



Drum-Type Gas Meters Series TG (Wet-Test)

Precision Volumetric Gas Meters for Scientific Laboratories

User Benefits

- › Highest accuracy: $\pm 0.5\%$ across full flow rate range
- › Calibration traceable to German National Primary Standard
- › Measurement of all gases and gas mixtures with equal accuracy
- › Use with extremely corrosive and inert gases
- › Lowest measurable flow rates
- › Largest selection of measuring ranges
- › Real time data acquisition option for PC (requires option »Pulse Generator«)
- › Most durable construction available, both chemically (from high-quality thermoplastics) and mechanically (stainless steel)
- › Maintenance-free (just checking of packing liquid level required)

Standard Equipment

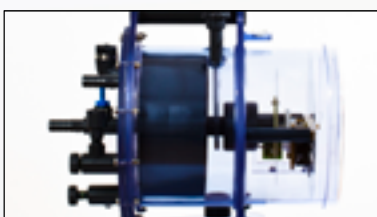
- › Magnetic coupling between measuring drum and counter: Casing thus absolutely liquid-tight
- › Multi-chamber rotary measuring drum with counter mechanism
- › Large needle-dial readout
- › 8-digit accumulating counter
- › Liquid level indicator for packing liquid (fill cup)
- › Supports for a full range of temperature devices and manometer
- › Bubble level for levelling with adjustable feet

Available Accessories

- › Windows software »RIGAMO« for data acquisition by PC
- › Pulse Generators – 50 / 200 / 2 x 200 (forward/reverse flow recognition) / 500 pulses per drum revolution
- › Thermometer (gas)
- › Thermometer (packing fluid)
- › Manometer
- › High Precision Packing Liquid Level Indicator »HPLI« (patented)
- › LCD counter, resettable
- › Remote Electronic Display Unit »EDU 32 FP« with analogue output and RS232 interface
- › Custom meter design



Precision Drum-Type Gas Meters RITTER Series TG (Wet-Test)



The TG 1 side view – note rear gas connections



Transparent front of the TG 05 (PVC/PVC) with a view of the pulse generator (option)



Meter rear view

Measurement Principle

RITTER drum-type (wet-test) gas meters work on the principle of positive displacement. The gas flow causes a rotation of the measuring drum which is partly submerged in a packing liquid (usually water or low viscous oil). The measuring drum compulsorily measures the gas volume by periodically filling and emptying the rigid measuring chambers. Coupled to the measuring drum by means of a magnetic coupling, a needle-dial and cumulating counter indicates the measured gas volume.

Accuracy

Each RITTER drum-type (wet-test) gas meter provides a measuring accuracy of $\pm 0.2\%$ or better at standard flow and $\pm 0.5\%$ across the full measurement range. Each instrument is manufactured according to the most rigorous German standards of quality control, and each meter is calibrated individually.

Measuring Range

The desired measurement range can be selected from among 8 meter sizes (types) extending from 1 ltr/h to 18,000 ltr/h.

Gas Pressure & Temperature

RITTER drum-type (wet-test) gas meters have a maximum gas inlet overpressure with polymer casings in standard version of 50 mbar / 0.725 psi (re-enforced: 500 mbar / 7.25 psi) and with stainless steel casings in standard version of 500 mbar / 7.25 psi (re-enforced: 1 bar / 14.5 psi); custom meters up to 40 bar (580 psi) are available. Pressure loss at min. / max. flow rate: 0.1 / 2 mbar, depending on the meter type. RITTER meters allow constant use temperatures ranging from -10°C to $+80^{\circ}\text{C}$ (14°F to $+176^{\circ}\text{F}$), depending on the meter material.

Measurement Standard

RITTER drum-type (wet-test) meters most accurately measure the actual volume of gas flow **directly**. This direct measurement is the major advantage and the superiority of the drum-type gas meter. Other measurement devices, which determine gas volume using secondary measurement

principles such as speed, heat capacity, hot-wire resistance or similar modalities, are less accurate when and if the correcting factor for the actual gas composition is unknown. With drum-type (wet-test) meters the condition and the composition of the gas do not influence the measurement

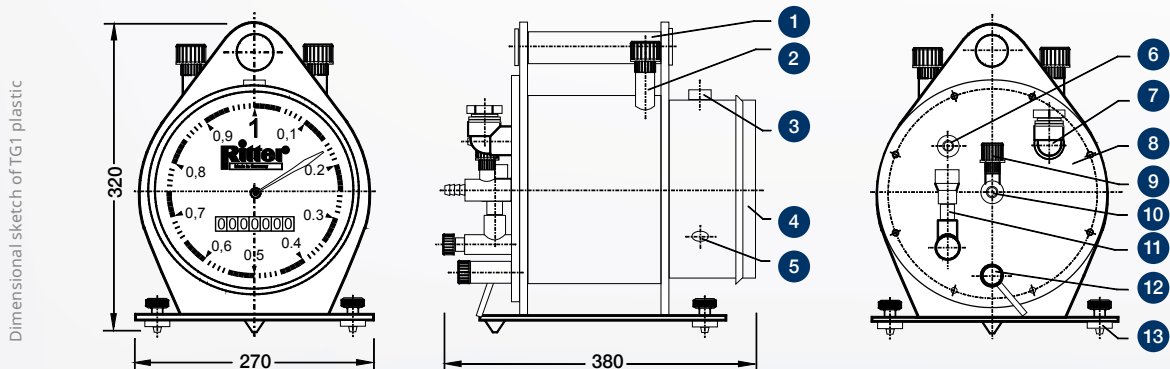
accuracy. Correcting factors which take into account gas composition, temperature, humidity etc. are not necessary with drum-type meters. However, the universal dependency of gas volume on temperature and pressure remains valid of course.

Performance Specifications

Type	Flow Rate Minimum [ltr/h]	Flow Rate Maximum [ltr/h]	Flow Rate Standard [ltr/h] ⁽¹⁾	Readout Indication Min. [ltr] ⁽²⁾	Readout Indication Max. [ltr]	Packing Fluid Required [ltr] ⁽³⁾	Measuring Drum Volume [ltr]	Pressure Loss Min. [mbar]
TG 0.5	1	60	50	0.002	9,999,999.9	3.5 / 2.5	0.5	0.4
TG 1	2	120	100	0.01	99,999,999	3.5 / 3.0	1.0	0.2
TG 3	6	360	300	0.02	99,999,999	11.0 / 5.8	3.0	0.2
TG 5	10	600	500	0.02	99,999,999	11.0 / 8.5	5.0	0.2
TG 10	20	1,200	1,000	0.10	99,999,999	21.0 / 15.5	10.0	0.1
TG 20	40	4,000	3,200	0.20	999,999,990	30.0 / 28.5	20.0	0.1
TG 25	50	7,000	5,000	0.1	999,999,990	39.0 / 42.0	25.0	0.1
TG 50	100	18,000	10,000	0.50	999,999,990	88.0 / 91.0	50.0	0.1

⁽¹⁾ The calibration is performed at standard flow and 20°C (68°F) / ⁽²⁾ Minimum dial division / ⁽³⁾ 1st value: Model 1-4 (SS) / 2nd value: Model 5-8; approx. values

**The maximum gas inlet overpressure is dependent on the casing material:
With plastic casings: 50 to 500 mbar / With SS casings: 0.5 to 40 bar**



- 1 Handle / 2 Support for: Thermometer gas and packing liquid, Manometer / 3 Level / 4 Removable cover
- 5 Pulse generator port (option) / 6 Gas outlet / 7 Filling nozzle / 8 Removable rear plate / 9 Manometer connection port
- 10 Gas inlet / 11 Filling level indicator / 12 Drainage faucet / 13 Levelling foot

Applications

RITTER drum-type (wet-test) gas meters are used universally to measure the volume of gas volumetrically in R&D laboratories and industries. Examples can be found in the petrochemical, chemical, coal mining, pharmaceutical, steel production, bio gas and synfuel industries, as well as in universities and environmental technology. Drum-type (wet test) meters are also used to calibrate other measuring devices for gas volume. The gas flow rate can be calculated and monitored by the RITTER software »RIGAMO« or Electronic

Display Unit »EDU 32 FP« (accessories). RITTER gas meters consistently provide the highest accuracy even at lowest gas flow rates with highly aggressive gases.

Data Presentation

Standard models provide a direct needle dial readout and a cumulating counter. For data acquisition and archiving by PC, the Windows software »RIGAMO« is available. For remote display of volume and flow rate the Electronic Display Unit »EDU 32 FP« (including analogue output and RS 232) can be used.

Packing Liquid

The volumetric measurement principle of drum-type gas meters requires the meter to be partly filled with a »packing liquid«. The high accuracy of RITTER drum-type gas meters is achieved by the precise setting of the packing liquid level. Ordinary tap water is a suitable packing liquid for most gases. For those applications in which water is not suitable, RITTER recommends and supplies alternatives at www.ritter.de/en/products/accessories/packing-liquids-for-drum-type-gas-meters/

Dimensions / Weight

Type	Model	Width [mm/inches]	Height [mm/inches]	Depth [mm/inches]	ø Gas Inlet/Outlet [mm]	Weight [kg] (without packing fluid)
TG 0.5	1 / 2 / 3 / 4	265 / 10.4	310 / 12.2	380 / 15.0	14	8.3 / 8.2 / 8.2 / 8.5
	5 / 6 / 7 / 8	270 / 10.6	320 / 12.6	350 / 13.8	16	4.0 / 3.0 / 5.0 / 3.0
TG 1	1 / 2 / 3 / 4	265 / 10.4	310 / 12.2	380 / 15.0	14	8.5 / 8.3 / 8.3 / 8.9
	5 / 6 / 7 / 8	270 / 10.6	320 / 12.6	380 / 15.0	16	4.3 / 3.1 / 5.1 / 3.1
TG 3	1 / 2 / 3 / 4	363 / 14.3	410 / 16.1	445 / 17.5	14	15.8 / 15.7 / 15.7 / 16.2
	5 / 6 / 7 / 8	330 / 13.0	375 / 14.8	405 / 15.9	16	6.3 / 4.5 / 8.1 / 4.5
TG 5	1 / 2 / 3 / 4	363 / 14.3	410 / 16.1	445 / 17.5	14	15.0 / 14.8 / 14.8 / 15.2
	5 / 6 / 7 / 8	330 / 13.0	375 / 14.8	465 / 17.7	16	7.1 / 4.9 / 9.2 / 4.9
TG 10	1 / 2 / 3 / 4	420 / 16.5	470 / 18.5	590 / 23.2	26	25.6 / 25.2 / 25.2 / 25.8
	5 / 6 / 7 / 8	410 / 16.1	470 / 18.5	560 / 22.0	25	10.6 / 7.8 / 13.6 / 7.8
TG 20	1 / 2 / 3 / 4	484 / 19.1	560 / 22.1	610 / 24.0	26	32.5 / 32.1 / 32.1 / 33.3
	5 / 6 / 7 / 8	505 / 19.9	545 / 21.5	615 / 24.2	25	18.0 / 13.4 / 23.2 / 13.4
TG 25	1 / 2 / 3 / 4	517 / 20.4	560 / 22.0	645 / 25.4	33	38.0 / 37.6 / 37.6 / 38.8
	5 / 6 / 7 / 8	550 / 21.7	640 / 25.2	665 / 26.2	32	26.7 / 19.4 / 34.5 / 19.4
TG 50	1 / 2 / 3 / 4	675 / 25.6	725 / 28.5	740 / 29.1	40	65.5 / 64.5 / 64.5 / 68.7
	5 / 6 / 7 / 8	680 / 26.8	725 / 28.5	755 / 29.7	40	57.0 / 32.0 / 73.3 / 40.7



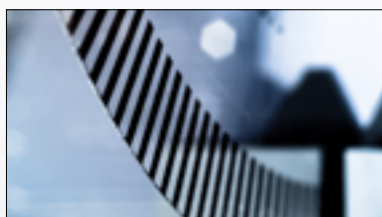
Thermometers gas & packing liquid, manometer (accessories)



High Precision Level Indicator »HPLI« (option)



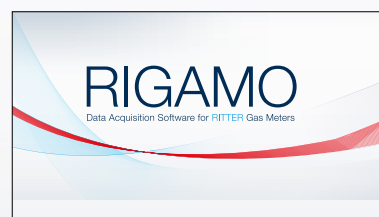
LCD counter, resettable (option)



Pulse Generator (option)



Electronic Display Unit »EDU 32« (accessory)



Data acquisition software »RIGAMO« (accessory)



Materials of Construction (Models)

RITTER gas meters are manufactured from 5 different excellent materials: Polyvinyl Chloride (PVC), Polypropylene (PP), Polyvinylidene Fluoride (PVDF), PE-el (polyethylene electrically conductive). The casing can be manufactured from the same material as the drum or out of stainless Chrome-Titanium steel (316 Ti) in order to meet higher requirements for pressure or impact strength. With this wide selection of materials, the user is able to measure even highly aggressive gases with laboratory accuracy.

The desired measurement range can be selected from among 8 meter sizes (types) from 1 ltr/h to 18,000 ltr/h at a gas temperature ranging from -10°C to 80°C. The solidly manufactured casing of the standard polymer meters is designed to withstand a maximum gas inlet overpressure of 50 to 500 mbar (polymer casings) or 500 mbar to 1 bar (stainless steel casings). Meters for higher pressure ranges up to 40 bars are available.

Models & Materials

Casing	Measuring Drum	Model No.	Max. Constant Use Temperature	
			[°C]	[°F]
PVC-transparent	PVC-grey	5	40	104
PP	PP	6	80	176
PVDF	PVDF	7	80	176
PE-el	PE-el	8	60	140
SS (316 Ti)	PVC-grey	1	40	104
SS (316 Ti)	PE-el	2	60	140
SS (316 Ti)	PP	3	80	176
SS (316 Ti)	PVDF	4	80	176

PVC = Polyvinyl Chloride
 PE-el = Polyethylene electrically conductive
 PP = Polypropylene
 PVDF = Polyvinylidene Fluoride
 SS = Stainless steel Chrome-Nickel-Molybdenum-Titanium
 US: 316 Ti, GER: 1.4571



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