Liquid Measurement

Liquid measurement with

Oval gear meters modular system type WG15

Volume and flow measurement with oval gear meters of the modular series by vemm tec. Precise, tried and tested measuring instruments for liquids. Optimum adaptation of the measuring instruments to the respective measuring task by our engineers. Representation of the measuring results by mechanical counters or output of volume pulses for further processing in electronic counter mechanisms or control processes. Use of the oval gear meters for industrial measurement, process control and for custody transfer. Whether in a chemical plant, when filling motor vehicles, aircraft or ships with diesel, motor petrol, lubricants or AdBlue®, the modular series oval gear meter presented by us is a measuring instrument of highest accuracy and long service life that reflects nearly 50 years of experience in the measuring technology of oval gear meters in our company.

Fig. 1) WG15 with pulse generator and single pointer indicator Z

Fig. 2) WG15 with angular pieces W45 and double pointer indicator ZR

Operating principle

The volume flow is measured by separating defined partial volumes that are formed between the oval gear meters and the measuring chamber wall. The oval gears are caused to rotate by the pressure difference of the measured media across the measuring mechanism and convey the partial volumes. Four partial volumes corresponding exactly to one measuring chamber content are transported by one full revolution of the oval gears. This chamber content is the measure for the volume flow. The rotary movement of the oval gear meters is transmitted from the measuring chamber to the following constructional units, i.e. counters and/or pulsers via a magnet coupling.

Properties:

- high measuring accuracy
- wide measuring range
- low investment, installation and maintenance costs
- no straight upstream and downstream lengths
- various process connections, such as DIN EN, ANSI, JIS……
- direct volume indication
- mobile and stationary use
- no voltage supply necessary

Volume and flow measurement of e.g.:

- fuels such as gasoline, diesel kerosene
- mineral and synthetic oils
- paints and varnish
- crude oil and fuel oil
- biodiesel and vegetable oil
- pharmaceutical products
- demineralized water
- AdBlue®
- acids and lyes
- dispersions and resins
- and much more……

AdBlue® is a registered trademark of the VDA.

DASTEC S.R.L.
Representantes / Distribuidores Exclusivos
Argentina
Tel: (+54 11) 5352 2500
Email: info@dastecsrl.com.ar
Web: www.dastecsrl.com.ar

vemm tec
Messtechnik GmbH

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Measuring range in l/min

Table A) For fluids with Newtonian flow behaviour. Oval gears with ***normal gearing***

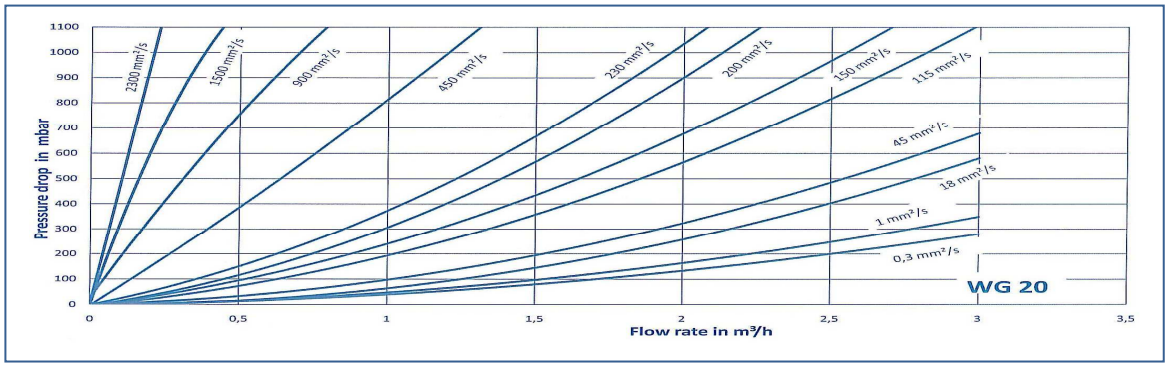
Viscosity in mPa s	< 0,3	0.3 to 17	3.5 to 120	8 to 350
Minimum	8	5	5	4
Continuous operation	30	40	40	30
Maximum	40	50	50	40

Table B) For fluids with Newtonian flow behaviour. Oval gears with ***special gearing***

Viscosity in mPa s	8 to 350	100 to 1000	500 to 2000	1000 to 5000
Minimum	5	4	2,5	1,2
Continuous operation	40	30	18	8
Maximum	50	40	25	12

Non-Newtonion fluids, other flow ranges and viscosities on request.

Pressure loss with normal gearing



Technical data

Measuring accuracy in the range of 1:10	+/-0.30 % of the measuring value (class of accuracy 0.5) +/-0.60 % of the measuring value (class of accuracy 1)
Repeat accuracy	+/-0.025% of the measuring value
Measured media temperatures	-40 to +270°C (depending on material and class of accuracy). The standard temperature range is around 60°C. (example: -10 to +50°C)
Ambient temperatures	-10 to + 55°C
Nominal diameter	15 mm
Process connections	EN 1092-1, DIN, ANSI, JIS, GOST, G ¾" or G 1"
Materials	ductile iron (EN-GJS-400-18-LT), stainless steel (1.4581), cast steel (GS-45)
Pressure stages	PN10, PN16, PN25, PN40, ANSI 150
Weight	depending on the type of material and the counter that is used
Installation length	170 mm
Type of protection	IP44
Admissible relative humidity:	100% at 30°C
Approvals	domestic type approval of the PTB No: 1.32.8-5.241- 92.42 EC type approval of the PTB No: 1.32.8-5.241 91.39 OIML PER No: PTB-1.5-4035600 ATEX approvals exist; depending on the type oval gear meters can be used in explosion zone 1.

Installation hints

In installations where the fluid to be metered is pumped, the suction line should be kept as short as possible and the pumps should be located below the liquid level. The oval gear meter is installed in the pressure line. In installations where the measured medium is supplied to the meter under natural flow, there must be a static pressure of between 0.2 and 1 bar (depending on the viscosity of the liquid). Gas inclusions in the fluid as well as solids have to be avoided, since they may cause damage to the oval gear meters or false results of measurement.

Pressure shocks can also cause damages to the oval gear meters and have to be avoided. Oval gear meters shall not be used immediately after reciprocating pumps, dosing machines etc. or in applications where the flow is suddenly interrupted by cut-off devices.

The use on mobile objects, such as road tankers, ships etc. is permitted. The following conditions have to be fulfilled:

- medium mechanical vibrations up to a vibration displacement of 75µm and an acceleration of 10g or
- shocks with a duration of 6ms and an acceleration of 10g

are permitted.

For outdoor use the oval gear meter has to be protected from direct sunlight as well as precipitation by a roof. The maximum pressure loss across the oval gear meter shall not exceed 1bar.

vemm tec Messtechnik GmbH
Gartenstrasse 20 ◆ 14482 Potsdam ◆Germany ◆ Tel. +49 331 7096 0 ◆ Fax +49 331 7096270 ◆
www.vemmtec.com