



Australian Government
Department of Industry,
Innovation and Science

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval NMI 5/6B/227

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.

Toshniwal Model OV series Bulk Flowmetering System

submitted by Toshniwal Hyvac Private Limited
4D/6 Industrial Estate
Ambattur
Chennai TAMILNADU 600058
INDIA

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.

This approval becomes subject to review on 1/09/23, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern approved – interim certificate issued	17/08/18

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 5/6B/227' and only by persons authorised by the submitter.

It is the submitter'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
Pattern Approval, Policy and
Licensing Section

TECHNICAL SCHEDULE No 5/6B/227

1. Description of Pattern

approved on 17/08/18

A Toshniwal model OV bulk flowmetering system (Figure 1) using Toshniwal Model OV Oval Wheel positive displacement flowmeter (Figure 2) as listed in table 1 below for bulk metering of petroleum products other than LPG.

TABLE 1

Meter Type	Diameter (mm)	Minimum Flow Rate (Q_{min}) (L/min)	Maximum Flow Rate (Q_{max}) (L/min)	Minimum Measured Quantity (V_{min}) (L)
OV 2	25	3.3	33	5
OV 5	25	5.5	55	5
OV 10	25	11	110	10
OV 50	50	35	350	20
OV 80	80	35	350	20
OV 115	65	55	550	50
OV 200	80	80	800	50
OV 350	80	120	1200	100
OV 400	100	135	1350	100
OV 1000	80	167	1667	100
OV 1500	100	250	2500	150
OV 2000	100	333	3333	200
OV 2000	150	333	3333	200
OV 3000	150	500	5000	500

Note: The flow rates must be at least a 10:1 ratio, maximum to minimum

1.1 Field of Operation

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

- | | | | |
|---|--|-----------------------------|------|
| • | Minimum measured quantity (V_{min}) | see table 1 | (#1) |
| • | Maximum flow rate (Q_{max}) | see table 1 | |
| • | Minimum flow rate (Q_{min}) | see table 1 | |
| • | Maximum pressure of the liquid (P_{max}) | 4000 kPa | |
| • | Minimum pressure of the liquid (P_{min}) | 80 kPa (nominal) | (#2) |
| • | Range of liquids viscosity | 0.3 to 150 mPa.s (at 20°C) | (#3) |
| | | 150 to 3000 mPa.s (at 20°C) | (#4) |
| • | Liquid temperature range | 0°C to 80°C | |
| • | Ambient temperature range | -25°C to 55°C | |
| • | Accuracy class | 0.5 | |
- (#1) For minimum measured quantities (V_{min}) less than 200 L, the scale interval of the calculator/indicator is 0.1 L; for deliveries greater than 200 L the scale interval is 1 L.
- (#2) Minimum pressure required for effective operation of the gas elimination device.
- (#3) For meter types listed table 1 that use normal oval wheel gear profile.
- (#4) For meter types listed in table 1 that use special tooth oval wheel gear profile.

1.2 Components of Measuring System

(i) Supply tank

The supply tank, which may incorporate a detector for low liquid-level. A positive displacement, centrifugal or submersible turbine type pump may be used to provide flow through one or more flowmeters.

(ii) Pump

The pump is required to have sufficient capacity to allow flow rates at least three times the minimum flow rate specified for the flowmeter. If the pump is not for the exclusive use of the flowmeter, the pump shall be of sufficient capacity to ensure that flow rate through each meter is maintained above its respective specified minimum flow rate and the pressure is maintained above the minimum backpressure recommended for each meter for all combinations of alternative uses of the pump.

A positive displacement type, centrifugal type, or submersible turbine type pump may be installed in a flooded suction configuration. Systems which incorporate submersible turbine type pumps, may in addition include centrifugal type pumps fitted above the liquid level in the supply tank as supplementary pump.

(iii) Non-return Valve

A non-return valve between the pump and the meter, or an arrangement of the components and piping to keep the system (up to the transfer point) full of liquid at all times.

(iv) Gas Elimination Device

The pattern is fitted with a Toshniwal make Strainer/air eliminator (Figure 3) or other compatible (#) strainer/air eliminator fitted upstream of the flowmeter to prevent vapour entering the flowmeter.

For applications where the duration of the shutdown period does not cause thermal contraction of the liquid and formation of pockets of gas upstream of the flowmeter, the gas elimination device may be modified for use as a strainer only, provided the supply tank incorporates a detector for low liquid-level.

(v) Measurement transducer

The measurement transducer is a Toshniwal model OV series oval wheel positive displacement flowmeter fitted with an Eltomatic model 01-08 or 01-09 (Ag series) dual channel 100 pulses per shaft revolution pulse generator (Figure 4), or any other compatible (#) NMI-approved pulse generator.

(vii) Calculator/Indicator

The signal output from the measurement transducer is interfaced to an approved Contrec Model 1010A (Figure 5) as described in the documentation of approval NMI S313A or any other compatible (#) NMI-approved calculator/indicator.

(#) 'Compatible' is defined to mean that no additions/changes to the hardware/software specified in this approval are required for satisfactory operation of the system.

(viii) Transfer Device

A transfer device is located downstream of the meter to define the start and finish of volume measured by the flowmeter and may be in the form of a shut-off valve or a decoupling valve fitted to the end of a hose or loading arm.

The transfer device may also be designed to control the flow rate, or a separate flow control valve may be fitted between the meter and the transfer device, provided that the flow control system maintains the operation of the meter within the approved field of operation.

1.3 Verification Provision

Provision is made for the application of a verification mark.

1.4 Sealing Provision

Provision is made for the calibration adjustments to be sealed as described in the approval documentation for the indicator. This is not applicable as all adjustments are via the flow computer (K-Factor), double password protected (1 password for general access and one for NMI purposes).

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 number	NMI No 5/6B/227
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
Maximum pressure of the liquid, P_{max} kPa (#1)
Minimum pressure of the liquid, P_{min} kPa
Liquid temperature range	... to ... °C (#2)
Type of liquid for which the system is verified (#3)
Environmental class	class C
Accuracy class	0.5

(#1) Required for systems with flexible outlet pipework.

(#2) Required if temperature converted volume to 15°C is reported.

(#3) This may be located separately, e.g. on a metal tag sealed to the instrument.

The minimum measured quantity (V_{min}) is clearly visible on the indicating device, e.g. 'Minimum Delivery 100 L', or the pre-set of the controller is limited to deliveries equal to or greater than the minimum delivery specified for the flowmeter.

TEST PROCEDURE

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

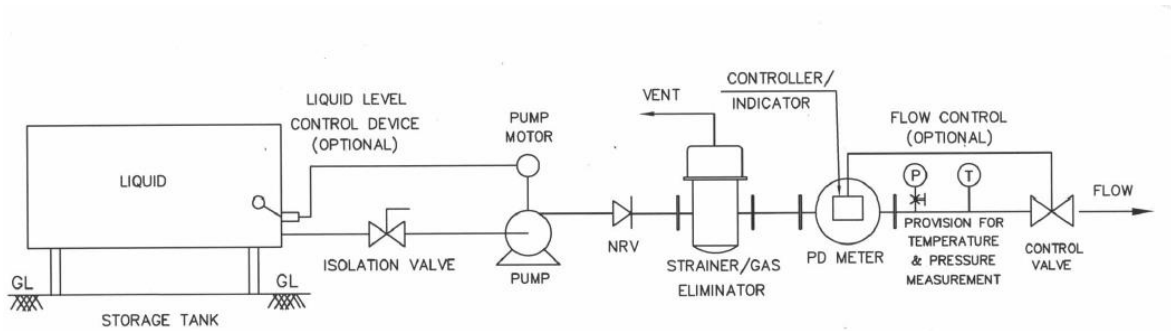
The instrument shall not be adjusted to anything other than as close as practical to zero error, even when these values are within the maximum permissible errors.

Instruments should be tested using a suitable test procedure.

Maximum Permissible Errors

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

FIGURE 5/6B/227 – 1



Schematic drawing of a Toshniwal Model OV Bulk Flowmetering System

FIGURE 5/6B/227 – 2



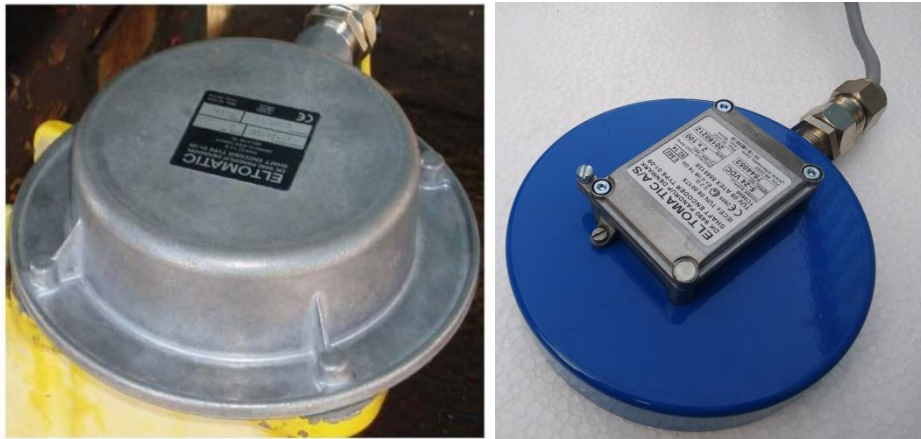
Toshniwal Model OV1000 Flowmeter

FIGURE 5/6B/227 – 3



Toshniwal make Strainer/air eliminator

FIGURE 5/6B/227 – 4



Eltomatic Model 01-08 or Model 01-09 Pulse Generator (in optional cover kit)

FIGURE 5/6B/227 – 5



Contrec Model 1010A Controller for Liquid-measuring Systems

~ End of Document ~