



**Australian Government**

**National Measurement  
Institute**

Bradfield Road, West Lindfield NSW 2070

## **Certificate of Approval**

### **No 10/1/24**

Issued by the Chief Metrologist under Regulation 60  
of the  
*National Measurement Regulations 1999*

This is to certify that an approval for use for trade has been granted in respect of the

Cryostar Model WM-Dispenser-100 LNG Fuel Dispenser for Motor Vehicles

submitted by       Cryostar SAS  
                          Zone industrielle  
                          BP 48  
                          68 220 Hesingue  
                          FRANCE.

**NOTE:** This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document OIML R81, *Dynamic Measuring Devices and Systems for Cryogenic Liquids*, dated 1998.

#### **CONDITIONS OF APPROVAL**

This approval becomes subject to review on 1 October 2015, and then every 5 years thereafter.

Instruments purporting to comply with this approval shall be marked with approval number 'NMI 10/1/24' and only by persons authorised by the submittor.

Instruments purporting to comply with this approval and currently marked 'NMI P10/1/24' may be re-marked 'NMI 10/1/24' but only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

The National Measurement Institute reserves the right to examine any instrument or component of an instrument purporting to comply with this approval.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate No S1/0/A.

#### DESCRIPTIVE ADVICE

**Pattern:** provisionally approved 10 May 2010  
approved 23 September 2010

- A Cryostar model WM-Dispenser-100 LNG fuel dispenser for motor vehicles incorporating a Micro Motion model CMF 100 mass flowmeter approved to dispense liquified natural gas (LNG).

Technical Schedule No 10/1/24 describes the pattern.

#### FILING ADVICE

The provisional status and conditions as given in Interim Provisional Certificate No P10/1/24 issued 10 May 2010 have now been removed.

The documentation for this approval comprises:

Certificate of Approval No 10/1/24 dated 27 October 2010  
Technical Schedule No 10/1/24 dated 27 October 2010 (incl. Test Procedure)  
Figures 1 to 3 dated 27 October 2010

Signed by a person authorised by the Chief Metrologist to exercise his powers under Regulation 60 of the *National Measurement Regulations 1999*.

A handwritten signature in black ink, consisting of a series of loops and a long horizontal stroke at the bottom.

## TECHNICAL SCHEDULE No 10/1/24

**Pattern:** Cryostar Model WM-Dispenser-100 LNG Fuel Dispenser for Motor Vehicles

**Submittor:** Cryostar SAS  
Zone industrielle  
BP 48  
68 220 Hesingue FRANCE

### 1. Description of Pattern

A Cryostar model WM-Dispenser-100 LNG fuel dispenser for motor vehicles (Figures 1 and 2) incorporating a Micro Motion model CMF 100 mass flowmeter approved to dispense liquified natural gas (LNG) (#) in attendant-operated mode.

(#1) The flowmeter is adjusted to be correct for liquified natural gas for which it is to be verified.

#### 1.1 Field of Operation

The field of operation of the measuring system is determined by the following characteristics:

- Minimum measured quantity,  $M_{min}$  20 kg
- Maximum flow rate,  $Q_{max}$  100 kg/min
- Minimum flow rate,  $Q_{min}$  15 kg/min
- LNG density range 350 to 550 kg/m<sup>3</sup>
- LNG temperature range -183 to -104°C
- LNG pressure range 0.1 to 3.0 MPa abs.
- Ambient temperature range -25°C to 55°C
- Accuracy class Class 2.5
- Power supply (nominal) 240 V AC

#### 1.2 Description of the Measuring System (Figure 2)

- (i) A supply tank designed to maintain the cryogenic liquid within the temperature range specified for the product in its liquid state.
- (ii) A Micro Motion model CMF100 flow sensor (Figure 3a) interfaced to a Micro Motion model MVD 2700 flow transmitter (Figure 3b) to provide a MODBUS signal indicating mass measurement.
- (iii) A Compac model C4000 calculator/indicator (Figure 3c) with a retail-type display unit (displaying quantity, unit price and total price). Each quantity display has a six-digit liquid crystal display (LCD) and displays to two decimal places (0000.01 kg). The calculator/indicator is to display the delivery of liquid in kilograms when the flowmeter output to the indicator is configured for mass flow.
- (iv) The instrument is approved with software version LNG 29258. The version can be viewed by pressing the parameter switch once.

- (v) A Siemens model S7-300 (CPU 315 or higher) programmable logic controller (PLC).
- (vi) A hose and delivery nozzle suitable for use with LNG
- (vii) The system has a liquid return line for pre-conditioning the system for thermal stabilisation prior to a delivery.

### 1.3 Checking Facilities

Before each delivery, the Programmable Logic Controller (PLC) checks the fuelling conditions and sends the start order to the calculator/indicator.

An automatic segment test is performed on the calculator/indicator at the start of each delivery. The calculator/indicator monitors the presence and correct transmission of the MODBUS signal from the model MVD 2700 flow transmitter. In the event of detecting error, it indicates this and stops the delivery via a solenoid valve.

### 1.4 Verification Provision

Provision is made for the application of a verification mark.

### 1.5 Sealing Provision

Provision is made for the access to the calibration adjustments to be sealed as shown in (Figure 3d).

### 1.6 Descriptive Markings and Notices

Each measuring system shall bear the following information, placed together either on the indicating device or on a data plate:

Pattern approval mark	NMI 10/1/24
Manufacturer's identification mark or trade mark	.....
Manufacturer's designation (model number)	.....
Serial number of the instrument	.....
Year of manufacture	.....
Maximum flow rate, $Q_{max}$	..... kg/min
Minimum flow rate, $Q_{min}$	..... kg/min
Minimum measured quantity ( $M_{min}$ )	..... kg (#1)
Maximum operating pressure ( $P_{max}$ )	..... MPa abs
Minimum operating pressure ( $P_{min}$ )	..... MPa abs
Nature of liquids to be measured	..... (#2)
Maximum temperature of the liquid, $T_{max}$	.....°C
Minimum temperature of the liquid, $T_{min}$	.....°C
Environmental class	class C

- (#1) In addition, the minimum measured quantity ( $M_{min}$ ) shall be clearly visible on any indicating device visible to the user during measurement, in the form 'Minimum delivery 20 kg'.
- (#2) Liquefied natural gas (LNG).

## TEST PROCEDURE

Instruments should be tested in accordance any relevant tests specified in the Uniform Test Procedures. Tests should be conducted in conjunction with any tests specified in the approval documentation for any components used.

### **Maximum Permissible Errors at Verification**

The maximum permissible error applied during a verification test of the fuel dispenser using the liquid for which it is to be verified, and from normal flow rate to the minimum flow rate is:

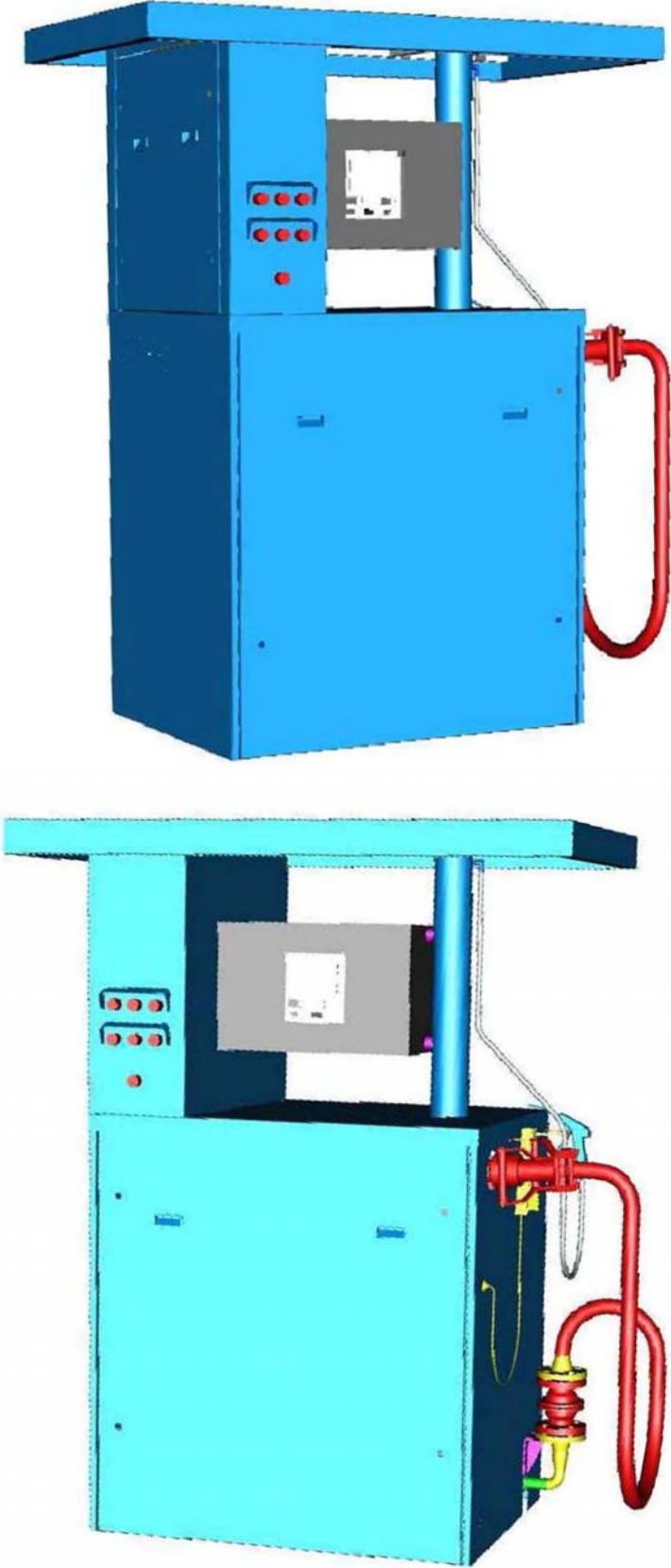
±2.5%.

Note: Adjusting the errors of a meter to values OTHER than as close as practical to zero is forbidden, even when these values are within the maximum permissible errors.”

For instruments with a minimum measured quantity of 20 kg;

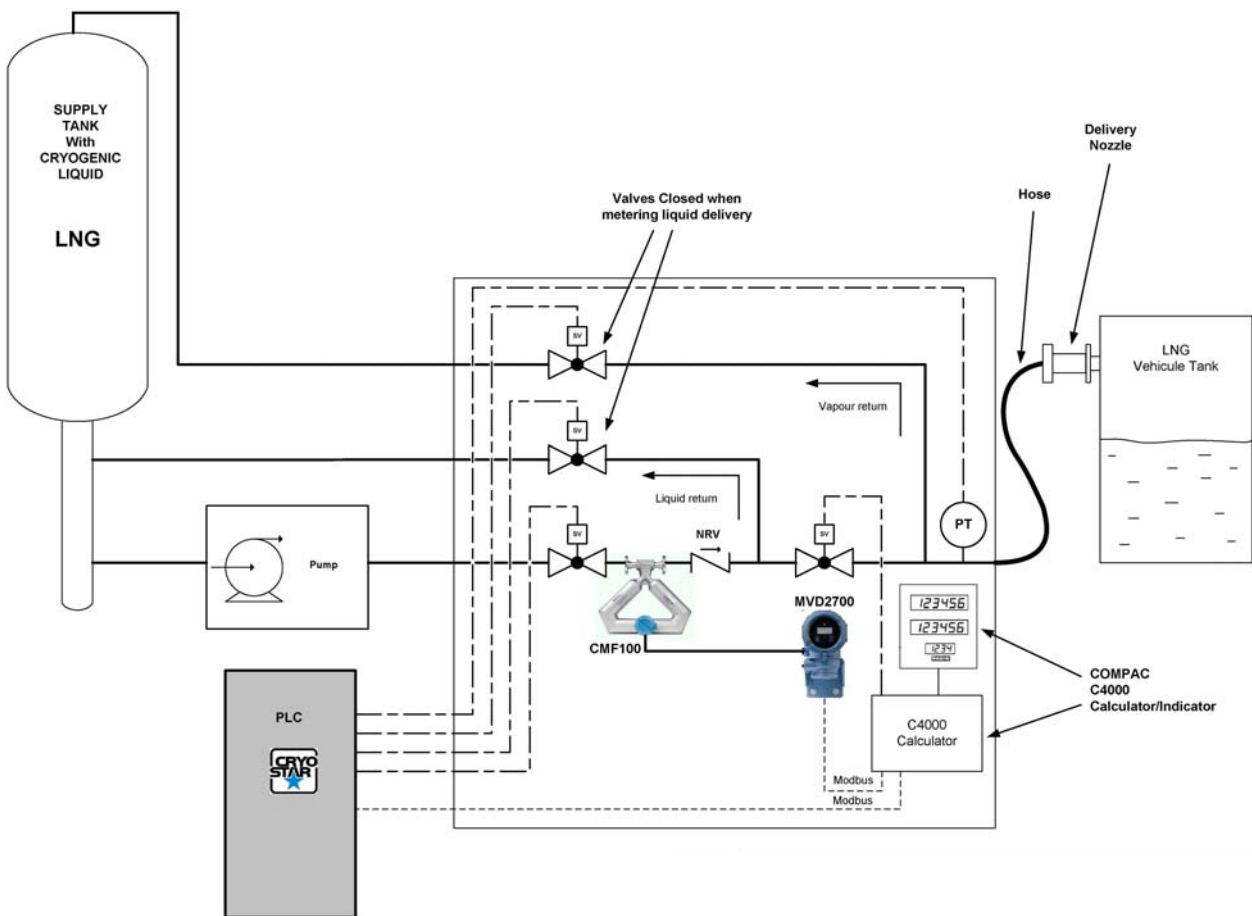
±1 kg for deliveries equal to the minimum measured quantity.

FIGURE 10/1/24 – 1



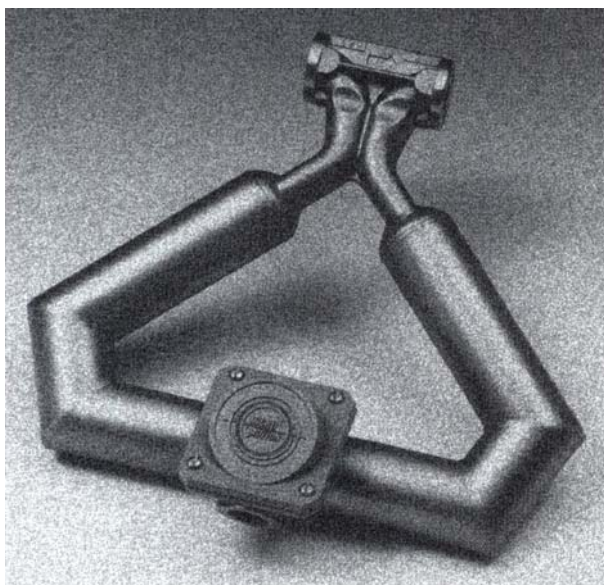
Cryostar Model WM-Dispenser-100 LNG Fuel Dispenser

FIGURE 10/1/24 – 2



Cryostar Model WM-Dispenser-100 LNG Fuel Dispenser  
Typical System Diagram

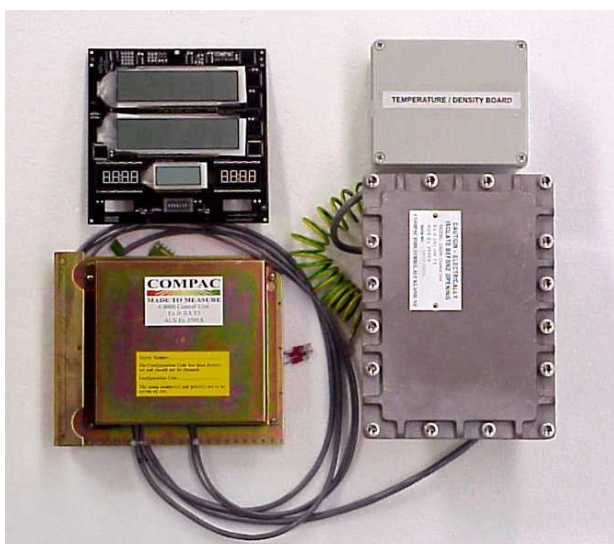
FIGURE 10/1/24 – 3



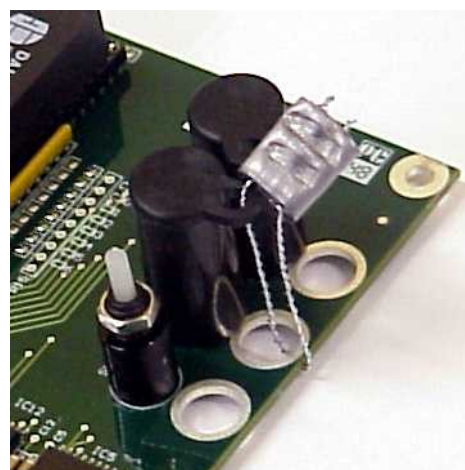
(a) A Micro Motion model CMF100 flow sensor



(b) A Micro Motion model 2700 Flow Transmitter



(c) A Compac Model C4000 Calculator/Indicator



(d) Typical Sealing