Australian Government
Department of Industry, Science, Energy and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 5/6E/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 instruments herein described.

Bartec Model MAK 3003 Milk Flowmetering System

submitted by Bartec Benke GmbH
Schulstrasse 30
94239 Gotteszell, Bavaria
Germany

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 NMI R 117 Measuring Systems for Liquids Other than Water, dated June 2011.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern approved – certificate issued	15/01/21

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 5/6E/24' and 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.

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

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

Darryl Hines
Manager
Policy and Regulatory Services

TECHNICAL SCHEDULE No 5/6E/23

1. Description of Pattern approved on 15/01/21

The Bartec MAK model 3003 vehicle-mounted milk flowmetering system using a Bartec model 6823-x electromagnetic flowmeter (also known as a PROCES-DATA model PD340-C76) approved for measuring the milk collected from a milk tank.

1.1 Field of Operation

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

- Minimum measured quantity (V_{min}) 500 L
- Maximum flow rate (Q_{max}) 2000 L/min
- Minimum flow rate (Q_{min}) 200 L/min
- Maximum pressure of the liquid (P_{max}) 800 kPa
- Ambient temperature range -25°C to 55°C
- Accuracy class 0.5
- Vehicle-mounted operation
- Product – milk at nominal controlled temperature

The flowmeter is adjusted to be correct for the liquid (milk) for which it is to be verified as marked on the data plate.

1.2 The System (Figure 1)

(i) A supply tank

The supply tank is a milk tank or a vat to which the metering system is temporarily connected. The base of these tanks slopes towards the outlet to facilitate emptying of the contents during the measuring process.

(ii) Pump

The system has a positive displacement pump acting as a priming pump combined with a centrifugal type pump of sufficient capacity which operates once the system has been primed to draw milk from the supply tank outlet and may be located lower than the inlet of the pump.

(iii) Gas Elimination Device

The gas elimination device is a Diessel/DME type E float-operated gas separator with a volume of approximately 60 litres fitted between the pump and the meter. The device incorporates a round float that has a shaft through its centre which allows the float to move in a vertical plane. At the top of this shaft is a ‘needle’ that operates a seat assembly designed to seal off the vent located at the top of the gas separator. As the liquid level in the gas separator rises, the float rises until the seat assembly, seals off the vent and the flow is directed to the flowmeter.

When the supply tank is emptied, pumping continues until the liquid level (and the float) in the gas eliminator drops, causing the ‘needle’ to lose contact with the vent seat, which allows the air to be vented to atmosphere and the flow to the meter stopped. The point at which the ‘needle’ loses contact with the vent seat defines the ‘liquid reference level’ in the gas separator for the start and end of the delivery.

The spring-loaded vent valve located at the top of the gas separator can be operated manually or pneumatically for facilitating the clean-in-place (CIP) operation.

A drain valve is allowed to be installed in the pipe exiting from the air eliminator so that during the calibration of the system, the air eliminator and pipework can be completely evacuated. This valve must be sealed after calibration is completed.

(iv) Transfer Point

The transfer point is defined by the electrodes of the electromagnetic flowmeter in conjunction with the 'liquid reference level' established automatically by the gas separator. The quantity required to establish the 'liquid reference level' is known as the priming quantity, which is determined for each metering system.

(v) Calculator/Indicator

A TCS model BARTEC type 6942-1x electronic calculator/indicator (Figure 3) is used with the electromagnetic flowmeter and configured for displaying the volume in 1 L increments.

The signal from the measuring transducer is transferred to the calculator/indicator via a P-Net fieldbus.

The BARTEC calculator/indicator (software version 1.x) has the following features:

- An LCD touch screen.
- Input/output (digital or analog) - Connection of magnetic valves or evaluation of feedback
- BARTEC P-Net - Connection to P-Net bus (electromagnetic flowmeter)
- BARTEC USB - Connection of optional components not relevant for the measurement
- RS232 - Connection of a printer or of components not relevant for the measurement
- RS485 - Connection of components not relevant for the measurement
- HART - Connection of components not relevant for the measurement
- BARTEC-Ethernet - Connection of components not relevant for the measurement
- Pt100 (4-conductor) - Connection of optional temperature sensors
- Bluetooth - Connection of components not relevant for the measurement
- Count - Rotation speed input (rev)
- PWM - Pump control
- A docket printer
- A function, open, start, stop and quit soft buttons
- A RFID writer
- Eight digital inputs and outputs (controlling pumps, valves and samplers) and one analogue input for temperature measurement
- Incorporates programmable levels of security. Access to meter calibration is only possible via a mechanical calibration/verification switch. The switch can be secured by means of a destructible adhesive label over the switch.

A typical sequence of operation is:

- Input driver number, route number and supplier number;
- Measure the quantity collected;
- Repeat above for each load;
- Discharge the milk collected and initiate data transfer sequence; and
- Initiate CIP (clean-in-place) operation.

(vi) Measurement Transducer

The measurement transducer is a Bartec model 6823-x electromagnetic flowmeter (also known as a PROCES-DATA model PD340-C76) (Figure 2) installed in a vertical position.

(vii) Check Valves

To prevent reverse flow, a spring-loaded non-return valve, which can be located immediately downstream or upstream of the flowmeter, opens at pressures above 20 kPa. An optional product sampler and/or strainer may be fitted before the pump.

(viii) Flow Control

A flow control valve/device may be fitted downstream of the flowmeter.

(ix) Power Supply

The power supply is provided by the vehicle to ensure the system operates on a voltage between 9 and 36 volts DC.

1.3 Verification Provision

Provision is made for the application of a verification mark.

1.4 Sealing Provision

The ‘cal/measure’ switch for the flow sensor electronics module and terminal box can be secured by a sealing wire through the holes in the two sealing screws provided (Figure 2), or alternatively by means of a lead seal or similar. A destructible adhesive label is placed over the verification switch in the BARTEC type 6942-1x calculator/indicator (Figure 4). Note that the ‘program enable’ switch in the terminal box of the flow sensor can be set to the ‘on’ position (meter calibration is secured by the verification switch in the calculator/indicator.

1.5 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 5/6E/24
Manufacturer's identification mark or trade mark	…..
Meter model	…..
Serial number of the instrument	…..
Year of manufacture	…..
Maximum flow rate, Q_{max}	….. L/min
Minimum flow rate, Q_{min}	….. L/min
Minimum measured quantity (V_{min})	….. L
Priming quantity	….. L
Approved for use with milk	…..

(b) The minimum measured quantity must be displayed in the vicinity of the indication in the form of 'V_{min} (or 'MMQ' or 'Minimum Delivery') 500 L'.

TEST PROCEDURE

Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

The instrument shall not be adjusted to anything other than as close as practical to zero error, even when these values are within the maximum permissible errors.

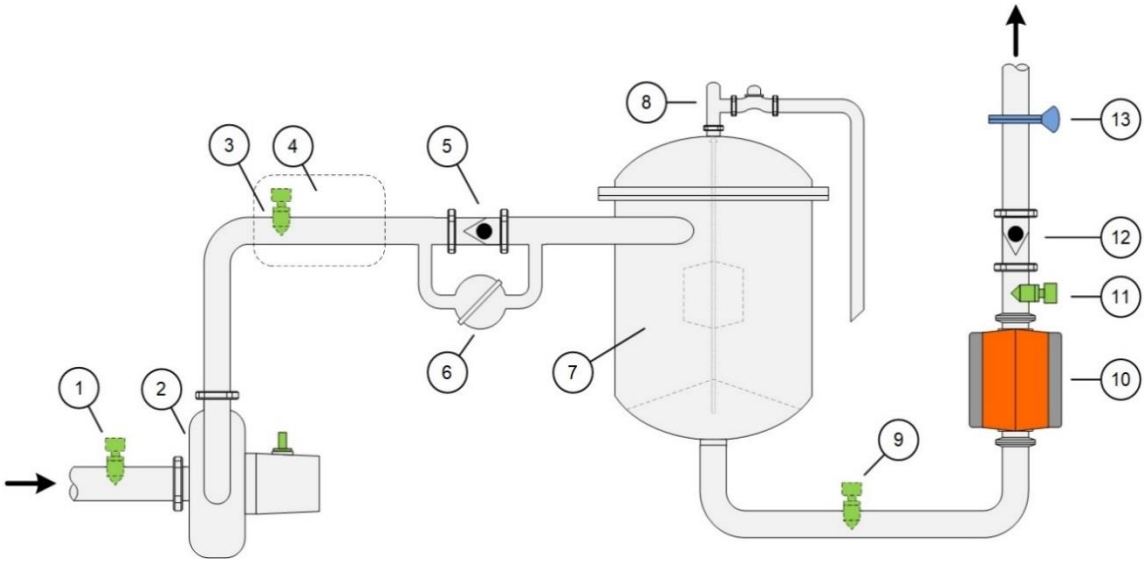
Instruments are to be tested with milk. The priming quantity is stored by the system (secured by the verification switch in the calculator/indicator) and is automatically added to the quantity measured if the system is not primed.

NOTE: The quantity required to prime the system shall be determined at verification and shall be configured and stamped on the nameplate. Complete one or more deliveries and check the volume indicated against the actual volume.

Maximum Permissible Errors at Verification

The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

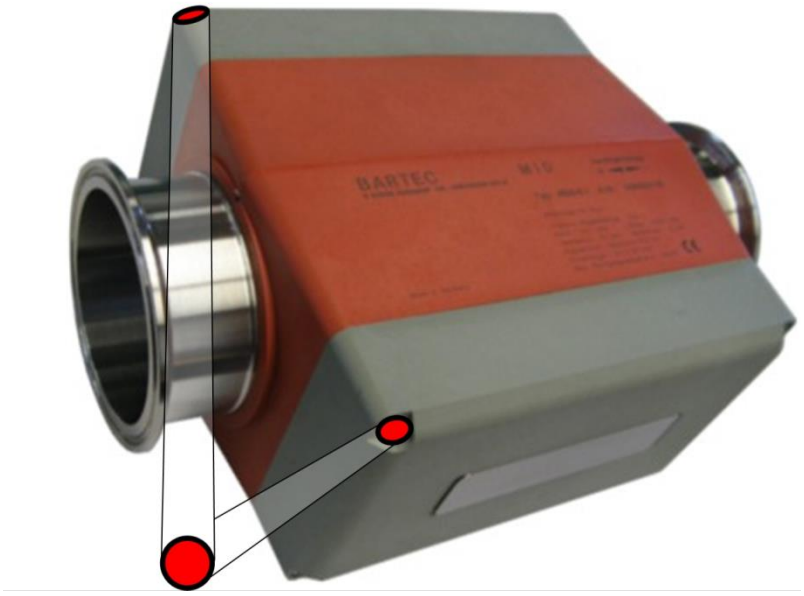
FIGURE 5/6E/24 – 1



1. Milksensor (optional)
2. Pump
3. Milk-/Temperature sensor (optional)
4. Sampling device (optional)
5. Check valve (NRV)
6. Priming pump
7. Air eliminator
8. CIP valve
9. Temperature sensor (optional)
10. Measurement transducer
11. Milk sensor
12. Check valve
13. Shut-off valve

Bartec Model MAK 3003 Milk Flowmetering System

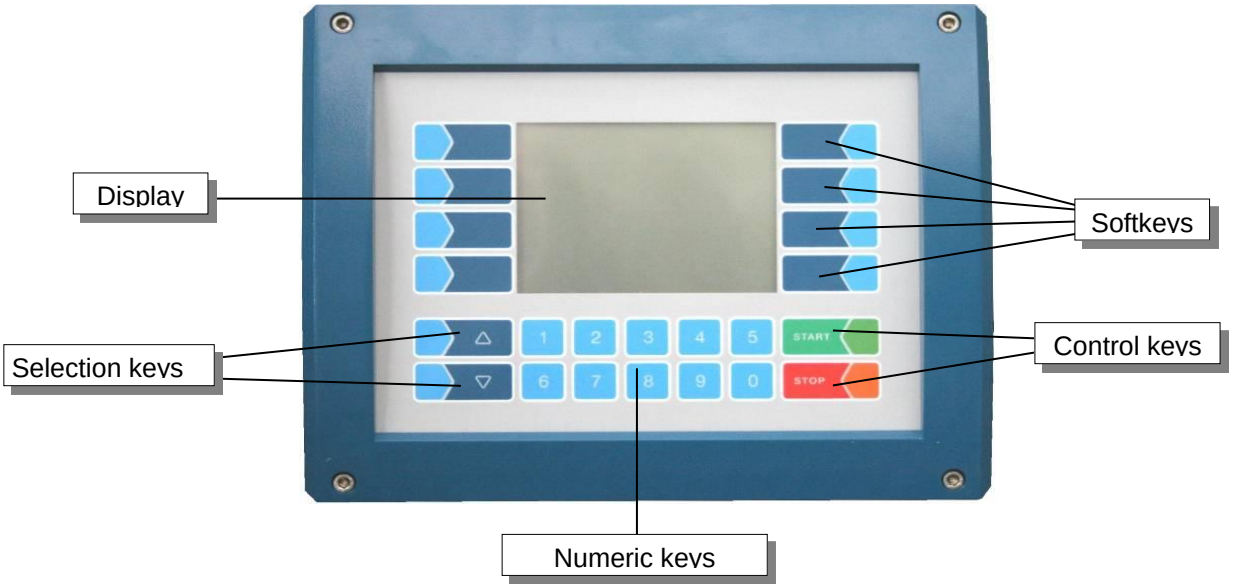
FIGURE 5/6E/24 – 2



Sealable Screws

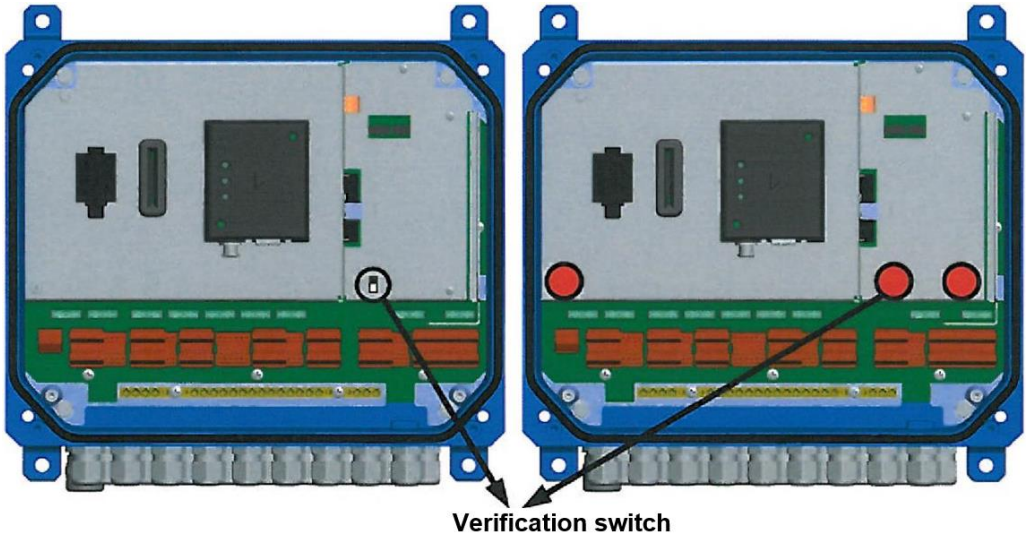
Bartec Model 6823-x Electromagnetic Flowmeter
(also known as a PROCES-DATA Model PD340-C76)

FIGURE 5/6E/24– 3



TCS Model BARTEC Type 6942-1x Calculator/Indicator

FIGURE 5/6E/24– 4



Verification switch BARTEC type 6942-1x

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