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CERTIFICAT D'EVALUATION

EVALUATION CERTIFICATE

N° LNE- 25874 rév. 1 du 19 Décembre 2014

Modifie le certificat 25874-0

Délivré par
Issued by

: Laboratoire national de métrologie et d'essais

En application
In accordance with

: OIML R117-1 (2007) - Guide WELMEC 8.8 - Guide WELMEC 7.2

OIML R117-1 (2007) - WELMEC Guide 8.8 - WELMEC Guide 7.2

Délivré à
Issued to

: SATAM - 47 allée des Impressionnistes Villepinte BP 85012
FRANCE - 95931 - ROISSY CH DE GAULLE CEDEX

Producteur
Producer

: SATAM   47 allée des Impressionnistes Villepinte BP 85012   FRA   95931   ROISSY CH DE
GAULLE CEDEX

Concernant
In respect of

: Dispositif calculateur-indicateur électronique SATAM type EQUALIS S utilisé comme partie d'un
système de mesurage continu et dynamique de quantités de liquides autres que l'eau.

*Electronic calculator-indicating device SATAM type EQUALIS S intended to be used in a measuring system for continuous
and dynamic measurement of quantities of liquids other than water.*

Caractéristiques
Characteristics

: Les caractéristiques sont décrites en annexe du certificat d'évaluation.

The characteristics are described in appendix to the evaluation certificate.

Les principales caractéristiques et conditions d'évaluation figurent dans l'annexe ci-jointe qui fait partie intégrante du
certificat et comprend 14 page(s) en annexe. Tous les plans, schémas et notices sont déposés au Laboratoire national de
métrologie et d'essais sous la référence de dossier P136122 .

*The principal characteristics, evaluation conditions are set out in the appendix hereto, which forms part of the approval documents and consists of 14 pages
in annex. All the plans, shematic diagrams and documentations are recorded under reference file P136122 .*

Etabli le 19 Décembre 2014
Issued on December 19th, 2014

Pour le Directeur Général
On behalf of the General Director

LNE

Laurence DAGALLIER
Directrice Déléguée
Deputy Director

Remarque
remark

: Ce certificat ne peut être cité dans un certificat d'examen CE de type sans l'autorisation du fabricant cité ci-
dessus

This evaluation certificate cannot be quoted in an EC Type examination certificate without permission of the manufacturer quoted above.

Laboratoire national de métrologie et d'essais

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Annex to evaluation certificate
LNE- 25874 rev. 1

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
22/11/2013	Revision 0	First issue
19/12/2014	Revision 1	Add some precisions for sealing plan. *This revision synthesizes all the precedent revisions.*

1. Designation

SATAM electronic calculator-indicator EQUALIS S intended for interruptible systems for measuring the volume or mass of liquids other than water, accuracy class 0.5, 1 or 1.5, fitted to a fixed installation or a vehicle. This instrument may be marketed under various names but will differ only in its presentation.

2. Description

The SATAM electronic calculator-indicator EQUALIS S consists of:

- **A "calculation module" unit**, which may also include the user interface components. If this is not the case, it is linked to a remote user interface unit.
  The calculation module unit performs the following functions:
  - ➤ It obtains and processes the pulses emitted by the pulse generator linked to it, or by two pulse generators if appropriate.
  - ➤ It calculates the volume measured in base conditions, or the mass.
  - ➤ It obtains the temperature of the fluid.
  - ➤ It calculates the corrected volume, or corrected mass.
  - ➤ It obtains the logic inputs of the system.
  - ➤ If necessary, through an additional module fitted in the calculation module :
    - it obtains two measures of the temperature of the fluid,
    - it calculates the two volumes measured in base conditions.

- **A user interface**, installed in the calculation module unit or in a similar separate unit, which performs the following functions:
  - ➤ It displays the measurement results on an LCD screen. The main display of the measurement results, the predetermined volume (or predetermined mass) and the volume totalizers (or mass totalizers) will be displayed in volume in measuring conditions, in mass, or in converted volume at 15°C, according to the parameter settings.

    If two pulse generators and two temperatures sensors are linked to the calculator, the measurement results can be displayed according to the selection done by the user :
    - o by meter ;
    - o or if necessary, in the form of cumulating ;
    - o or if necessary, alternatively in a cyclic way.
  - ➤ If required, data entry and essential operations required are done through 20-key keyboard.
  - ➤ It may be switched on or off using the on/off buttons.

- **An hydraulic module**
  - ➤ This module is integrated on a dedicated box.
  - ➤ This module is fitted with one or two boards that controls the various automatic controls piloted by the calculator-indicator.
  - ➤ It also include an interface board that performs the following functions:
    - o The safety for the communication and for the energy dedicated to the "calculation module" unit, and if necessary to the user interface unit(s),
    - o It saves and secure transaction data,

- o It saves the main parameters of the various modules,
- o If requires, it controls printed information.
- ➢ If the calculator-indicator is fitted to a fixed installation, this hydraulic module is fitted with a 230 VAC / 24 VDC convertor that supply power to the electronic with 24 VDC.
- ➢ If the calculator-indicator is fitted on a vehicle, this hydraulic module is supplied with 24 VDC power supply through a MEANWELL reference SD-50B-24 convertor.

- **A pulse generator** SATAM AC30 model or Hewlett Packard HEDS 5700 model, or any other pulse generator (current generator or open collector type) that is covered by an assessment report and whose compatibility with the calculator device has been demonstrated.
- Every "calculation module" unit may be linked to one or two measuring systems. When two measuring systems are used, according to the implementation conditions they may be used simultaneously for one measuring system or alternately for two separate measuring systems.

- **Optional**
  - ➢ The calculator-indicator may be connected to a secondary user interface unit.
  - ➢ If the calculator-indicator is fitted on a vehicle, the user interface may have an additional button in order to control the vehicle's engine.
  - ➢ The calculator-indicator may receive one or two additional hydraulic modules.

2.1 Metrological functions

The SATAM electronic calculator-indicator EQUALIS S performs the following functions:

- **It calculates and displays volume(s) in metering conditions** resulted of the measuring system(s) linked. If required, the volume(s) is(are) corrected by applying correction factors determined during calibration,

- **It calculates and displays mass(es)**, resulted of the measuring system(s) linked. If required, the volume(s) is(are) corrected by applying correction factors determined during calibration,

- If required, **it calculates and displays converted volume(s)** in the basic conditions (15℃), resulted of the measuring system(s) linked. This figure is calculated by taking into account the temperature of the liquid measured when it is distributed via one or two Pt 100 sensor(s). Using a standard conversion formula, the conversion factor can be calculated according to density for the base conditions of the liquid(s) measured,

- If required, **it calculates and displays the mean temperature(s) of the liquid measured** when it is distributed via a Pt 100 sensor,

- **It memorizes and secures** measurement information,

- It **totalizes accumulated volumes** in metering conditions, and if required in the basic conditions at 15℃,

- It **totalizes accumulated masses**,

- **It presets the volume to be delivered** in metering conditions, and if required in the basic conditions at 15℃,

- **It presets the mass to be delivered**,

- **It prints measurement results** when used with an Epson TM-U295 printer,

- **It reads and prints memorized measurement information** from the user interface of the calculator-indicator.

- **If necessary, it totalizes the accumulated volumes in the metering conditions resulted respectively from the measuring systems linked**. The result is displayed as a gross volume, or if necessary as a converted volume in the basic conditions at 15℃,

- **If necessary, it totalizes the accumulated masses in the metering conditions resulted respectively from the measuring systems linked**. The result is displayed as a mass,

- **It calculates the price corresponding to the volume of fuel distributed**.

2.2 Functions not covered by statutory requirements

The SATAM electronic calculator-indicator EQUALIS S also performs, when required, the following functions:

- it controls an on-line blending device, by calculating and controlling the rate of the components of the mixture,

- it controls an on-line additivation device, by managing and controlling the injection, its rate and the possible process errors,

- it presets the price of the fuel to be delivered.

2.3 Software

The SATAM electronic calculator-indicator EQUALIS S is equipped with a type P and a risk class C software application, according to WELMEC Guide 7.2.

The authorized checksum associated to the metrological functions is :

Authorized checksum	Approved into the certificate revision nr
0x2be4cbc	LNE-25874-0

1- <u>Reference of the documentation submitted for evaluation:</u>
   - o   Programming manual : EQUALIS S Calculator _ Depot Version - **U517504**
   - o   Programming manual : EQUALIS S Calculator _ Truck Version - **U517505**
   - o   Technical description EQUALIS S _ Depot Version - **U517502**
   - o   Technical description EQUALIS S _ Depot Version - **U517503**
   - o   EQUALIS S – Software Design - **U517508**

2- <u>Identification and description of locations of software componentns in the measuring instrument (i.e. EPROM, processor, hard disk, ...) that need to be sealed or secured :</u>
   See § 10. "Securing and sealing" in the certificate.

3- <u>Instructions of how to check the software identification (for metrological supervision)</u>
   The checksum can be displayed on the calculator-indicator through the following steps:
   - o   Press on "Main Menu",
   - o   Enter the personal code, and press again on "Main Menu",
   - o   Select the "Maintenance" menu,
   - o   Select the "W & M" menu,
   - o   Enter the specific password "W&M",
   - o   Select the "Software Identification" menu : the checksum is then displayed.

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3. Characteristics

3.1 Metrological characteristics

The metrological characteristics of the SATAM electronic calculator-indicator EQUALIS S are as follows:

- Volume unit : L
- Volume unit : m^3
- Volume indication scale interval: 0.01 or 0.1 or 1
- Volume indication scale interval: 0.001 for the additivation function
- Mass unit : kg or t
- Mass indication scale interval: 0.01 or 0.1 or 1
- If necessary, in the beginning of the delivery, the scale interval can be displayed with a decimal behind the comma and then move on to the unit at a delivered quantity chosen
- Maximum indicator range: 999,999 scale intervals
- Minimum delivery:
    - 200 scale intervals when the device is installed in a class 0.5 measuring system
    - 100 scale intervals when the device is installed in a class 1 measuring system
    - 50 scale intervals when the device is installed in a class 1,5 measuring system
- If required, temperature indication scale interval: 0.1℃
- Liquid temperature range: - 40℃ to + 80℃
- Maximum metering frequency: 2 kHz

3.2 Environment

The SATAM electronic calculator-indicator EQUALIS S has the following environmental characteristics:
- Mechanical class: **M2**
- Electromagnetic class: **E3**
- Temperature range: **- 25℃ to + 55℃**

4. Interfaces and compatibility

The SATAM electronic calculator-indicator EQUALIS S performs the following functions:
- It provides pulses outputs for the volume calculated (or for the mass calculated),
- It provides an RS485 series output for the volume calculated (or for the mass calculated).

In case of an application with two metering systems, the transmitted volume (or transmitted mass) by the pulses outputs or by the RS485 serial output corresponds to the accumulation of the volumes resulted from the measuring systems.

In the case where the main display of the meter is the converted volume at 15°C, the transmitted volume by the pulses outputs or by the RS485 serial output is the converted volume at 15°C.

5. Special manufacture and installation conditions

Manufacture and installation conditions are described in section 2 above.

6. Special conditions for commissioning

There is no special condition for commissioning.

7. Special conditions of use

7.1 "Fixed installation" version

The SATAM electronic calculator-indicator EQUALIS S converts the volume measured to base conditions (15°C) on the basis of the density for a given product. Consequently, no substantial modification of density during measuring is permitted.

The standard ISO 91-1 and the following API-ASTM-IP tables are used for conversion of volumes of hydrocarbons: API-ASTM-IP 54A, 54B, 54C and 54D. API-ASTM-IP 54 and CFPB tables are used for conversion of volumes of Liquid Petrol Gas.

If the SATAM electronic calculator-indicator EQUALIS S is used to control an on-line blending or additivation device, the respective values for flow rate and minimum delivery corresponding to each measuring system linked to the calculator wil be considered in the parameters, i.e. minimum flow rate and minimum preset.

7.2 Vehicle version

The SATAM EQUALIS S electronic calculator-indicator converts the volume measured to base conditions (15°C) on the basis of the density for a given product. Consequently, no substantial modification of density during measuring is permitted.

The standard ISO 91-1 and the following API-ASTM-IP tables are used for conversion of volumes of hydrocarbons: API-ASTM-IP 54A, 54B, 54C and 54D.
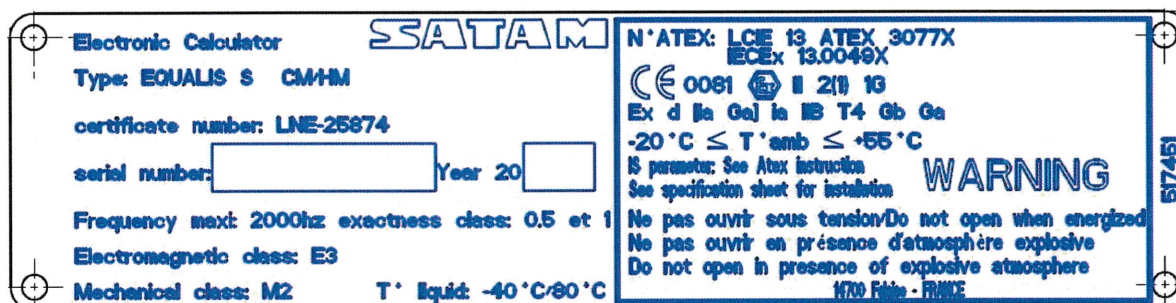
8. Special conditions for verification

The verification of the conformity of the SATAM electronic calculator-indicator EQUALIS S includes:

 - ➢ a conformity examination to check that the instrument meets the requirements defined on this certificate,
 - ➢ a conformity check of the metrological part of the software, by display of the checksum (see §2.3 "Software"),
 - ➢ verification of the instrument accuracy : metering pulses must be sent with a frequency corresponding to the maximum flow rate of the measuring system,
 - ➢ a check of satisfactory operation of display control devices and measurement transducer(s),
 - ➢ if required, an accuracy check of the temperature measurement device(s) used for conversion (PT100 sensor(s)),
 - ➢ if required, a check of the printer control device. Check that printed information corresponds to the metrological information transmitted by the SATAM calculator-indicator EQUALIS S.

9. Nameplate

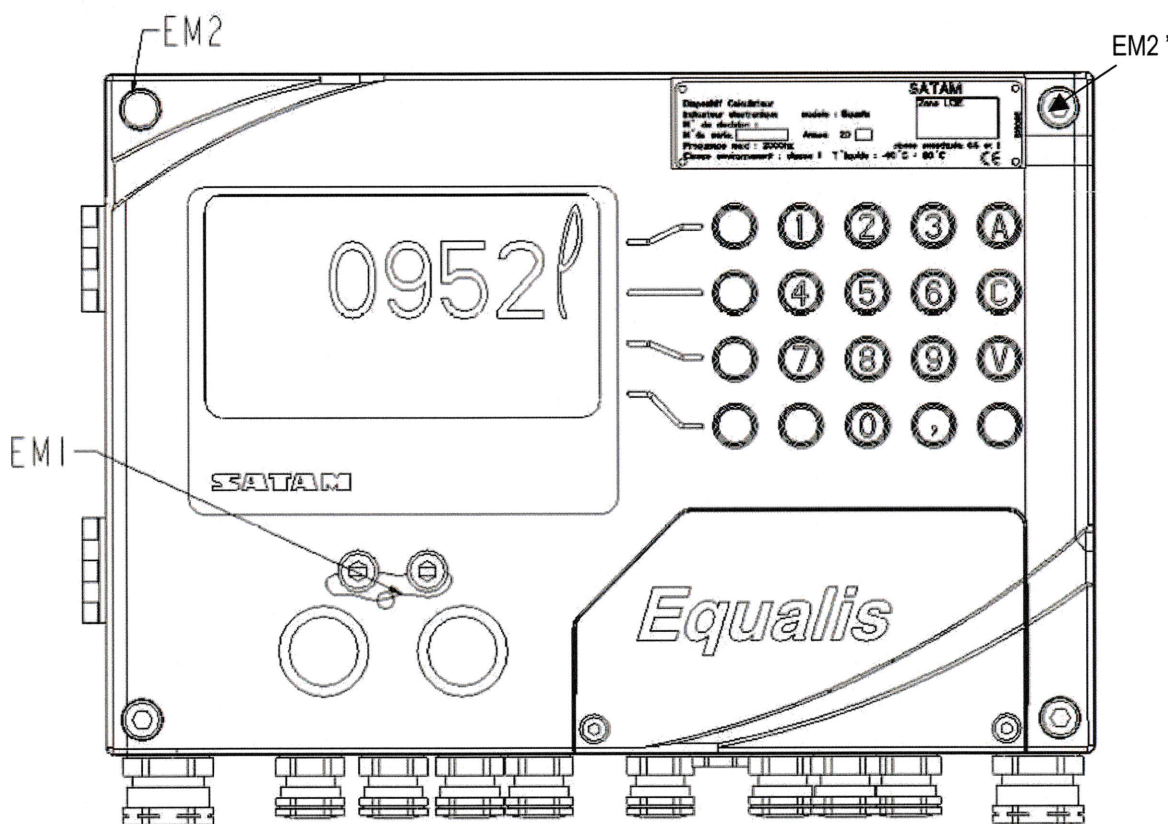|	
Electronic Calculator SATAM	N°ATEX: LCIE 13 ATEX 3077X IECEx 13.0049X
Type: EQUALIS S CM/HM	CE 0081 II 2(1) 1G
certificate number: LNE-25874	Ex d [ia Ga] ia IIB T4 Gb Ga
serial number: Year 20	-20°C ≤ T°amb ≤ +55°C
Frequency max: 2000hz exactness class: 0.5 et 1	IS parameter: See Atex instruction See specification sheet for installation WARNING
Electromagnetic class: E3	Ne pas ouvrir sous tension/Do not open when energized Ne pas ouvrir en présence d'atmosphère explosive
Mechanical class: M2 T° liquid: -40°C/60°C	Do not open in presence of explosive atmosphere M700 Febre - FRANCE

Nameplate drawing

10. Securing and sealing

Sealing for the user interface (Drawing A)

EM1 : Prevent modification of metrological parameters.
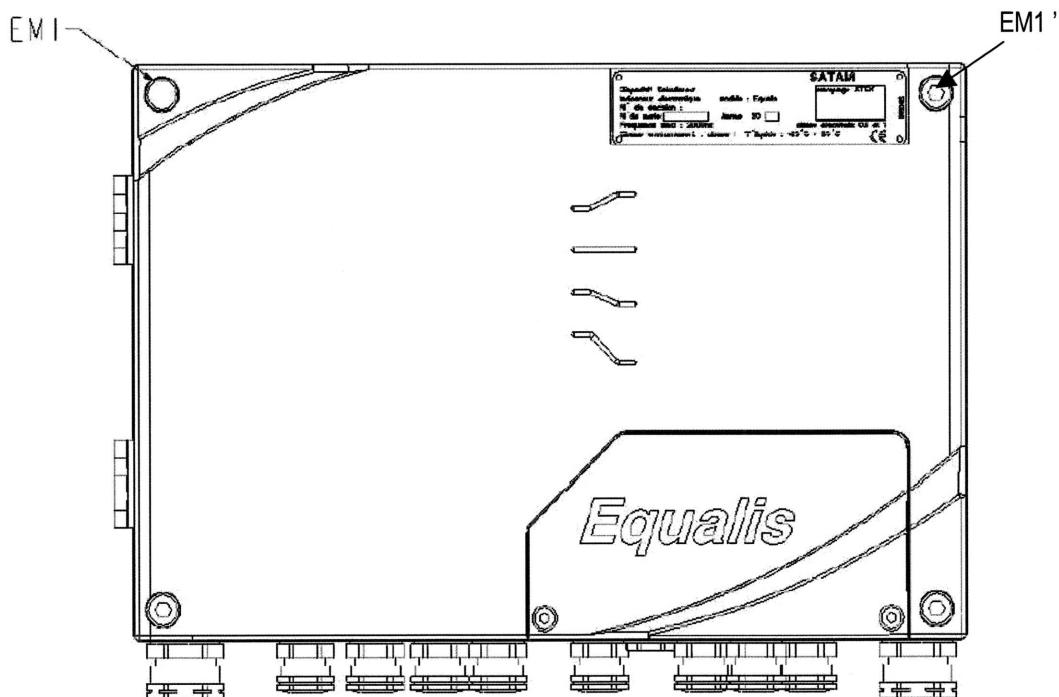**EM2 or EM2' :** Seals the cover.

Sealing for the ZCAN board (Drawing B)
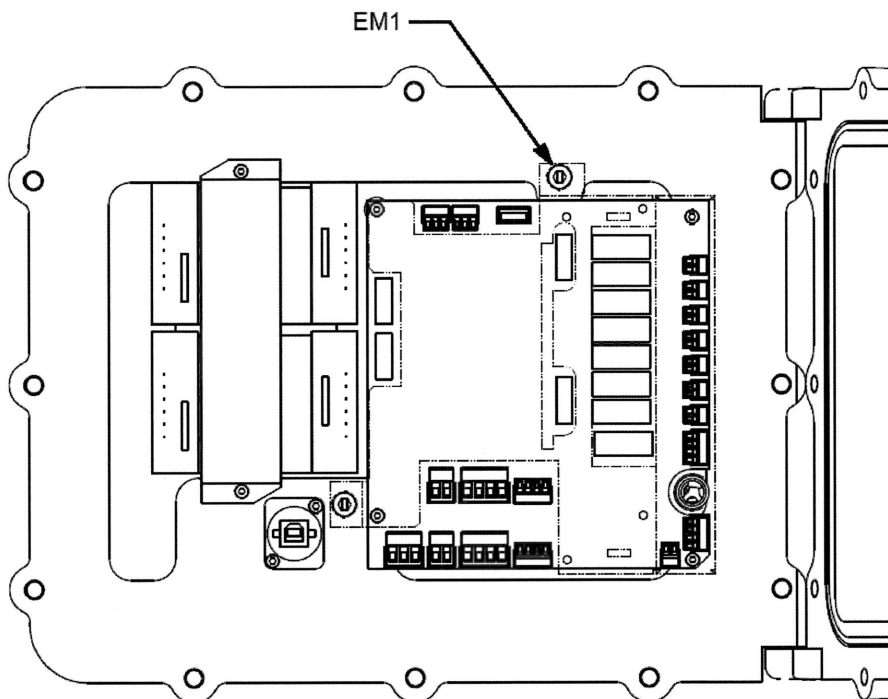
EM1 : Seal the ZCAN V3 covering plate.

Sealing for the calculation module (Drawing C)
Calculator version with remote user interface.

EM1 or EM1' : Seals the cover.