kg/m<sup>3</sup>

Temperature of the pumped fluid

-20°C ÷ +40°C (above the freezing point)

Ingress protection

IP68

Maximum depth for the use

10 bar (100 m in water: 1000 kg/m<sup>3</sup>)  
120 m with flat power supply cable

Temperature class:

T6 (with intervention temperature of the protection at 75°C ± 5%)  
T5 (with intervention temperature of the protection at 80°C ± 5% or at 85°C ± 5%)

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## EXTENSION n. 01/14

to EC-Type Examination Certificate CESI 09 ATEX 047 X

Report n. EX-B4014203

### Descriptive documents (prot. EX-B4014206)

Application, doc. 2006/01-01-00-EX DCH rev. 1 (5 pages)	dated	2013/10/15
Document 2006/01-01-00-EX RESS rev. 1 (16 pages)	dated	2013/10/15
Document 2006/01-01-00-EX AR II rev. 1 (16 pages)	dated	2013/10/15
Document 2006/01-01_0-00-EX NT rev. 1 (21 pages + 48 pages annexed)	dated	2013/10/15
<i>Technical notes – Performance characteristics</i>		
Document 2006/01-01_1-00-EX NT rev. 1 (4 pages)	dated	2013/10/15
Document 2006/01-01_2-00-EX NT rev. 1 (4 pages)	dated	2013/10/15
Document 2006/01-01_8-00-EX NT rev. 1 (4 pages)	dated	2013/10/15
Document 2006/01-01_9-00-EX NT rev. 1 (4 pages)	dated	2013/10/15
<i>Instructions - Standard series</i>		
Document 2006/01-01_1-00-EX IU rev. 1 (9 pages)	dated	2013/07/08
Document 2006/01-01_2-00-EX IU rev. 1 (9 pages)	dated	2013/07/08
Document 2006/01-01_3-00-EX IU rev. 1 (9 pages)	dated	2013/07/08
Document 2006/01-01_4-00-EX IU rev. 1 (9 pages)	dated	2013/07/08
Document 2006/01-01_5-00-EX IU rev. 1 (9 pages)	dated	2013/07/08
Document 2006/01-01_6-00-EX IU rev. 1 (9 pages)	dated	2013/07/08
Document 2006/01-01_7-00-EX IU rev. 1 (9 pages)	dated	2013/07/08
Document 2006/01-01_8-00-EX IU rev. 1 (9 pages)	dated	2013/07/08
Document 2006/01-01_9-00-EX IU rev. 1 (9 pages)	dated	2013/07/08
Document 2006/01-01_10-00-EX IU rev. 1 (9 pages)	dated	2013/07/08
Document 2006/01-01_11-00-EX IU rev. 1 (9 pages)	dated	2013/07/08
<i>Instructions - ID series</i>		
Document 2006/01-01_1-01-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_2-01-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_3-01-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_4-01-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_5-01-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_6-01-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_7-01-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_8-01-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_9-01-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_10-01-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_11-01-EX IU rev. 0 (9 pages)	dated	2013/07/16
<i>Instructions - 316 series</i>		
Document 2006/01-01_1-02-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_2-02-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_3-02-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_4-02-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_5-02-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_6-02-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_7-02-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_8-02-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_9-02-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_10-02-EX IU rev. 0 (9 pages)	dated	2013/07/16
Document 2006/01-01_11-02-EX IU rev. 0 (9 pages)	dated	2013/07/16
<i>Motor drawings</i>		
Drawing n. 2006/01-01_04-00-EX DWG rev. 1 (2 pages)	dated	2013/03/18
Drawing n. 2006/01-01_05-00-EX DWG rev. 1	dated	2013/03/18
<i>Hydraulic parts drawings</i>		
Drawing n. 2006/01-01_07-00-EX DWG rev. 1	dated	2013/03/18

## EXTENSION n. 01/14

to EC-Type Examination Certificate CESI 09 ATEX 047 X

Drawing n. 2006/01-01_08-00-EX DWG rev. 1	dated	2013/03/18
Drawing n. 2006/01-01_09-00-EX DWG rev. 1	dated	2013/03/18
Drawing n. 2006/01-01_10-00-EX DWG rev. 1	dated	2013/03/18
Drawing n. 2006/01-01_11-00-EX DWG rev. 1	dated	2013/03/18
Drawing n. 2006/01-01_12-00-EX DWG rev. 1	dated	2013/03/18
Drawing n. 2006/01-01_13-00-EX DWG rev. 1	dated	2013/03/18
Drawing n. 2006/01-01_14-00-EX DWG rev. 1	dated	2013/03/18
Drawing n. 2006/01-01_15-00-EX DWG rev. 1	dated	2013/03/18
Drawing n. 2006/01-01_16-00-EX DWG rev. 1	dated	2013/03/18
Drawing n. 2006/01-01_17-00-EX DWG rev. 1	dated	2013/03/18

One copy of all documents is kept in CESI files.

### Routine tests

The manufacturer shall carry out the routine tests foreseen at clause 9 of the standard EN 60079-18 and at clause 7.1 of the standard EN 60079-7.

### Special conditions for safe use (X)

- The permanently connected supplying cable shall be properly protected against the risk of mechanical damage. The connection of its terminals shall be made in safe area or adopting one of the protections shown in the standard EN 60079-0;
- The electric pump shall remain completely submerged while operating;
- A flow-switch shall be installed in safe area or with a suitable protection (standard EN 60079-0); it shall disconnect the motor in case of a reduction of the flow rate below 5 l/min;
- Pumps shall be protected with a suitable differential magneto-thermic circuit-breaker which shall cut the supply also in case a single phase current drops to zero (e.g. intervention of a single thermostat);
- Pumps shall operate in the standing position or leant up to 80 degrees from vertical position;
- In case of intervention of the thermal protection, unless the external reason which caused the overheating is well known, the pump shall be sent to the manufacturer or its authorized centre for oil level and quality check;
- In case of repeated interventions of the thermal protection, the equipment is to be considered not suitable for the kind of usage;
- Pumps cannot be used in case signs of oil leakage are noticed outside the pump;
- Before using the pump verify the compatibility of the fluid with the materials of the pump.

### Essential Health and Safety requirements

Assured by compliance of safe instructions, special condition for safe use and conformity to the standards:

- EN 60079-0: 2012
- EN 13463-1: 2009
- EN 13463-5: 2011
- EN 60079-18: 2009
- (\*) EN 60079-6: 2007
- (\*) EN 60079-7: 2007

(\*) The requirements of these standards have not been thoroughly fulfilled but combined in order to have a protection level suitable for category 2G (EPL Gb).



[1] **SUPPLEMENTARY EU-TYPE EXAMINATION CERTIFICATE**

[2] **Equipment or Protective System intended for use  
in potentially explosive atmospheres  
Directive 2014/34/EU**

[3] Supplementary EU-Type Examination Certificate number:  
**CESI 09 ATEX 047 X /02**

4] Product: **Multistage centrifugal underwater electrical pumps series '4" EX',  
'ID 4" EX' and '316 4" EX'**

[5] Manufacturer: **Officine di Trevi S.a.s.**

[6] Address: **SS n. 3 "Flaminia", km. 145  
I-06032 Trevi - PG  
Italy**

[7] This supplementary certificate extends EC-Type Examination Certificate CESI 09 ATEX 047 X to apply to Product designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

[8] CESI, notified body n. 0722 in accordance with Article 17 of the Directive 2014/34/EU of the Parliament and Council of 26 February 2014, certifies that this Product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment or 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 report n. EX-C1010210.

[9] In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Supplementary certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016.

[10] If the sign "X" is placed after the certificate number, it indicates that the Product in subject to special conditions for safe use specified in the schedule to this certificate.

[11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, examination and tests of the specified Product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this Product. These are not covered by this certificate.

[12] The marking of the Product shall include the following:

II 2G Ex eb h mb ob IIC T6/T5 Gb

This certificate may only be reproduced in its entirety and without any change, schedule included.

Date 2021/06/22 - Translation issued on 2021/06/22

Prepared  
Tiziano COLA

Verified  
Alessandro FEDATO

Approved  
Roberto PICCIN

[13] **Schedule**

[14] **SUPPLEMENTARY EU-TYPE EXAMINATION CERTIFICATE n. CESI 09 ATEX 047 X /02**

[15] **Description of the variations to the Product**


With this new issue of the certificate, the following variations have been made to the product:

- The harmonized standards, which guarantee the conformity of the product with the health and safety requirements of the directive 2014/34/UE, have been updated:

- EN IEC 60079-0 (2018)
- EN ISO 80079-36 (2016)
- EN ISO 80079-37 (2016)
- EN 60079-18 (2015)
- EN 60079-6 (2015) (\*)
- EN 60079-7 (2015) (\*)

(\*) The requirements of these standards have not been thoroughly fulfilled but have been combined to have a protection level suitable for category 2G (EPL Gb).

- According to the updated standards the marking has been changed and the partial protection principles “eb” and “ob” have been put in the marking string:

or  II 2G Ex eb h mb ob IIC T6 Gb (with thermal protection set at 70°C)

 II 2G Ex eb h mb ob IIC T5 Gb (with thermal protection set at 80/85°C)

- For non-electrical protection it has been used the protection principle “k” (liquid immersion) instead of “c” (constructional safety);
- New compound, FKM, can be used for the O-rings and other rubber parts in the pumps of series ID 4” EX;
- Product marking is made through laser carving of the motor cylinder avoiding the use of plates;
- Partial reorganization of the annexed documents in the annexed technical file.

**Description of Product**

Multistage centrifugal underwater electrical pumps, series: 4” EX, ID 4” EX and 316 4” EX, are multi-impeller electric pumps for use in areas with possible presence of explosive atmospheres, due to gases, vapours or mists, for the following scopes:

- emptying sumps,
- draining flooded places,
- raising water from wells, pools and basins,
- industrial waterworks,
- draining sewage and cesspool systems,
- pumping hydrocarbons (only series ID 4” EX).

The electric pumps in subject are composed by an electric motor (6 possible powers), placed in the lower part of the equipment, surmounted by the hydraulic part constituted by a multistage centrifugal pump (11 different families) having different numbers of impellers and diffusers according to the model. In the lower part of the motor, above a special bored disk which protects it from washing, there is a rubber bellows which uniform internal motor oil pressure to external liquid pressure, nullifying the strain of the pump structure.

The types of protection, adopted against the explosion risk, refer to different parts of the apparatus: the mechanical protection “k” is applied to the hydraulic part, the electrical protection “mb” to the electric connections inside the motor and the round cable entry, a special protection, obtained by combining partial “eb” and “ob” types, is applied to the oil-immersed electric motor.

The usage of three thermal switches with manual reset (one per phase, one out of three logic) guarantees the temperature class also in case of malfunctioning.

The windings of the two-poles electric motor can be made as single-phase or three-phases. In the case of a single-phase winding, the power shall be supplied using a capacitance (having the characteristics shown on the marking plate) placed in safe area and connected by a skilled electrician.

This certificate may only be reproduced in its entirety and without any change, schedule included.



[13]

## Schedule

[14]

### SUPPLEMENTARY EU-TYPE EXAMINATION CERTIFICATE n. CESI 09 ATEX 047 X /02

Maximum rated currents (2= two phases; 3Y, 3Δ= three phases star or triangle connection):

Electric pump family	Maximum rated current [A]																											
	Motor 0.5 CV			Motor 0.75 CV			Motor 1 CV			Motor 1.5 CV			Motor 2 CV			Mot. 3 CV												
	3Y	3Δ	2	3Y	3Δ	2	3Y	3Δ	2	3Y	3Δ	2	3Y	3Δ	2	3Y	3Δ											
THETA	1.5	2.6	3.8	1.9	3.3	5.5			6			8.7	/			/												
CROMA			4.9			5.6	2.1	3.6	6.4			9.2			12.5	/												
GAMMA	/			/					6.4	3.4	5.9	9.7	4.8	8.2	12.9	6.0	10.4											
KAPPA							5.9	9.0	12.1																			
OMEGA							9.0	12.7																				
SIGMA							9.1	11.7																				
IOTA							9.1	10.8																				
ALPHA							1.9	3.3	5.6			2.1			3.6			6.6			9.5			12.0				
BETA							/					/							3.4	5.9	9.5			12.0				
ASTRA															2.1			3.6	5.3	3.4	5.9	9.0			11.1			
VENERE															6.3			3.4	5.9	9.3			11.5					

Insulation class:

F

Duty type:

S1 (continuous at constant load)  
S4 (20 cycles per hour maximum)

Rated speed:

2850 turns per minute

Maximum density of the pumped fluid:

1200 kg/m<sup>3</sup>

Temperature of the pumped fluid:

-20°C ÷ +40°C (above the freezing point)

Ingress protection:

IP68

Maximum depth for the use:

100 m (1 MPa, with flat cable)  
120 m (1.2 MPa, with round cable)  
20 m (200 kPa, for series ID 4" EX)

Temperature class: T6 (with maximum intervention temperature of the protection at 75°C ± 5%)

T5 (with maximum intervention temperature of the protection at 80°C ± 5% or at 85°C ± 5%)

#### Warning labels

“DO NOT OPEN WHEN ENERGIZED”

“CAUTION - AUTOMATIC THERMAL PROTECTED MOTOR”

#### Electrical connection

Electric pumps are furnished with the supply cable, having the length required by the user, permanently connected to the pump. The connection of the free edge of the supply cable shall be carried out, by skilled person, in safe zone or applying a suitable protection, according to in force regulations.

For pumps with single-phase motor, it shall be installed, in safe zone, or with suitable protection, a condenser (excluded from the certificate) having the characteristics stated on the plate.

[16] **Report n. EX-C1010210**

#### Routine tests

The manufacturer is shall carry out the routine tests requested by clause 7.1 of the standard EN 60079-7, by clauses 9.1 and 9.2 of the standard EN 60079-18.

[13] **Schedule**

[14] **SUPPLEMENTARY EU-TYPE EXAMINATION CERTIFICATE n. CESI 09 ATEX 047 X /02**

[17] **Special conditions for safe use (X)**

- The permanently connected supply cable shall be properly protected against the risk of mechanical damage. The connection of its terminals, shall be made in safe zone or adopting one of the protections foreseen by the standard EN IEC 60079-0;
- The electric pump shall remain completely submerged when operating;
- A flow-switch shall be installed in safe area or with a suitable protection (standard EN IEC 60079-0); it shall disconnect the motor in case of a reduction of the flow rate below 5 l/min;
- Electric pumps shall be protected with a suitable differential magneto-thermic circuit-breaker which shall open the circuit also in case the current, of a single-phase, drops to zero (e.g. intervention of a single thermostat);
- Pumps shall operate in the standing position or leant at maximum 80 degrees from vertical;
- In case of intervention of the thermal protection, unless the external reason which caused the overheating is well known, the pump shall be sent to the manufacturer or its authorized centre for oil level and quality check;
- In case of repeated interventions of the thermal protection, the equipment is to be considered not suitable for the kind of usage;
- Pumps cannot be used in case signs of oil leakage are noticed outside the pump;
- Before using the pump, verify the compatibility of the fluid with the materials of the pump.

[18] **Essential Health and Safety Requirements**

EHSR are assured by compliance with safety conditions, by risk analysis carried out by the manufacturer and by conformity with the following standards:

- EN IEC 60079-0: 2018** Explosive atmospheres - Part 0: Equipment – general requirements
- EN 60079-18: 2015** Explosive atmospheres - Part 18: Equipment protection by encapsulation “m”
- EN ISO 80079-36: 2016** Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements
- EN ISO 80079-37: 2016** Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non-electrical type of protection constructional safety “c”, control of ignition sources “b”, liquid immersion “k”.

The requirements of the following standards have been partially fulfilled:

- EN 60079-6: 2015** Explosive atmospheres - Part 6: Equipment protection by liquid immersion “o”
- EN 60079-7: 2015** Explosive atmospheres - Part 7: Equipment protection by increased safety “e”

[19] **Descriptive documents (prot. EX-C1010211)**

- * Document 2006/01-01_00-02-EX DCH	rev. 2 (5 pages)	dated 2019/10/31
- * Document 2006/01-01_00-02-EX RESS	rev. 2 (16 pages)	dated 2019/10/31
- * Document 2006/01-01_00-02-EX AR II	rev. 2 (19 pages)	dated 2019/10/31
- * Document 2006/01-01_00-02-EX NT	rev. 2 (20 pages)	dated 2019/10/31
- * Products datasheets annexed to the technical note 2006/01-01_00-02-EX NT (33 pages)		
- <u>Technical notes – Performance characteristics</u>		
* Document 2006/01-01_00-00-EX NT/P	rev. 0 (7 pages)	dated 2019/10/31
* Document 2006/01-01_01-00-EX NT/P	rev. 0 (7 pages)	dated 2019/10/31
* Document 2006/01-01_02-00-EX NT/P	rev. 0 (7 pages)	dated 2019/10/31
- <u>Instructions for the use</u>		
* Document 2006/01-01_01-00-EX IU/EX	rev. 0 (9 pages)	dated 2019/10/31
* Document 2006/01-01_02-00-EX IU/ID	rev. 0 (9 pages)	dated 2019/10/31
* Document 2006/01-01_03-00-EX IU/316	rev. 0 (9 pages)	dated 2019/10/31

[13]

## Schedule

[14] **SUPPLEMENTARY EU-TYPE EXAMINATION CERTIFICATE n. CESI 09 ATEX 047 X /02**

***Descriptive documents, follows:***

***- Instructions for the use – technical specifications***

* Document 2006/01-01_01-00-EX IU-ST/IT	rev. 0 (9 pages)	dated	2019/10/31
* Document 2006/01-01_02-00-EX IU-ST/IT	rev. 0 (8 pages)	dated	2019/10/31
* Document 2006/01-01_03-00-EX IU-ST/IT	rev. 0 (9 pages)	dated	2019/10/31

***- Technical drawings of the driving part***

* Drawing n. 2006/01-01_01-01-EX DWG	rev. 1	dated	2019/10/31
* Drawing n. 2006/01-01_02-01-EX DWG	rev. 1 (2 pages)	dated	2019/10/31
* Drawing n. 2006/01-01_03-01-EX DWG	rev. 1	dated	2019/10/31
* Drawing n. 2006/01-01_04-02-EX DWG	rev. 2 (2 pages)	dated	2019/10/31
* Drawing n. 2006/01-01_05-02-EX DWG	rev. 2	dated	2019/10/31
Drawing n. 2006/01-01_06-00-EX DWG	rev. 0	dated	2009/06/22

***- Technical drawings of the hydraulic parts***

* Drawing n. 2006/01-01_07-02-EX DWG	rev. 2	dated	2019/10/31
* Drawing n. 2006/01-01_08-02-EX DWG	rev. 2	dated	2019/10/31
* Drawing n. 2006/01-01_09-02-EX DWG	rev. 2	dated	2019/10/31
* Drawing n. 2006/01-01_10-02-EX DWG	rev. 2	dated	2019/10/31
* Drawing n. 2006/01-01_11-02-EX DWG	rev. 2	dated	2019/10/31
* Drawing n. 2006/01-01_12-02-EX DWG	rev. 2	dated	2019/10/31
* Drawing n. 2006/01-01_13-02-EX DWG	rev. 2	dated	2019/10/31
* Drawing n. 2006/01-01_14-02-EX DWG	rev. 2	dated	2019/10/31
* Drawing n. 2006/01-01_15-02-EX DWG	rev. 2	dated	2019/10/31
* Drawing n. 2006/01-01_16-02-EX DWG	rev. 2	dated	2019/10/31
* Drawing n. 2006/01-01_17-02-EX DWG	rev. 2	dated	2019/10/31

*Note: an \* is included before the title of documents that are new or revised annexed to this supplement.*

One copy of all documents is kept in CESI files.

**Certificate history**

Issue N.	Issue Date	Summary description of variation
02	Current	Standards updating, application of the non-electrical protection principle "k", construction changes and the materials used
01	2014/07/28	Standards updating, two new series ID 4" EX e 316 4" EX added, two new motors added 0.5 CV and 075 CV, added new materials for the hydraulic parts.
00	2007/11/05	First issue of the certificate