

CERTIFICAT D'EXAMEN CE DE TYPE

EC TYPE EXAMINATION CERTIFICATE

N° LNE - 6184 rév. 5 du 03 Décembre 2010

Modifie le certificat 6184-4

Délivré par : Laboratoire national de métrologie et d'essais
Issued by

En application : Décret n°2006-447 du 12 avril 2006, arrêté du 28 avril 2006, transposant en droit français, la
In accordance with directive 2004/22/CE du 31 mars 2004

Decree nr 2006-447 dated 12 April 2006 and order dated 28 April 2006, transposing into French law, the European directive 2004/22/EC of 31 March 2004

Fabricant : SATAM - 5 rue Des Chardonnerets - FRANCE - 93290 - TREMBLAY EN FRANCE
Manufacturer

Mandataire : - - FRA - -
Authorized representative

Concernant : Ensembles de mesurage de liquides autres que l'eau SATAM types ZCE 5 24/24, ZCE 5 24/48,
In respect of ZCE 5 80/80 et ZCE 5 80/150.
Measuring systems for liquids other than water SATAM types ZCE5 24/24, ZCE5 24/48, ZCE5 80/80 and ZCE5 80/150.

Caractéristiques : Caractéristiques détaillées dans l'annexe au présent certificat.
Characteristics

Characteristics detailed in the appendix.

Valable jusqu'au : 06 Mars 2017
Valid until March 6th, 2017

Les principales caractéristiques et conditions d'approbation figurent dans l'annexe ci-jointe qui fait partie intégrante du certificat et comprend 32 page(s). Tous les plans, schémas et notices sont déposés au Laboratoire national de métrologie et d'essais sous la référence de dossier L021652 -D3-1-1.

The principal characteristics, approval conditions are set out in the appendix hereto, which forms part of the approval documents and consists of 32 page(s). All the plans, schematic diagrams and documentations are recorded by Laboratoire national de métrologie et d'essais under reference file L021652 -D3-1-1.

Etabli le 03 Décembre 2010
Issued on December 3rd, 2010

Pour le Directeur Général
On behalf of the General Director

LNE
Laurence DAGALLIER
Directrice Déléguée
Deputy Director

Laboratoire national de métrologie et d'essais

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Original wording in French language. In case of (legal) problems refer back to the text in French language. No legal claims or duties can be derived from the translation.

Summary :

Date	Revision	Modification
05/03/2007	Revision 0	Initial
15/05/2007	Revision 1	English Translation Modify the conditions for verification
27/11/2007	Revision 2	Add measuring systems types ZCE 5 24/24 and ZCE 5 24/48 ; Create two configurations of these measuring systems: horizontal or vertical ; Extension of the use of these measuring systems to products : ethanol and biofuels by incorporating certified meters TOKHEIM SOFITAM APPLICATIONS types ZC 17 (certificate No. LNE-11052) ; Integration of a proportional valve command driven mechanical, electrical or pneumatic.
27/04/2009	Revision 3	Modify the name of the company (SATAM)
03/12/2009	Revision 4	Possibility to replace the SATAM gas extractor EC 29-150 by an automatic gas detection and evacuation display
03/12/2010	Revision 5	Deletion of references to the Equalis L calculator and to the Veeder Root 7887 mechanical indicator Adding a remark for minimum delivery Changing supply delivery Changing sealing plans Changing §3.2 Environment Change identification plate (delete manufacturer address)

1. Designation

SATAM measuring systems ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 and ZCE 5 80/150 for loading road or rail tankers and for stationary installations.

These instruments may be marketed under various names but will differ only in their presentation.

2. Description

The SATAM measuring system ZCE 5 24/24 or ZCE 5 24/48 is fitted with:

- a SATAM meter ZC 17-24/24 (for measuring system ZCE 5 24/24) or ZC 17-24/48 (for measuring system ZCE 5 24/48), subject of the evaluation certificate LNE-11052
- where appropriate,
 - whether a control valve permitting 2 flows SATAM types XAD 39 or XAD 54 or an other type with the same characteristics of these valves,
 - whether a mechanic or electric or air-operated proportional representation valve the pressure of which is compatible with the maximum pressure (8 bars) of the measuring system
- where appropriate,
 - whether a SATAM gas extractor EC 29-150
 - whether an automatic gas detection and evacuation display located between the pump and the measuring device.

The SATAM measuring system ZCE 5 80/80 or ZCE 5 80/150 is fitted with:

- a SATAM meter ZC 17-80/80 (for measuring system ZCE 5 80/80) or ZC 17-80/150 (for measuring system ZCE 5 80/150), subject of the evaluation certificate LNE-11052
- where appropriate,

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- whether a control valve permitting 2 flows SATAM types XAD 37 or an other type with the same characteristics of these valves for the measuring system ZCE 5 80/80,
 - whether a valve SATAM types XAD 36 or an other type with the same characteristics of these valves for the measuring system ZCE 5 80/150
 - whether a mechanic or electric or air-operated proportional representation valve the pressure of which is compatible with the maximum pressure (10 bars) of the measuring system
- where appropriate,
- whether a SATAM gas extractor EC 29-150
 - whether an automatic gas detection and evacuation display located between the pump and the measuring device.

SATAM measuring systems ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 and ZCE 5 80/150 may be configured in vertical position or in horizontal position (see the paragraph 9 "Securing and sealing").

2.1 Metrological functions

SATAM measuring systems ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 or ZCE 5 80/150 perform metrological functions described :

- in the evaluation certificate LNE-11052 related to the SATAM meters ZC 17-24/24, ZC 17-24/48, ZC 17-80/80 and ZC 17-80/150,
- if required, in the evaluation certificate related to the relevant electronic calculator-indicator device.

2.2 Non-metrological functions

When fitted with an electronic calculator-indicator device, the SATAM measuring systems ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 or ZCE 5 80/150 also perform non-metrological functions described:

- in the evaluation certificate LNE-11052 related to the SATAM meters ZC 17-24/24, ZC 17-24/48, ZC 17-80/80 and ZC 17-80/150,
- if required, in the evaluation certificate related to the relevant electronic calculator-indicator device.

2.3 Software

When the SATAM measuring systems ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 or ZCE 5 80/150 are fitted with an electronic calculator-indicator device, the software checksum is defined in the evaluation certificate related to the relevant calculator device.

3. Characteristics

3.1 Metrological characteristics

Metrological characteristics of the indicating part of electronic calculator-indicator devices are described in the following documents :

- in the evaluation certificate LNE-11052 related to the SATAM meters ZC 17-24/24, ZC 17-24/48, ZC 17-80/80 and ZC 17-80/150,
- if required, in the evaluation certificate related to the relevant electronic calculator-indicator device.

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Metrological characteristics of SATAM measuring systems ZCE 5 24/24 or ZCE 5 24/48 are as follows:

	ZCE 5 24/24	ZCE 5 24/48
Accuracy class	0.5	
Liquids measured	Hydrocarbons with cinematic viscosity under 20 mm ² /s, industrial oils and fatty acid methyl esters for diesel engines and ethanol	
Minimum flowrate	2,4 m ³ /h	4,8 m ³ /h
Temperature range of metered liquids	- 10 °C to + 90 °C when fitted with a mechanical indicating device - 10 °C to + 80 °C when fitted with an electronic calculator-indicator	
Maximum pressure (P _{max})	8 bars	
Minimum delivery	100 litres	

Metrological characteristics of the SATAM measuring systems ZCE 5 80/80 or ZCE 5 80/150 are as follows:

	ZCE 5 80/80	ZCE 5 80/150
Accuracy class	0.5	
Liquids measured	Hydrocarbons with cinematic viscosity under 20 mm ² /s, industrial oils and fatty acid methyl esters for diesel engines and ethanol	
Minimum flowrate	8 m ³ /h	15 m ³ /h
Temperature range of metered liquids	- 10 °C to + 90 °C when fitted with a mechanical indicating device - 10 °C to + 80 °C when fitted with an electronic calculator-indicator	
Maximum pressure (P _{max})	10 bars	
Minimum delivery	100 litres	

The minimum delivery of a measuring system can be higher than the value defined in tables above and shall have the form 1.10ⁿ, 2.10ⁿ or 5.10ⁿ authorized units of volume, where n is a positive or negative whole number, or zero.

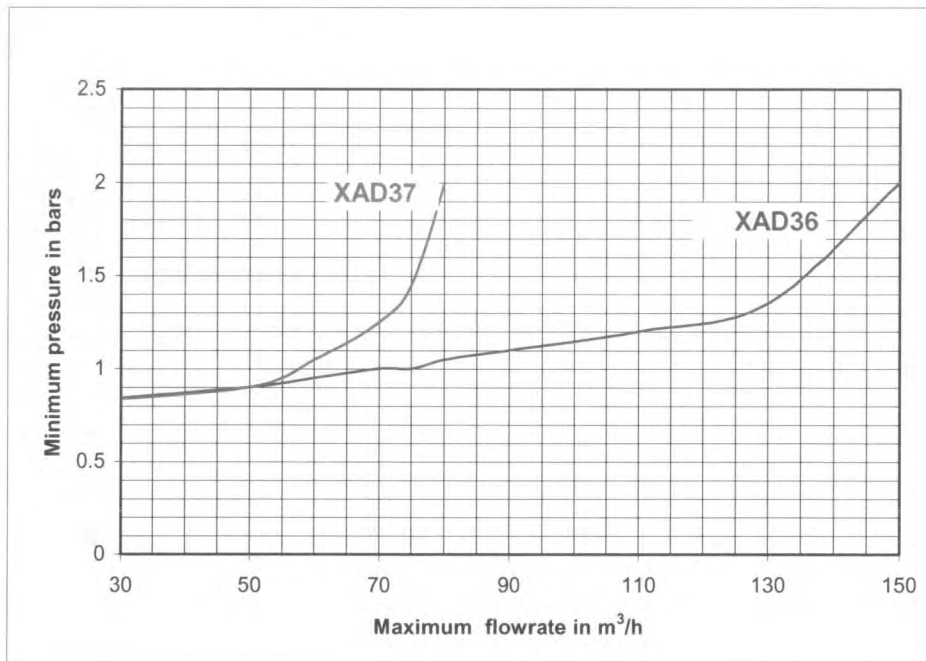
The maximum flowrate of the SATAM measuring system is 24 m³/h for the ZCE 5 24/24 and 48 m³/h for the ZCE 5 24/48. For these flowrates values, the minimum pressure required by the loading electrovalves is 1 bar.

The maximum flowrate of the SATAM measuring system is 80 m³/h for the ZCE 5 80/80 and 150 m³/h for the ZCE 5 80/150. For these flowrate values, the minimum pressure required by the loading electrovalves is 2 bars.

Supply conditions may affect flowrate, however. The maximum flowrate that the ZCE 5 measuring systems can reach may sometimes be lower than the theoretical maximum (although still over four times higher than the minimum flowrate). In such cases minimum pressure may be reduced to values below 2 bars.

The maximum flowrate and minimum pressure of the ZCE 5 80/80 and ZCE 5 80/150 measuring systems are therefore given according to the type of valve and the maximum flowrate actually reached (according to supply conditions), as in this graph:

The maximum flowrate and minimum pressure specified on the measuring system's data plate must correspond to the maximum flowrate reached during on-site conformity verification accuracy tests (see paragraph 8).



3.2 Environment

SATAM measuring systems ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 and ZCE 5 80/150 have the following environmental characteristics:

Mechanical class: M1

Electromagnetic class: E2

Temperature range:

- - 40 ° C ; + 55 ° C for mechanical parts of the measuring system SATAM type ZCE5, especially for measuring systems with mechanical indicator
- for measuring systems fitted with electronic parts, temperature range of those elements are mentioned in evaluation certificate LNE-11052 and in evaluation certificate of the concerned electronic calculator.

When fitted with an electronic calculator-indicator, parts installed outdoor of the SATAM measuring systems ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 or ZCE 5 80/150 are designed to operate in condensing humidity.

4. Interfaces and compatibility

When fitted with an electronic calculator-indicator device, the SATAM measuring systems ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 or ZCE 5 80/150 perform the functions described :

- in the evaluation certificate LNE-11052 related to the SATAM meters ZC 17-24/24, ZC 17-24/48, ZC 17-80/80 and ZC 17-80/150,
- in the evaluation certificate related to the relevant electronic calculator-indicator device.

5. Special manufacture and installation conditions

5.1 Supply conditions

SATAM measuring systems ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 or ZCE 5 80/150 must be installed so that during normal operation neither air intake nor gas release can occur in the liquid upstream of the meter.

The pumped flow of the measuring systems ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 or ZCE 5 80/150 must be such that the pressure at the pump inlet is always greater than the atmospheric pressure and the saturated vapour pressure of the liquid.

However when the measuring system ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 or ZCE 5 80/150 is fitted with a gas separator subject of an evaluation certificate, pressure at the pump inlet can be lower than the atmospheric pressure.

The meter and the pipework between the meter and the transfer point shall be kept full of liquid during measurement and during shutdown periods. A non-return valve is installed downstream of the meter.

For a low level loading, this valve is installed at the coupler level.

For a high level loading, this valve is installed in the high part of the hose.

5.2 Installation of an electronic calculator-indicator device

The special conditions for the installation of the electronic calculator-indicator devices are described in the evaluation certificates related to the relevant electronic calculator-indicator device.

6. Special conditions for putting system into service

There may be a manual or an automatic gas evacuation device on the automatic gas detection display.

When the SATAM measuring systems ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 and ZCE 5 80/150 are fitted with an automatic gas detection and evacuation display with a manual evacuation display, and if the measurement is stopped because gas are detected, the operator has to evacuate manually the gas before the measurement can continue.

When not fitted with an automatic valve, the gas evacuation display shall bear a legend which is clearly visible by the user to indicate that the manual gas evacuation valve shall stay closed, that its opening is only for gas removal and that its use is the owner's responsibility.

7. Special conditions of use

Special conditions of use of ZC 17-24/24, ZC 17-24/48, ZC 17-80/80 and ZC 17-80/150 meters are described in the evaluation certificate LNE-11052.

Special conditions of use of the electronic calculator-indicator devices are described in the evaluation certificates related to the relevant electronic calculator-indicator device.

8. Special conditions of verification

Verification of the conformity of the SATAM measuring systems ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 and ZCE 5 80/150 comprises :

- If the meter is fitted with an electronic calculator-indicator device, the following tests and examinations:
 - verification of conformity of the metrological part of the instrument's software. The checksum must be the same that is described in the evaluation certificate related to the relevant electronic calculator-indicator device,

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- verification of the instrument's accuracy by simulating inlet quantities (volume measured in metering conditions, temperature if required).

Metering pulses must be sent by a pulse generator either at the maximum metering frequency which is defined in the evaluation certificate related to the electronic calculator-indicator device, or at the frequency corresponding to the measuring system's maximum flowrate

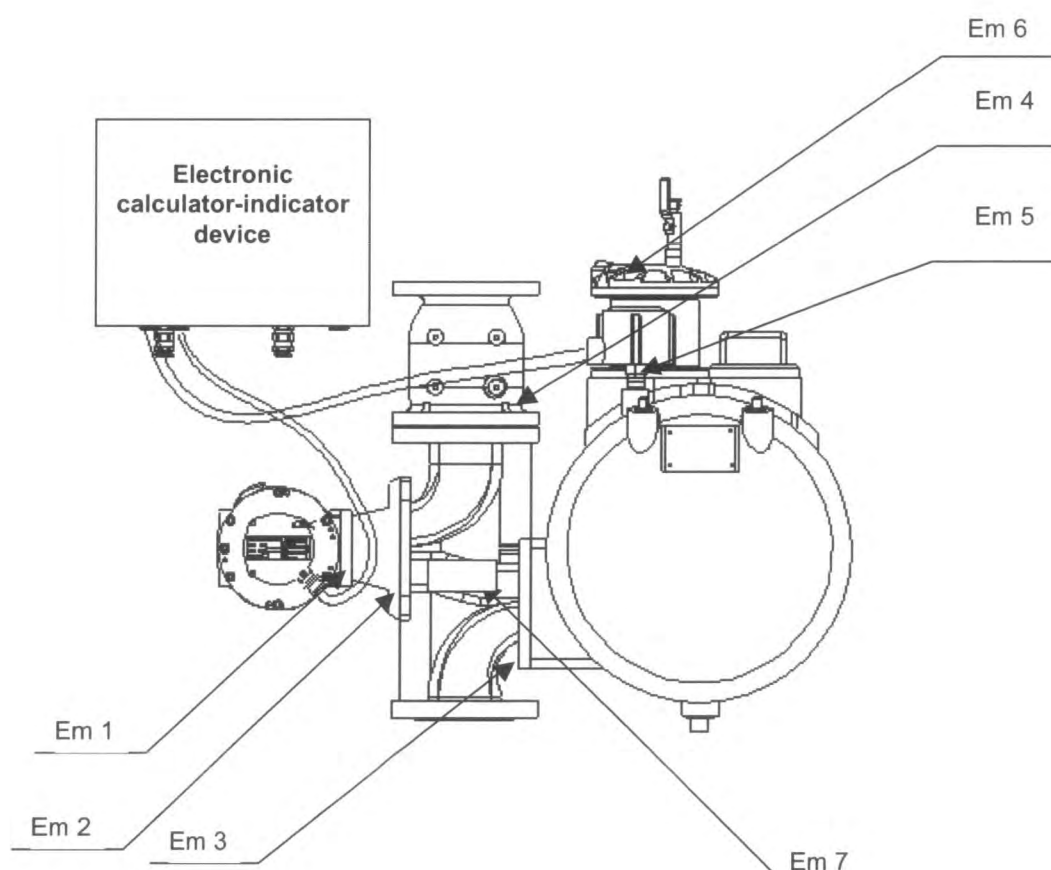
- tests to check the correct operation of the indicator checking device, the measurement transducer and, if required, the temperature sensor
 - if required, tests to check that the printer control device operates correctly and that printed information corresponds to the metrological information transmitted by the electronic calculator-indicator.
- the following tests and examinations performed on the complete installed measuring system:
 - an examination to check that the measuring system meets the requirements of this certificate (this examination includes verification of the supply conditions specified in paragraph 5.1)
 - if required, a test to check that the gas extractor operates correctly at the maximum flowrate
 - if required, if the measuring system is fitted with an automatic gas detection device with a manual evacuation device, a test to check that it is unable to operate when the cable link between the electronic calculator-indicator device and the gas detection device is interrupted
 - if required, a test to check the accuracy of the temperature measurement used for conversion (Pt 100 sensor),
 - an accuracy test performed at the measuring system's minimum and maximum flowrates and at an intermediate flowrate.

In the case, where preliminary accuracy tests are carried out on the meter, in a first stage, at the minimum and maximum flowrates of the meter and at an intermediate flowrate, the accuracy test at an intermediate flowrate on the complete measuring system on site is optional.

9. Securing and sealing

The measuring system is sealed by means of threaded rods with lead seals or sealing devices pressed onto spiral wire.

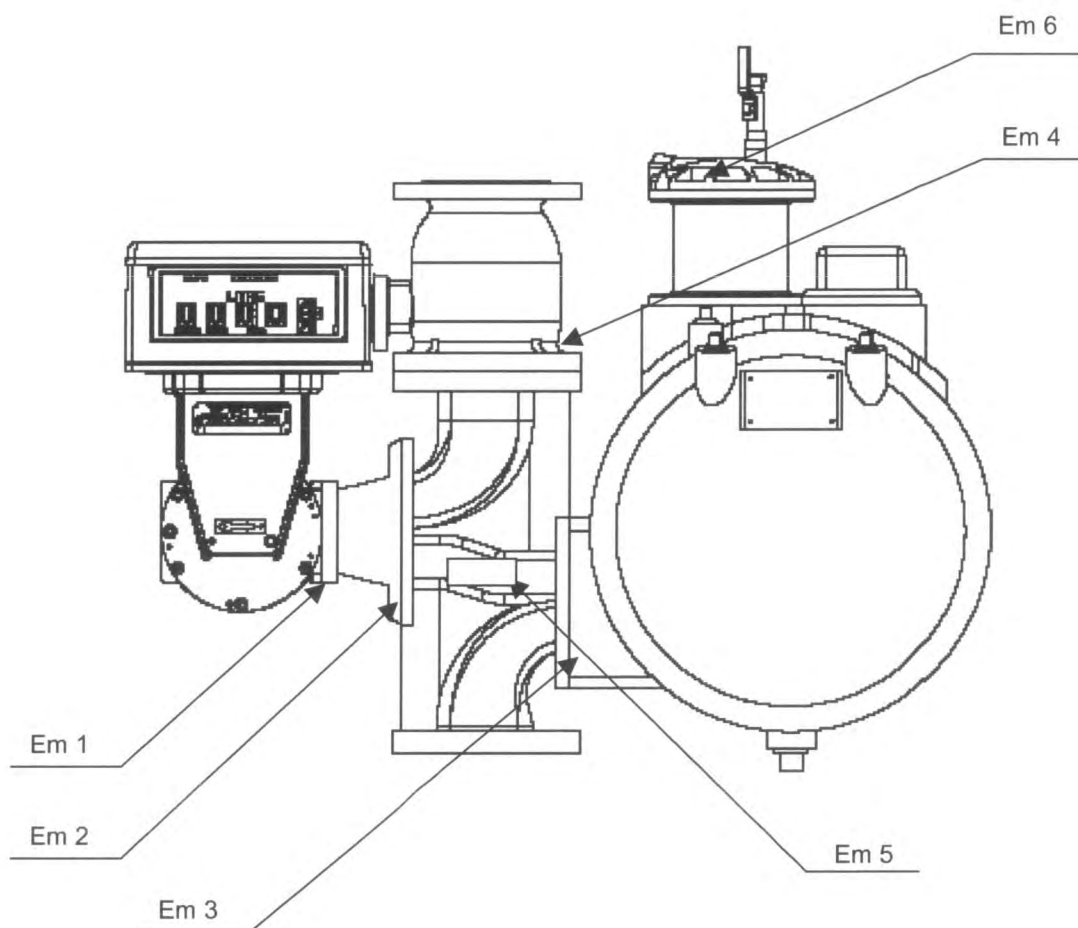
Sealing plan of SATAM measuring system
ZCE 5 24/24 or ZCE 5 24/48 in vertical position
fitted with an electronic calculator-indicator device



- Em 1 : Protects the meter to the connector tubing
Em 2 : Protects link between central tubing and connector tubing
Em 3 : Protects link between central tubing and gas extractor
Em 4 : Protects link between central tubing and venting valve
Em 5 : Prevents dismantling of the temperature sensor
Em 6 : Prevents dismantling of gas elimination head
Em 7 : Prevents dismantling of the measuring system identification plate

The sealing plan of the meter is described in the evaluation certificate n° LNE-11052.

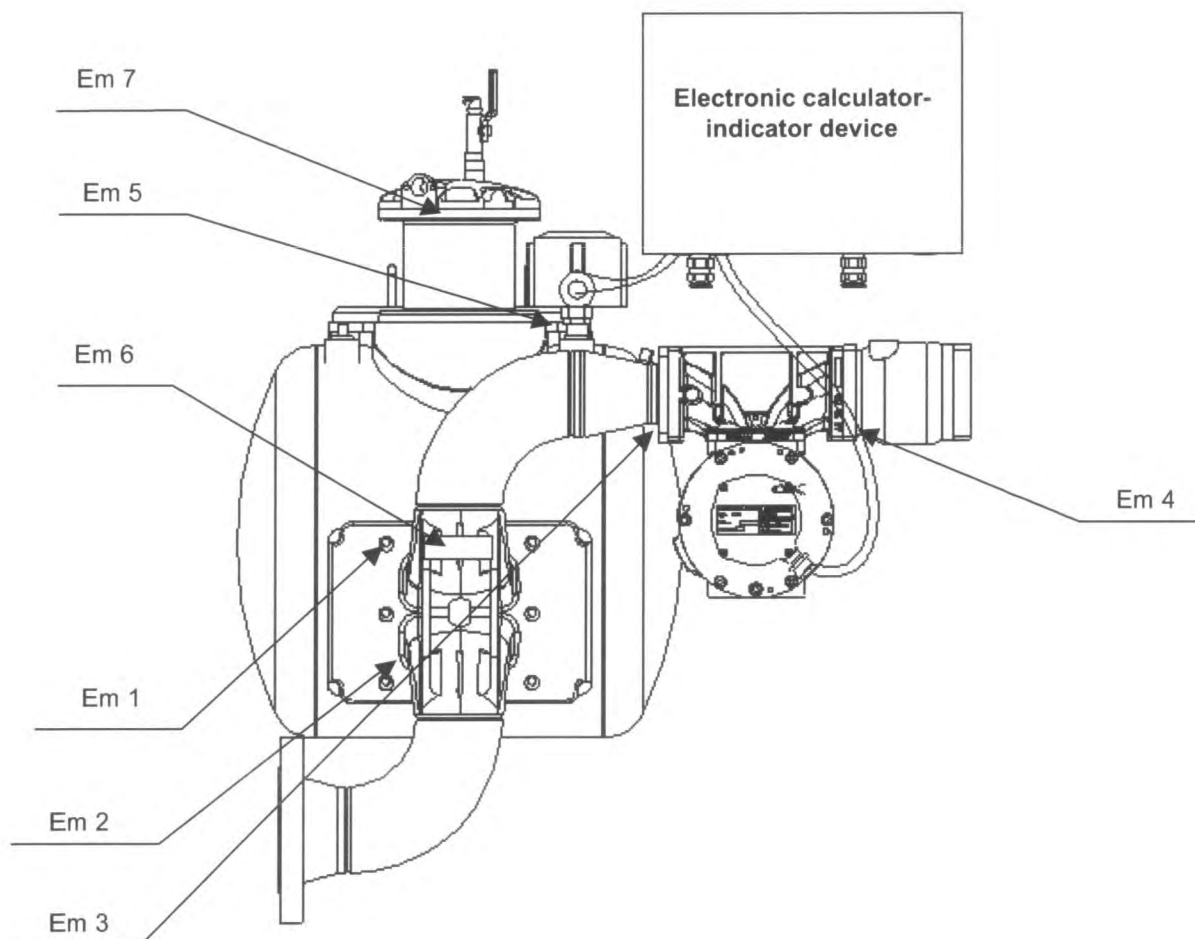
Sealing plan of SATAM measuring system
ZCE 5 24/24 or ZCE 5 24/48 in vertical position
fitted with an mechanical indicating device



- Em 1 : Protects the meter to the connector tubing
- Em 2 : Protects link between central tubing and connector tubing
- Em 3 : Protects link between central tubing and gas extractor
- Em 4 : Protects link between central tubing and venting valve
- Em 5 : Prevents dismantling of the measuring system identification plate
- Em 6 : Prevents dismantling of gas elimination head

The sealing plan of the meter is described in the evaluation certificate n° LNE-11052.

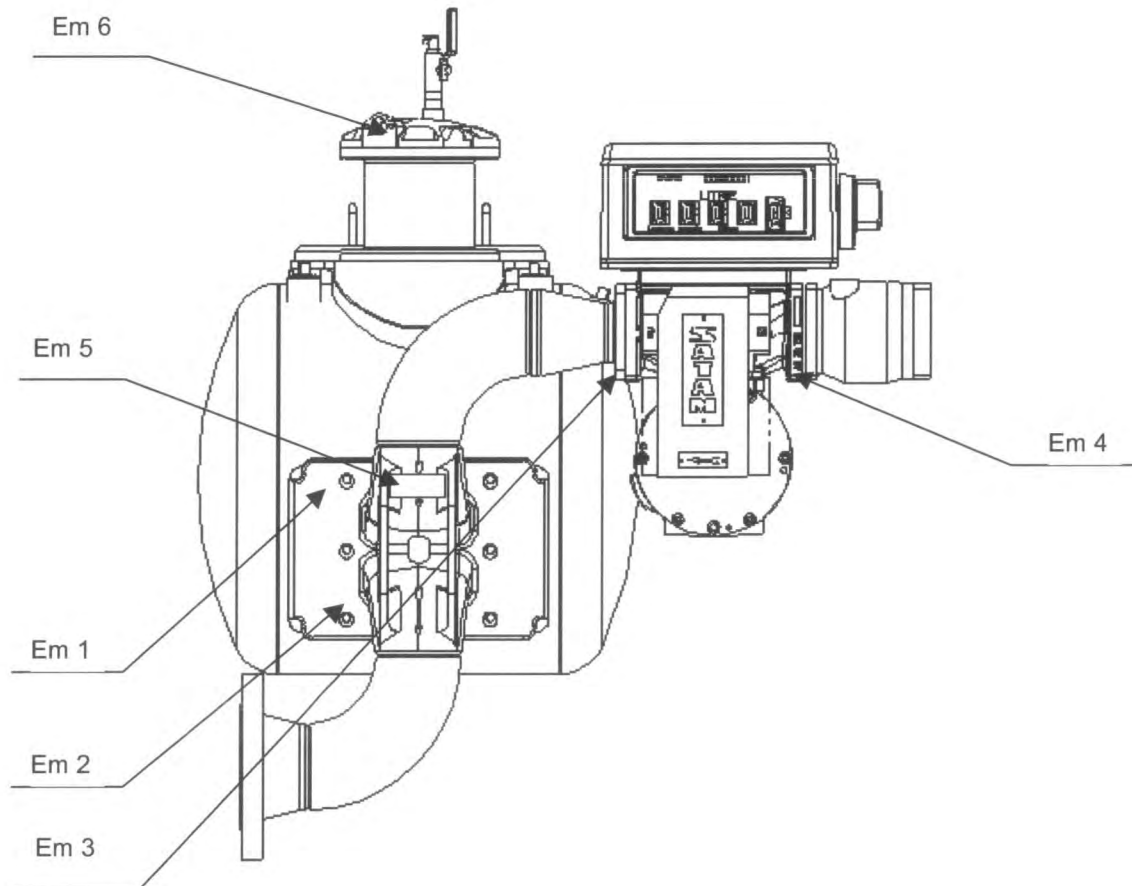
Sealing plan of SATAM measuring system
ZCE 5 24/24 or ZCE 5 24/48 in horizontal position
fitted with an electronic calculator-indicator device



- Em 1 : Prevents dismantling of the gas extractor filter
- Em 2 : Protects link between tubing and gas extractor
- Em 3 : Protects link between tubing and meter
- Em 4 : Protects link between meter and venting valve
- Em 5 : Prevent dismantling of the temperature sensor
- Em 6 : Prevents dismantling of the measuring system identification plate
- Em 7 : Prevents dismantling of gas elimination head

The sealing plan of the meter is described in the evaluation certificate n° LNE-11052.

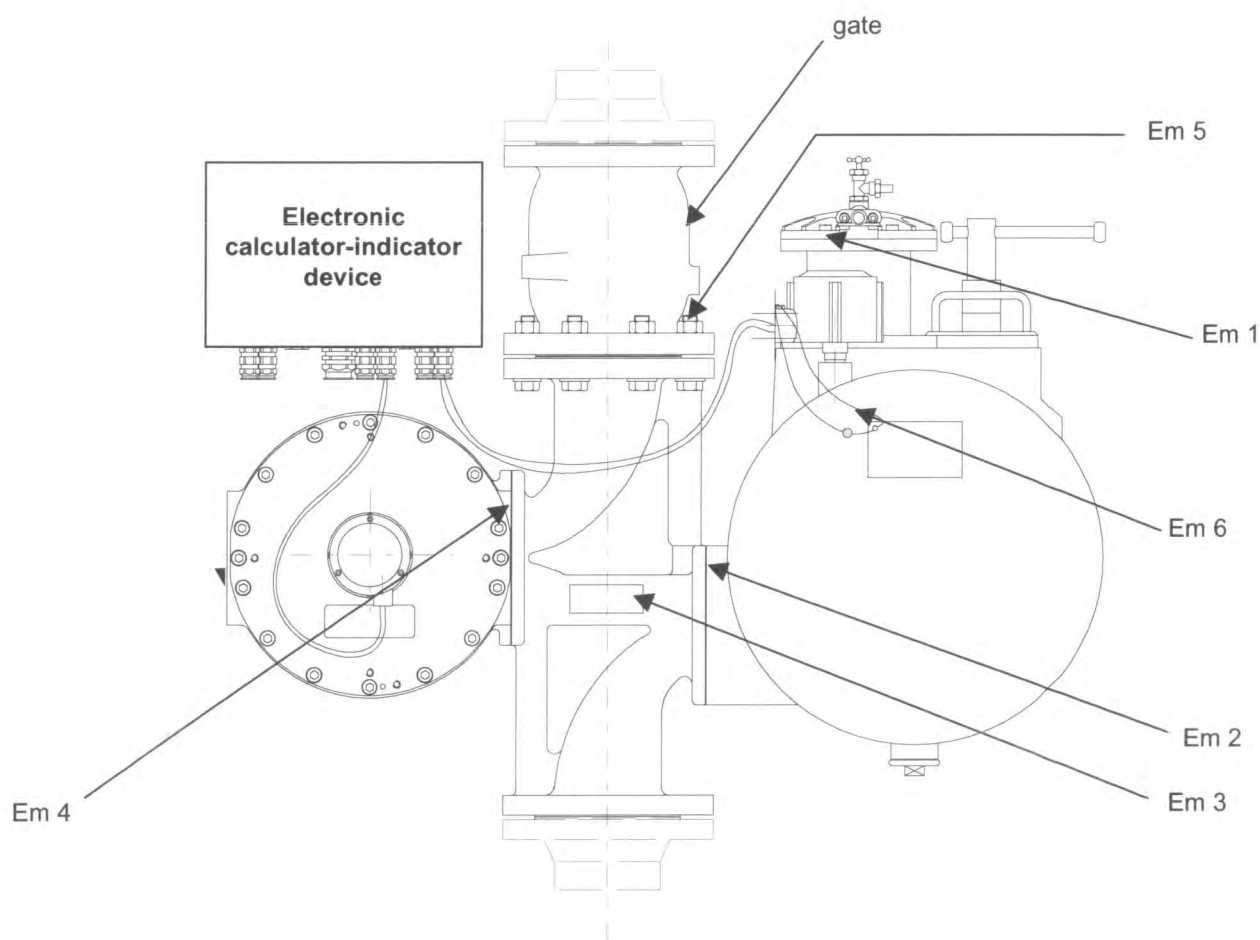
Sealing plan of SATAM measuring system
ZCE 5 24/24 or ZCE 5 24/48 in horizontal position
fitted with a mechanical indicating device



- Em 1 : Prevents dismantling of the gas extractor
- Em 2 : Protects link between tubing and gas extractor
- Em 3 : Protects link between tubing and meter
- Em 4 : Protects link between meter and venting valve
- Em 5 : Prevents dismantling of the measuring system identification plate
- Em 6 : Prevents dismantling of gas elimination head

The sealing plan of the meter is described in the evaluation certificate n°LNE-11052.

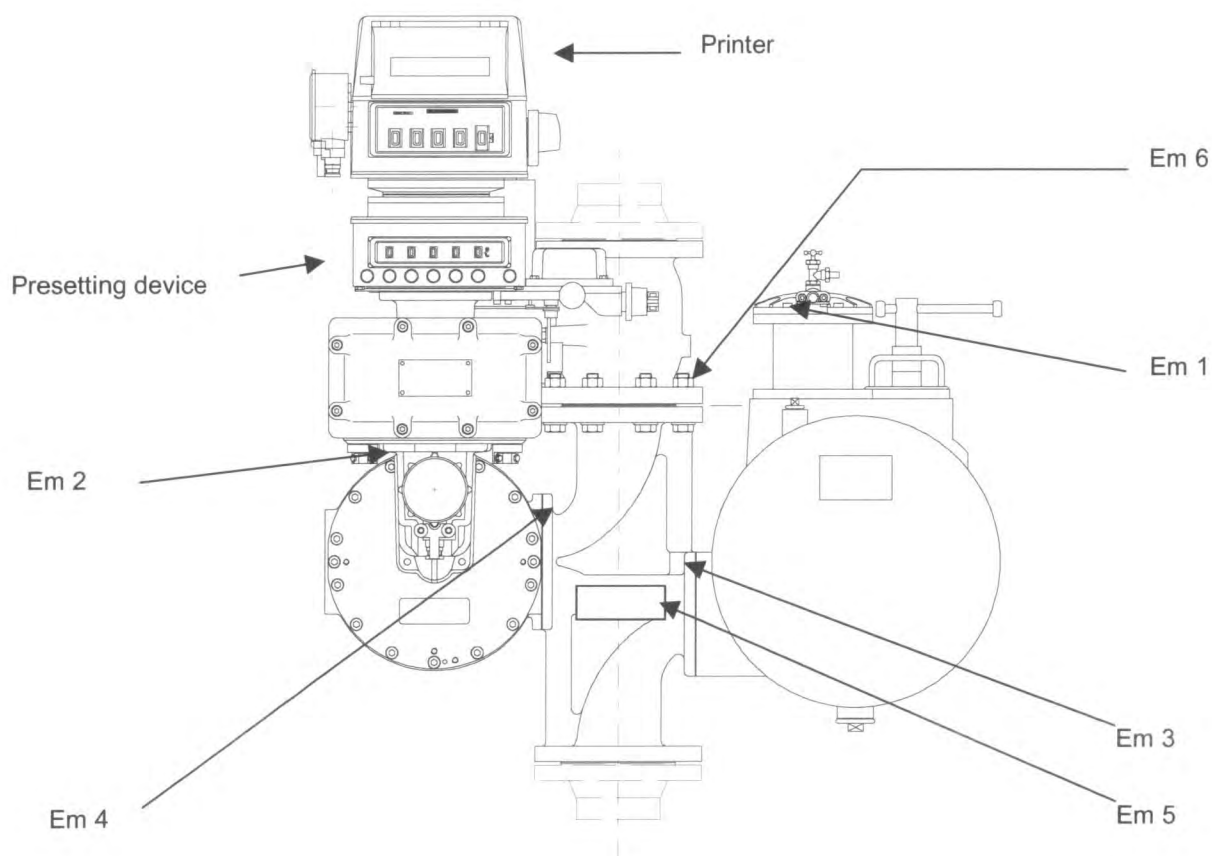
Sealing plan of SATAM measuring system
ZCE 5 80/80 or ZCE 5 80/150 in vertical position
fitted with an electronic calculator-indicator device



- Em 1 : Prevent dismantling of gas elimination head
- Em 2 : Protects link between tubing and gas extractor filter
- Em 3 : Prevents dismantling of measuring system data and stamping plate
- Em 4 : Protects link between tubing and meter
- Em 5 : Prevents dismantling of the valve
- Em 6 : If necessary, prevents dismantling of the temperature sensor

The sealing plan of the meter is described in the evaluation certificate LNE-11052

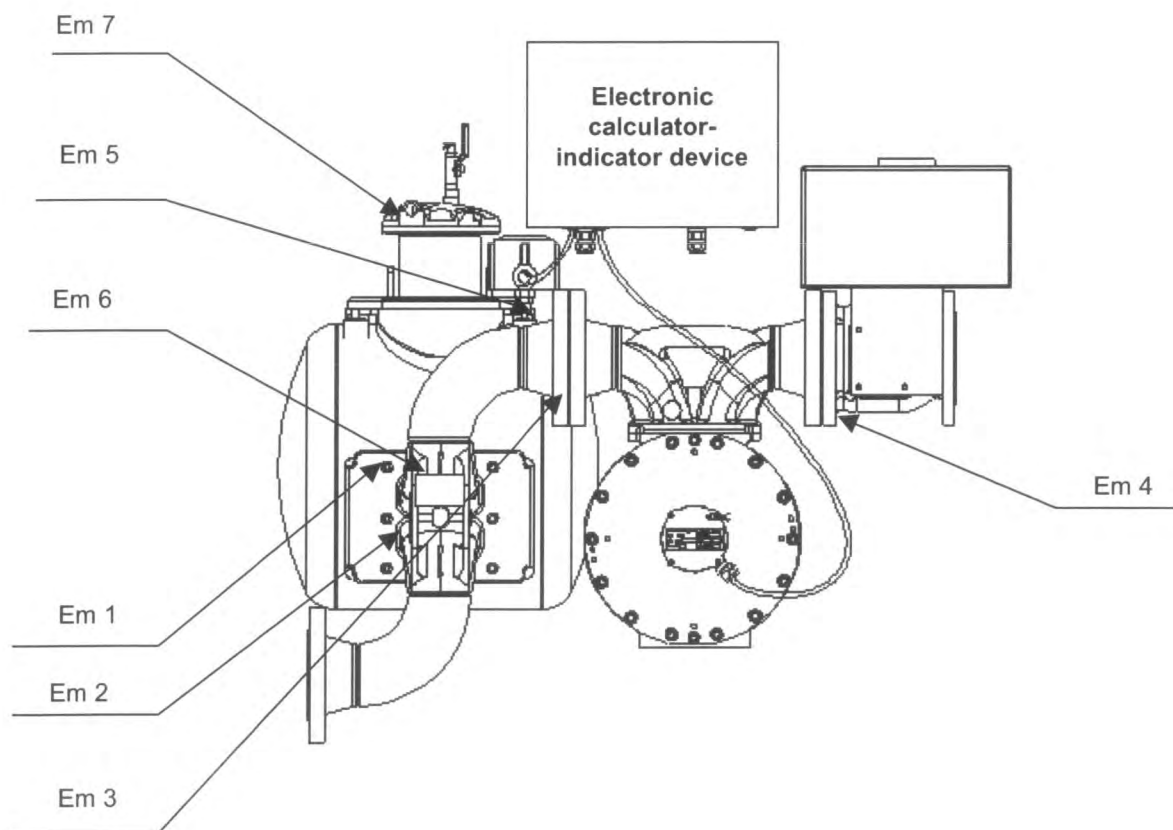
Sealing plan of SATAM measuring system
ZCE 5 80/80 or ZCE 5 80/150 in vertical position
fitted with a mechanical indicating device



- Em 1 : Prevent dismantling of gas elimination head
- Em 2 : Prevents dismantling of device ensuring transmission from measuring device to reading head
- Em 3 : Protects link between tubing and gas extractor filter
- Em 4 : Protects link between tubing and meter
- Em 5 : Prevents dismantling of measuring system data plate
- Em 6 : Prevents dismantling of venting valve

The sealing plan of the meter is described in the evaluation certificate LNE-11052.

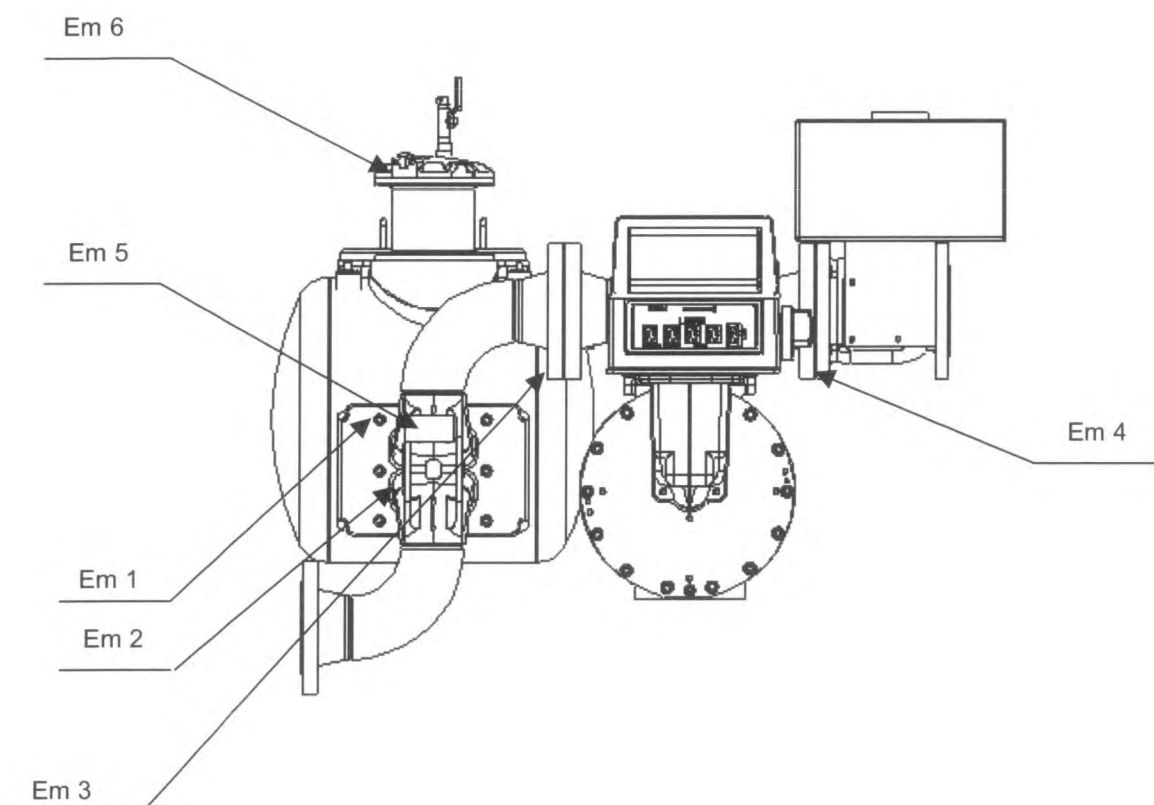
Sealing plan of SATAM measuring system
ZCE 5 80/80 or ZCE 5 80/150 in horizontal position
fitted with an electronic calculator-indicator device



- Em 1 : Prevent dismantling of gas extractor filter
- Em 2 : Protects link between tubing and gas extractor filter
- Em 3 : Protects link between tubing and meter
- Em 4 : Protects link between meter and venting valve
- Em 5 : Prevents dismantling of the temperature sensor
- Em 6 : Prevents dismantling of the measuring system identification plate
- Em 7 : Prevents dismantling of venting valve

The sealing plan of the meter is described in the evaluation certificate n°LNE-11052.

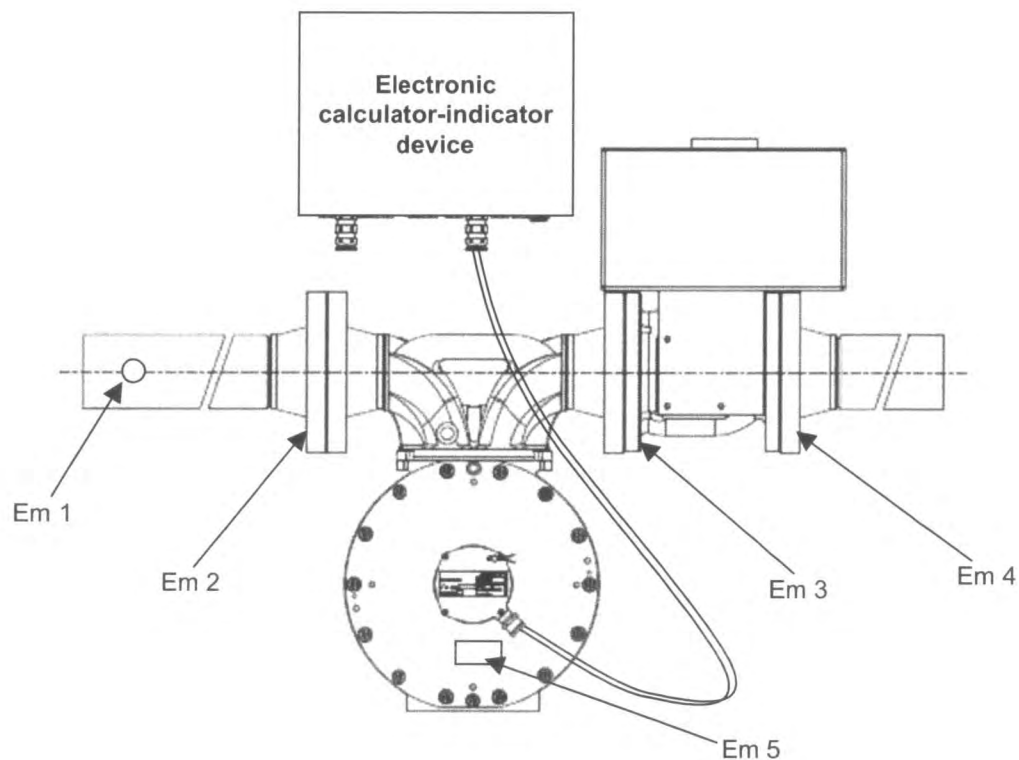
Sealing plan for a SATAM measuring system
ZCE 5 80/80 or ZCE 5 80/150 in horizontal position
fitted with a mechanical indicating device



- Em 1 : Prevent dismantling of gas extractor filter
- Em 2 : Protects link between tubing and gas extractor
- Em 3 : Protects link between tubing and meter
- Em 4 : Protects link between meter and venting valve
- Em 5 : Prevents dismantling of the measuring system identification plate
- Em 6 : Prevents dismantling of venting valve

The sealing plan of the meter is described in the evaluation certificate n° LNE-11052.

Sealing plan for a SATAM measuring system
ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 or ZCE 5 80/150 in horizontal or vertical position
fitted with an automatic gas detection and evacuation display
fitted with an electronic calculator-indicator device



The meter, the automatic gas detection and evacuation display and the stopping automatic valve can be mounted in horizontal or vertical position.

- Em 1 : Protects link between automatic gas detection and evacuation device and tubing and prevents access to electric connection
- Em 2 : Protects link between tubing and meter
- Em 3 : Prevents upstream dismantling of the stopping automatic valve
- Em 4 : Prevents downstream dismantling of the stopping automatic valve
- Em 5 : Seals the measuring system identification plate

The sealing plan of the meter is described in the evaluation certificate n° LNE-11052.

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10. Marking and inscriptions

SATAM measuring systems ZCE 5 24/24, ZCE 5 24/48, ZCE 5 80/80 and ZCE 5 80/150 are fitted with a data plate on which the marking is displayed.

ENSEMBLE DE MESURAGE METERING UNIT		SATAM	
Modèle ZCE.5 <i>Model</i>	<input type="text"/>	N° de série <i>Sérial number</i>	<input type="text"/>
		Année 20 <i>Year</i>	<input type="text"/>
Certificat LNE - N° 6184 <i>Certificate number</i>			
CE	M <input type="text"/>	<input type="text"/>	Ex II 2 G C T4
Classe d'exactitude : 0.5 <i>Exactness class</i>			
Classe d'environnement mécanique: M1 <i>Environmental class mechanical</i>			
Classe d'environnement électromagnétique: E2 <i>Environmental class electromagnetic</i>			
Débit max <i>max. flow rate</i>	<input type="text"/> m ³ /h	Pression max. <i>max. working pressure</i>	<input type="text"/> bar
Débit min <i>mini. flow rate</i>	<input type="text"/> m ³ /h	Pression min. <i>min. working pressure</i>	<input type="text"/> bar
Quantité mesurée minimale <i>Minimum delivery liters</i>		<input type="text"/> litres	
Liquide mesuré: <i>Liquid measured</i>	<input type="text"/>		
Marque: <i>Mark</i>	<input type="text"/>		

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