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CERTIFICATE

[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

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

Prepared	**Verified**	**Approved**
Tiziano COLA	Alessandro FEDATO	Roberto PICCIN

Schema di certificazione CESI-ATEX

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
PRD N. 018B
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

[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:

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

  or

  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 uniforms 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.

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

The electric pumps, subject of this certificate, are identified by the following code (e.g. *ID ALPHA EX 13*):

<Family> EX <nn> (*Standard series*)
316 <Family> EX <nn> (*Standard series where steel parts are made of AISI 316*)
ID <Family> EX <nn> (series suitable for pumping hydrocarbons)

➢ ***<Family>***

Identifies the family of the pump (among the 11 following families):

THETA	**GAMMA**	**OMEGA**	**IOTA**	**BETA**	**VENERE**
CROMA	**KAPPA**	**SIGMA**	**ALPHA**	**ASTRA**	

➢ ***<nn>***

Identifies the number of stages of the hydraulic part (equal to the number of impellers). See the following table:

Family	*Mod. no. family*	*Stages No.*																	
		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*			✓					✓			✓						✓			

Electrical characteristics

Rated powers of the electric motors installed for the different model of the pumps (to be seen with previous table.):

Family	*Power [kW]*					
	0.37 *(0.5 CV)*	**0.55** *(0.75 CV)*	**0.75** *(1 CV)*	**1.10** *(1.5 CV)*	**1.50** *(2 CV)*	**2.20** *(3 CV)*
THETA	✓	✓	✓	✓		
CROMA	✓	✓	✓	✓	✓	
GAMMA			✓	✓	✓	
KAPPA			✓	✓	✓	✓
OMEGA				✓	✓	✓
SIGMA				✓	✓	✓
IOTA				✓	✓	✓
ALPHA		✓	✓	✓	✓	✓
BETA				✓	✓	✓
ASTRA			✓	✓	✓	✓
VENERE			✓	✓	✓	✓

Single-phase motor (with the starting capacitance to be installed):
Rated supply voltage 230 V~

Three-phases motor:
Rated supply voltage 400 V~ (star connection)
230 V~ (triangle connection)
Maximum voltage on each phase 230 V~
Supply rated frequency 50 Hz

[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	2.1	3.6	6	3.4	5.9	8.7	/			/	
CROMA			4.9			5.6			6.4			9.2	4.8	8.2	12.5		
GAMMA	/			/			/		6.4			9.7			12.9		
KAPPA									5.9			9.0			12.1	6.0	10.4
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			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^3
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)
- *Technical notes – Performance characteristics*
  - * 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
- *Instructions for the use*
  - * 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