Australian Government
National Measurement Institute
Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 5/6B/219

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.

Alfons Haar Model PreciFUEL Liquid-Measuring System

submitted by HAAR Australia Pty Ltd
3/10 Law Court
Sunshine West VIC 3020

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 July 2011.

This approval becomes subject to review on 1/03/19, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern provisionally approved – interim certificate issued	7/02/14
1	Pattern amended (validity date) – interim certificate issued	2/05/14
2	Pattern amended (validity date) – interim certificate issued	18/9/14
3	Pattern & variants 1 & 2 approved – certificate issued	29/01/15

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 5/6B/219' and only by persons authorised by the submittor.

Instruments purporting to comply with this approval and currently marked 'NMI P5/6B/219' may be re-marked 'NMI 5/6B/219' 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.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate of Approval 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*.

Dr A Rawlinson

TECHNICAL SCHEDULE No 5/6B/219

1. Description of Pattern provisionally approved on 7/02/14 approved on 29/01/15

An Alfons Haar model PreciFUEL bulk flowmetering system incorporating an Alfons Haar model MKA 800 positive displacement flowmeter (Figure 1 and Table 1) with an Alfons Haar model IGELZ pulse transmitter interfaced to an Alfons Haar model X-Master 4 calculator/indicator for bulk metering of petroleum products other than LPG.

Approved products include various grades of liquid hydrocarbons including petrol/ethanol blends and pure ethanol ('E100') and various grades of pure biodiesel and biodiesel/distillate blends (to Australian government standard).

1.1 Field of Operation

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

•	Minimum measured quantity (V_{min})	100 L	(#1)
•	Maximum flow rate (Q_{max})	1200 L/min	
•	Minimum flow rate (Q_{min})	60 L/min	
•	Maximum pressure of the liquid (P_{max})	1000 kPa	
•	Minimum pressure of the liquid (P_{min})	30 kPa (nominal)	(#2)
•	Range of liquids viscosity	0.4 to 20 mPa.s (at 20°C)	(#3)
•	Liquid temperature range	-10°C to 50°C	
•	Ambient temperature range	-25°C to 55°C	
•	Accuracy class	0.5	

(#1) When the calculator/indicator is set to indicate volume in 1 L increments.

(#2) Minimum pressure required for effective operation of the gas elimination device.

(#3) The flowmeter is adjusted for use with one product viscosity for which it is to be verified and as marked on the data plate.

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 with positive displacement pumps are installed so that the pump stops when the liquid level in the supply tank is low. 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 pumps.

(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

Systems are fitted with a Gammon model GTP-21A or Armstrong model 11AV elimination device and/or an Alfons Haar model LMS 1D air detection sensor (Figure 3).

(v) Measurement Transducer

The measurement transducer is an Alfons Haar model MKA 800 65 mm (2.5”) positive displacement flowmeter (Figure 2) with dual pick-off coils producing an electrical output signal proportional to volume throughput. The pick-off signal is conditioned by a dual signal pre-amplifier to produce a square wave output signal.

(vi) Calculator/Indicator

An Alfons Haar model X-Master 4 calculator/indicator (Figure 4) which has a graphics display and numerical/function soft keys housed in an aluminium enclosure. The calculator/indicator may have additional model names marked, e.g. CountMASTER, ARU-MASTER.

(vii) 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 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 Sealing and Verification Provision

Refer to Figure 5 for sealing requirements.

Provision is also made for a verification mark to be applied.

1.4 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/219
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 ...$_o$C (#2)
Nominal k-factor	….. pulses/L
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 200 L', or the pre-set of the controller is limited to deliveries equal to or greater than the minimum delivery specified for the flowmeter.

2. Description of Variant 1 approved on 29/01/15

With certain other MKA series flowmeters as listed below in Table 1.

TABLE 1

Flowmeter Model	Size (mm)	Minimum Flow Rate (*Qmin*) (L/min)	Maximum Flow Rate *(Qmax*) (L/min)	Minimum Delivery *(Vmin*) (L)
MKA300	DN50	25	450	20
MKA800	**DN65**	**60**	**1200**	**100**
MKA2290	DN80	80	2000	200
MKA3350	DN100	100	4000	200

(*) The specifications for the meter of the pattern are in **bold** type

3. Description of Variant 2 approved on 29/01/15

As a hydrant dispensing system for installation on a vehicle dispensing fuel from a pressurised hydrant line (Figure 6). A dry break coupler must be used on the inlet to the vehicle to guarantee that no air is allowed into the system upon removal the coupling from the hydrant connection – where this cannot be guaranteed by the system design, an LMS1D sensor or SME bubble detector may be used to stop fuelling if air is detected in the system.

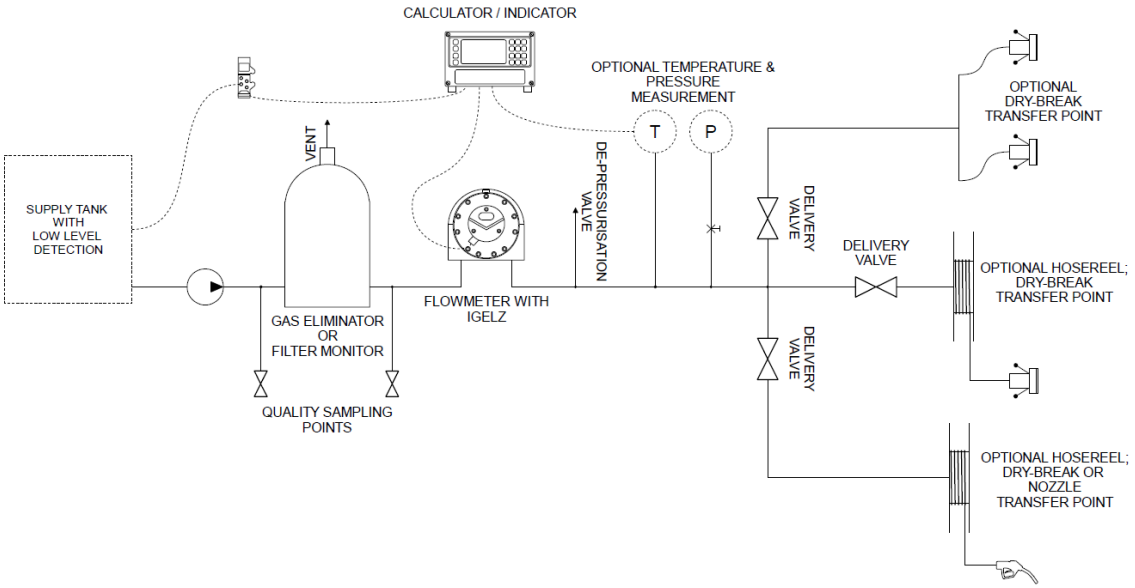
TEST PROCEDURE

Instruments shall be tested and verified in conjunction with any tests specified in the approval documentation for the instruments to which the pattern is connected, as appropriate, and in accordance with any relevant tests specified in the National Instrument Test Procedures, using the type of liquid with which they will be used and which is marked on the instrument.

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.

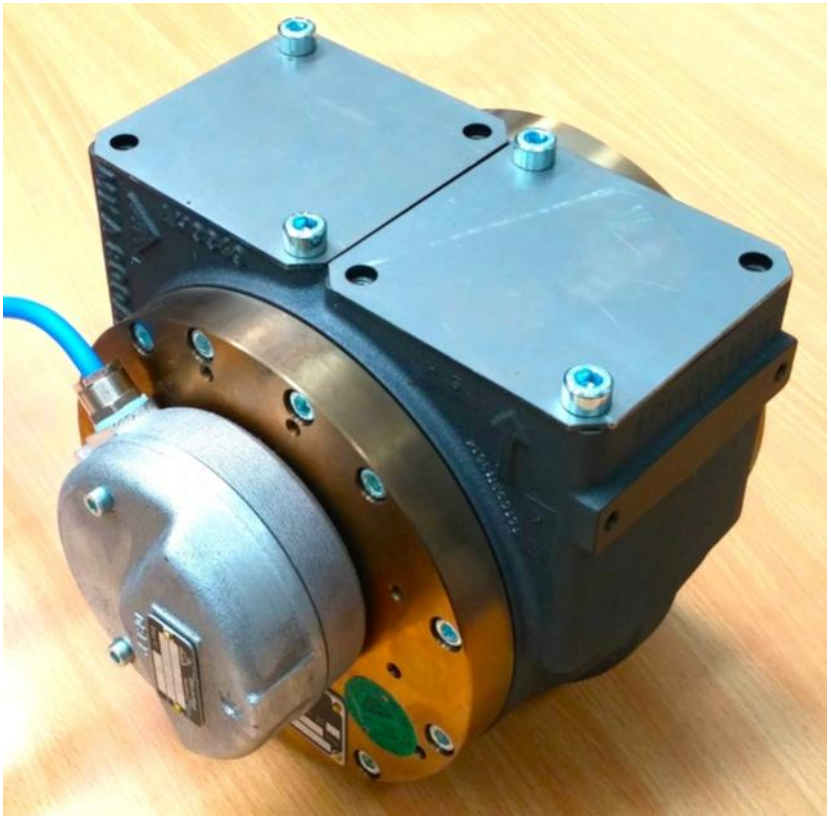
The maximum permissible errors applicable are those applicable to the system to which the instrument approved herein is fitted, as stated in the approval documentation for the system, or in Schedule 1 of the *National Trade Measurement Regulations 2009*.

Figure 5/6B/219 – 1



Alfons Haar Model PreciFUEL Liquid-Measuring System (Pattern)

Figure 5/6B/219 – 2



Alfons Haar Model MKA 800 Flowmeter

Figure 5/6B/219 – 2

Gammon Model GTP-21A

Armstrong Model 11AV

Alfons Haar Model LMS 1D

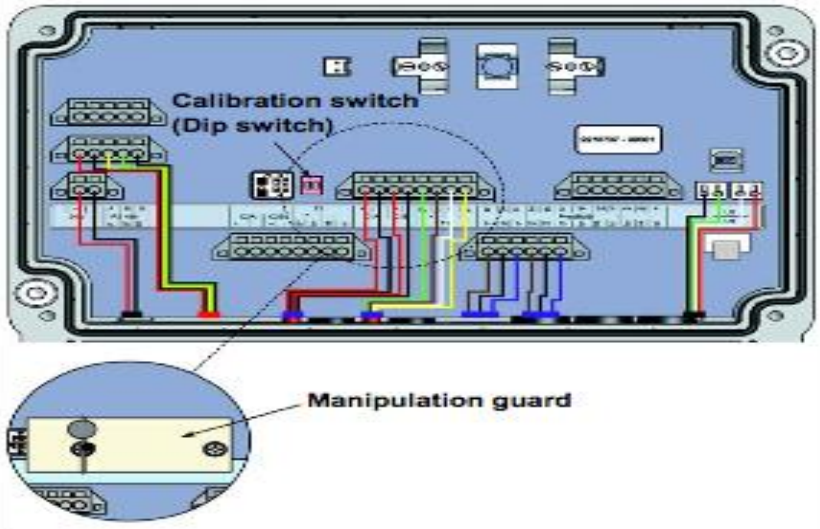
Gas Elimination Devices

Figure 5/6B/219 – 4

Alfons Haar Model X-Master 4 Calculator/Indicator

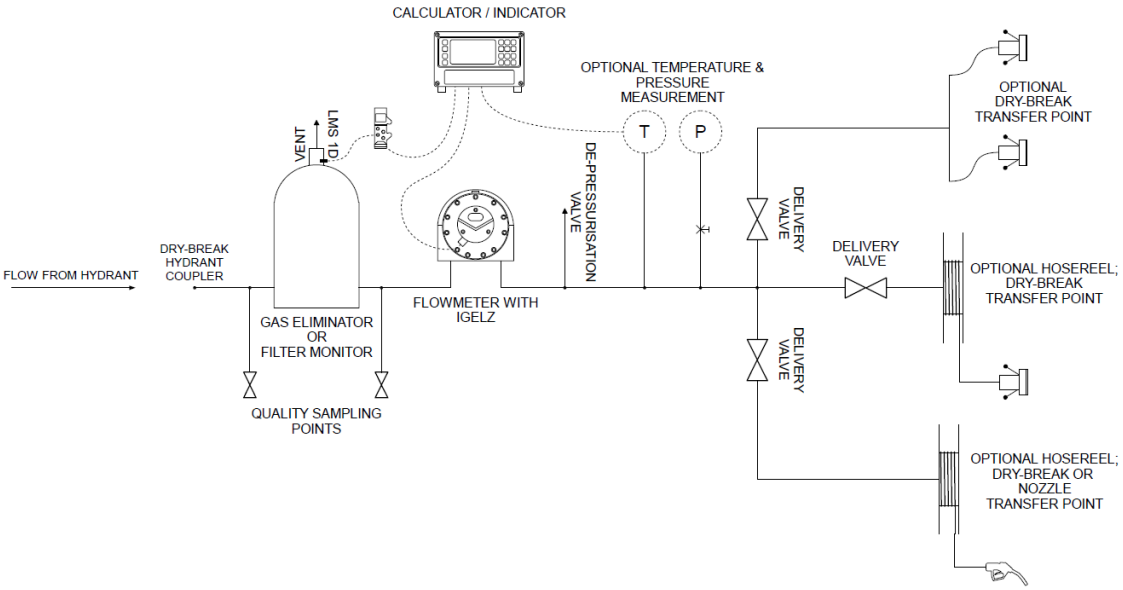
Figure 5/6B/219 – 5

Manipulation guard	Cover (part no. S001141) to protect the pulser connections and the calibration switch against manipulations. The manipulation guard has to be lead sealed after successful calibration of X-MASTER.



Sealing of Calculator/Indicator

Figure 5/6B/219 – 6



Alfons Haar Model PreciFUEL Hydrant Liquid-Measuring System (Variant 2)

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