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Schema di certificazione
CESI-ATEX
CESI

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. 27/9/2000

CERTIFICATE



[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:

CESI 04 ATEX 098X

[4] **Equipment: Vacuum units type VVB, VVC, VVD and VVB+RO..., VVC+RO..., VVD+RO...**

[5] **Manufacturer: Italtvacuum S.r.l.**

[6] **Address: Via Stroppiana, 3
10071 Borgaro (TO) - Italia**

[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] CESI, notified body n. 0722 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 report n. EX- A4511359.

[9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 13463-1: 2001 EN 13463-5: 2003 prEN 13463-6: 2004 EN 13463-8: 2003

[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, examination and tests 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 1/2G c b k IIB T4 $T_{amb}(-20^{\circ}C \div +30^{\circ}C)$

II 1/2G c b k IIB T150 or T3 $T_{amb}(-20^{\circ}C \div +40^{\circ}C)$

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

Date December 17th 2004 - Translation issued the 17th December 2004

Prepared
Tiziano Cola

Verified
Mirko Balaz

Approved
Ulisse Colombo

CESI

CENTRO ELETTROTECNICO SPERIMENTALE ITALIANO
Business Unit Certificazione
Il Responsabile

[13]

Schedule

[14]

EC-TYPE EXAMINATION CERTIFICATE n. CESI 04 ATEX 098X

[15] **Description of equipment**

Vacuum units, subject of this certificate, are made of a two stages reciprocating compressor to which can be connected, upstream of it with respect to the process fluid flow, one or two in series *root* compressors (types RO...).

The reciprocating compressor is driven, through belt transmission, by an electric motor already certificated for category 2G; each of the possible *root* compressors, as well, is driven by an electric motor already certificated for the category 2G.

The *root* compressors, when installed, start working when the suction duct pressure go below the preset threshold and stop when it goes past a second pressure threshold. The two start and stop *root* compressor set points, preset by the manufacturer, are controlled by a suitable pressure switch. Each *root* compressor is equipped with a safety manual reset pressure switch which interrupts the power supply when the outlet pressure rises over the preset threshold.

The outlet duct of the reciprocating compressor can be connected to a condenser where the vapours are condensed by heat exchange with the cooling water of the secondary circuit.

The parts are lubricated through two independent oil circuits: one re-circulating and the other one-way with the relevant tanks. The oil level in each tank is controlled by a level switch with two intervention levels: warning for low level and motor stop when the low level condition lasts more than 1 hour.

The temperature of the hottest spot of the equipment is checked by a PT100 probe with signal transmitter, having reliability level SIL2, which stops the motors and in any condition guarantees the temperature class marked on the plate.

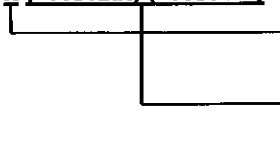
According to the classification of the areas with risk of explosion (input datum for this certificate), the equipment is category 1 inside the circuit run by the process fluid and category 2 outside.

It follows the list of the equipment installed and already marked for category 2G which is required by the area classification, their precise identifications are reported in the annexed documents. The equipments in the table can be changed by the manufacturer with different ones having the same characteristics and an ATEX protection level not lower than the one shown

<i>Equipment</i>	<i>Type</i>	<i>Manufacturer</i>	<i>ATEX Marking</i>
Electric motors of the reciprocating and the <i>root</i> compressor	AB30	CEMP	II 2G EEx d IIB T4
Level switches on the two lubricating oil circuits	LS A100	INDRA	II 2G EEx d IIB T6
Control and safety pressure switches on the <i>root</i> compressors	J 120	United Electric Controls Co	II 2G EEx d IIC T6
Temperature sensor	TPR 10	Endress+Hauser	II 1/2GD EEx ia IIC T6 T85
Temperature transmitter	TMT 182	Endress+Hauser	II 1G EEx ia IIC T6

Three different types of two stages reciprocating compressors are possible identified by the letters *B*, *C* and *D* with increasing flow rates and five *root* compressors: *RO300*, *RO500*, *RO1000*, *RO2000*, *RO3800* as described in the annexed documentation. The different models of the vacuum units are identified by the following code made of fixed fields and optional ones written between brackets:

VV_x (+RO_{xxx}) (+RO_{xxx})



Two stages reciprocating compressor type: *B*, *C* or *D*

Identification of the eventual one or two *root* compressors installed upstream of the reciprocating compressor

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

[13]

Schedule

[14]

EC-TYPE EXAMINATION CERTIFICATE n. CESI 04 ATEX 098X

[15] Description of equipment (continue)

Safety devices

The safety devices shown in the table below are installed on the vacuum units, they directly stop the motors when going past the set thresholds. Devices reset and motors restart can only be manual.

<i>Equipment</i>	<i>Setting</i>
Level switch of the tank for the re-circulating lubricant oil	Light signalling warning when the level reaches the minimum, motor stop after 1 hour functioning with oil at the minimum level.
Level switch of the tank for the one-way lubricant oil	
Safety pressure switch placed on each <i>root</i> compressor	It stops the <i>root</i> compressor when the outlet pressure exceed the set level, independently by the control pressure switch.
PT100 Sensor and temperature transmitter	It stops the motors when the temperature go past: T = 130°C (with marking T4) T = 145°C (with marking T150°C) T = 180°C (with marking T3)

Electro-mechanical characteristics

Electric motors power

- Reciprocating compressor 3 kW (type B), 5.5 kW (type C), 11kW (type D)
- *root* compressor 1.5 kW (RO300), 2.2 kW (RO500), 4 kW (RO1000), 5.5 kW (RO2000), 7.5 kW (RO3800)

Motor supply voltage

400 V a 50Hz (three-phases wiring)

Compressors speed

- Reciprocating compressors 250 rev/min
- *root* compressors 3000 rev/min

Ambient temperature

-20°C ÷ +30°C (class T4)

Temperature of the processed fluid

-20°C ÷ +40°C (class T3 and T150)

[16] Report n. EX- A4511359

Descriptive documents (prot. EX-A4511360)

- Technical file UT 04040, rev. 00 (21 sheets. double sided) dated 21/06/2004
- Annexed to the technical file:*
 - Facsimile EC declaration of conformity
 - Facsimile plates of the vacuum units
 - Thermal analysis report, document UT 03043, rev. 00 (3 sheets. double sided) dated 12/05/2003
 - Drawing n. 5494, rev. 0 + components identification (1+3 sheets) dated 17/06/2004
 - Drawing n. 7078, rev. 0 + components identification (1+1 sheets) dated 18/06/2004
 - Drawing n. 4073 dated 17/06/2004
 - Drawing n. VVB_B dated 25/03/2002
 - Drawing n. VVC_B dated 29/06/2001
 - Drawing n. VVD_B dated 12/05/2002
 - Drawing n. OLIO VV_ (2 sheets) dated 14/04/2004
 - Drawing n. P&I-d W_ + components key (1+2 sheets. double sided) dated 21/06/2004
 - Table of the metal material in contact one each other dated 17/06/2004
 - Data sheets of the non metallic materials (5 sheets)
 - Vapour tension – condensation temperature table for solvents
 - ATEX certificated components list ATEX and relevant certificates (27 sheets)

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

[13] **Schedule**

[14] **EC-TYPE EXAMINATION CERTIFICATE n. CESI 04 ATEX 098X**

[16] **Report n. EX- A6017761 (continue)**

- Operating instructions, document UT04064 (13 sheets. double sided)
Annexed to the operating instructions:
 - Temperature transmitter data sheet (10 sheets)
- Use and maintenance manual, document UT03101 and annexes (70 sheets. double sided)
- Manufacturer declaration

One copy of all documents is kept in CESI files.

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

- Temperature sensor and relevant signal transmitter are intrinsic safety equipments, hence they must be powered through a suitable certificated barrier which has to be installed in safe zone or suitably protected using a protection method according to the standard EN 50014;
- Follow the maintenance procedures and the safety instructions supplied by the manufacturer;
- The safety devices shown in the previous table shall stop the motors in case the thresholds are over-passed and their reset can only be manual;
- The vacuum units installation shall be fixed and suitable equipotential connections among isolated metallic parts and to the plant ground shall be made;
- Wiring shall be done according to the in force regulations and the motors and control devices electric connecting cables shall be protected against the risk of mechanical damage; the junctions, when made in areas with possible presence of explosive atmosphere, shall be suitably protected using a protection method according to the standard EN 50014;
- Concerning the already certificated equipments follow the relevant use, maintenance and safety instructions which shall be supplied by Italvacuum to the end user.

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

The essential health and safety requirements are fulfilled by the harmonized reference standards and the risk evaluation of the manufacturer.

EXTENSION n. 01/09

to EC-Type Examination Certificate CESI 04 ATEX 098 X



Equipment: Vacuum units type VVB, VVC, VVD and VVB+RO..., VVC+RO..., VVD+RO...

Manufacturer: Italtvacuum S.r.l.

Address: Via Stroppiana, 3
10071 Borgaro (TO) - Italy

Admitted variations

- *Constructive changes:*
 - Modification of the lubrication system;
 - Other secondary variations as shown in the annexed drawings.
- *Updating of the reference standards.*

Equipment description

The project relevant to the original certificate has been changed for this extension for what concerns the lubrication system. The different items continue to be lubricated through two independent oil circuits: one re-circulating and the other one-way with the relevant tanks, but, compared to the original project, some constructive improvements have been applied in order to optimize the system and reduce the one-way oil flux.

All the details of the variations are described in the annexed technical note.

The marking does not change compared to the one of the original certificate::

II 1/2G c b k IIB T4 $T_{amb}(-20^{\circ}C + +30^{\circ}C)$

II 1/2G c b k IIB T150 or T3 $T_{amb}(-20^{\circ}C + +40^{\circ}C)$

This extension and annexed descriptive documents must be annexed to the EC-Type Examination Certificate 04 ATEX 098 X.

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Date 9th February 2009 - translation issued the 9th February 2009

Prepared CERT/PRO – Tiziano Cola

Verified CERT/PRO – Mirko Balaz

Approved CERT – Fiorenzo Bregani

CESI S.p.A.

Divisione Energia
"Area Tecnica Certificazione"
Il Responsabile

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EXTENSION n. 01/09

to EC-Type Examination Certificate CESI 04 ATEX 098 X

Report n. EX- A9006327

Descriptive documents (prot. EX- A9006328)

- Technical note UT 08127 rev. 00 (71 sheets)	dated	12/12/2008
- Use and maintenance manual UT 07008 (98 sheets)	dated	June 2008
- Operational instructions UT 04064 rev. 01 (33 sheets)	dated	12/12/2008
- Table list of metallic contacting materials UT 08128 rev. 00 (5 sheets)	dated	19/12/2008
- Technical drawing VVC lubrication scheme	dated	6/06/2005
- Technical drawing PWBXXXXXXXXX00_0	dated	13/02/2009
- Technical drawing PWCXXXXXXXXX00_0	dated	13/02/2009
- Technical drawing PWDXXXXXXXXX00_0	dated	13/02/2009
- Materials and components data (10 sheets)		

One copy of all the documents mentioned above is kept in CESI files.

Special conditions for safe use (X)

- Temperature sensor and relevant signal transmitter are intrinsic safety equipments, hence they must be powered through a suitable certificated barrier which has to be installed in safe zone or suitably protected using a protection method according to the standard EN 50014;
- Follow the maintenance procedures and the safety instructions supplied by the manufacturer;
- The safety devices shown in the previous table shall stop the motors in case the thresholds are over-passed and their reset can only be manual;
- The vacuum units installation shall be fixed and suitable equipotential connections among isolated metallic parts and to the plant ground shall be made;
- Wiring shall be done according to the in force regulations and the motors and control devices electric connecting cables shall be protected against the risk of mechanical damage; the junctions, when made in areas with possible presence of explosive atmosphere, shall be suitably protected using a protection method according to the standard EN 50014;
- Concerning the already certificated equipments follow the relevant use, maintenance and safety instructions which shall be supplied by Italvacuum to the end user.

Essential Health and Safety Requirements

Covered by compliance to the following standards:

- EN 13463-1 (2001) – Non electrical equipment for potentially explosive atmospheres: Basic method and requirements;
- EN 13463-5 (2003) – Non electrical equipment for potentially explosive atmospheres: Protection by constructional safety “c”;
- EN 13463-6 (2005) – Non electrical equipment for potentially explosive atmospheres: Protection by control of ignition sources “b”;
- EN 13463-8 (2003) – Non electrical equipment for potentially explosive atmospheres: Protection by liquid immersion “k”.

The manufacturer has also carried out the evaluation of the residual risks.

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