Department for Innovation, Universities & Skills

AMENDMENT TO CERTIFICATE

Certification No 2176 Amendment 34

Submitted by: **Dresser Wayne**
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Authorisation is hereby given by the Secretary of State for Trade and Industry for the following certificate of approval relating to a pattern of a liquid flow meter to be amended as described below.

Certification No 2176 Amendment 34: Wayne 'Burkert' assisted vapour recovery system with or without Vapour Gate System

Signatory: **M Bokota**
for Chief Executive
National Weights and Measures Laboratory
(Part of the National Measurement Office)
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Description

The Wayne 'Burkert' assisted vapour recovery system is shown in Figure 1 with the Vapour Gate Meter. A vacuum pump supplies vapour recovery for each grade of fuel. In one dispenser there may be grades with or without vapour recovery. The rate of vapour recovery is controlled by independent electronics that adjusts, using a pulse drive output, the vapour flow according to the fluid flow. Vapour recovery continues for a short period after the nozzle has been stowed.

Construction

The existing hose is replaced by a co-axial hose with the vapour line converted at the upper flexible to affixed connection to small bore copper pipe. This pipe is taken via a proportional control valve to an independent electrically driven vacuum pump. The nozzle is replaced with a nozzle having a vapour annulus and an additional mechanism connected to the fluid flow valve that shuts the vapour line at the same time as the fluid flow. Recovered vapour is returned to the supply tank independent of the dispenser hydraulics. The following components are used in the Burkert vapour recovery system:

a)	Hose:	Elaflex Conti Slimline 21 or Goodyear Vapour Assist hose manufactured to DIN 2824, EN1360:1996
b)	Vapour recovery nozzles:	Any compatible vapour recovery nozzle
c)	Motor:	Elnor type BA240CP11-AR-R or BAI75EII AR
d)	Vacuum pump types:	Gardner Denver Thomas types 8014-5.0, or 8014-6.0. Or Dürr types MEX 0831-10, MEX 0831-11 or MEX 0544. Or ASF Thomas TFK 3G/4L. Or Fenner G56-1001
e)	Proportional valve:	Burkert types 6022/2832, 2832-A-04.5-EF-MS-GM82-024/DC-07*-PD36*MA01
f)	Control board:	Burkert 147911 or Compact vapour recovery controller, type 1094: Burkert 131561 (Figure 23)
g)	Break coupling:	Elaflex CSB 21

Parts c, d, and e are situated in the hydraulics enclosure and part f is situated in the display head.

Vapour Gate System

The meter measures the gas volume that passes through the vapour recovery system. The meter is an oscillating type of gas meter, a small amount of gas passes through the meter and is made to oscillate as it passes a thin heated platinum wire. This creates a frequency that is proportional to the gas flow. The ISB/interface transforms this frequency to pulses that iGEM calculate in to a volume. A ratio, referred later to as A/L, is calculated by dividing the amount of gas volume recovered with the amount of liquid dispensed. This ratio is allowed to be $0.85 \geq A/L \geq 1.15$, otherwise the filling is considered as erroneous.

A second path can be installed between the nozzle/nozzles and the VR meter that is controlled by an on/off valve. During normal circumstances this valve will be closed. Every filling is evaluated by iGEM and if fillings start to be out of the normal characteristics, according to certain parameters, the system will perform a self check just after the filling has

ended. IGEM simulates a short filling during the self check and the on/off valve is opened to obtain a known and controlled pressure. If the A/L value from the self check is a certain amount higher than the A/L value from the filling, iGEM will consider the filling erroneous even if the measured A/L value is within range. This test is used to detect if any of the nozzles has a jammed suction path in the vapour channels.

If the system has ten fillings on the same side out of range, ten unapproved self checks on the same nozzle or a combination of both, it will start a timer, if after 168 hours has elapsed it will close down the side until the error is reset.

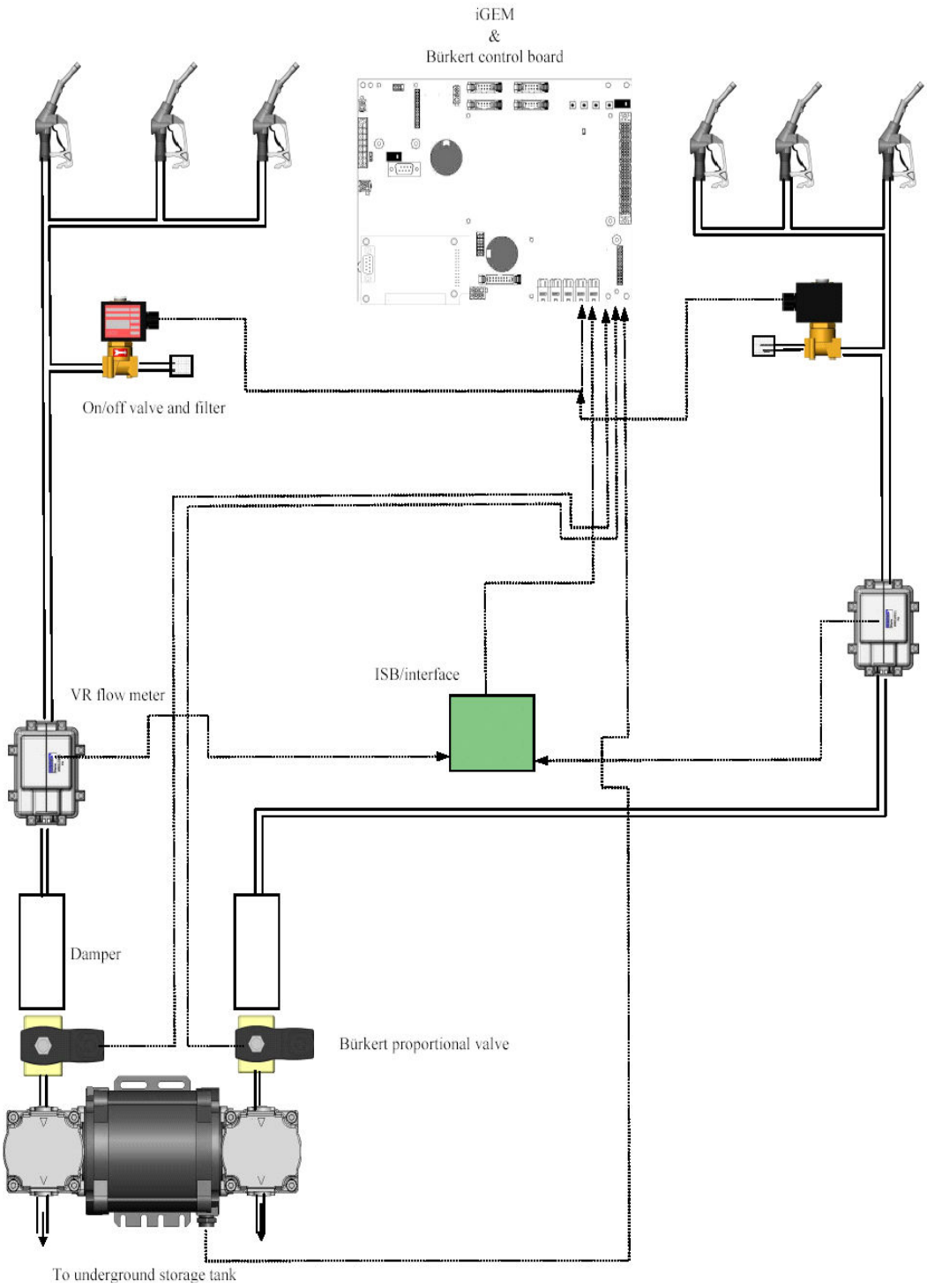

Figure 1 Wayne 'Burkert' assisted vapour recovery system with Vapour Gate Meter

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