



INDUSTRIAL GAS METERS

Industrial Gas Meters

For fiscal and non-fiscal measures

[Turbine meters](#)



ZENNER
All that counts.



- Turbine gas meter with measuring cartridge
- Sizes G 65 - G 1000
- Flow rates: 5 - 1600 m³/h
- Report 1:20
- Nominal diameters DN 50 - DN 150
- PN 10-16 and ANSI pressure fields 150-600
- Length 3 DN
- Suitable for outdoor installations (IP67)
- Standard flow rectifier Thermowell on the case of the counter (on request)
- PTB and European (CEE) and international approvals.
- Verified and certified by the Office National Metric.
- Suitable for natural gas, gas refinery, city gas, butane, ethylene, air, nitrogen. Other gases a request.
- High pulse generator Frequency (optional)
- ENCODER Absolute S1 (optional)

TRZ2

Tax Turbine Gas Meter

The gas flowing through the meter sets the turbine wheel in motion. The number of revolutions of the wheel is proportional to the volume passing through the meter. To optimize measurement performance a patented flow straightener eliminates flow disturbances such as swirl or asymmetric flow that are e.g. created by bends or T-pieces upstream of the meter. After the flow conditioner the cross section of the meter is reduced to increase flow velocity and consequently increase the driving impulse of the medium on the turbine wheel.

The combination of flow conditioning and optimized measurement unit incl. the turbine wheel make it possible to measure the flow rate accurately even at low flows and pressures. The shaft on which the turbine wheel is fixed is held in place by robust ball bearings that help to maintain high performance for a long time with minimized maintenance needs. Via gears and a magnetic coupling the revolutions of the turbine wheel are transmitted to the 8-digit mechanical counter located in the pressure-less index head. The outlet of the meter has been optimized to decrease pressure loss and create optimal flow conditions after the meter.

The measurement cartridge is supported by an O-ring, it is free of voltages because it is separated from the case and is not affected by environmental conditions such as temperature fluctuations.

Applications

- Distribution networks
- Gas transportation

The TRZ2 series is particularly suitable for its high measurement accuracy, stability over time and its compact design.
- Sample counter for testing facilities

Given the high precision and reproducibility, TRZ2 turbines are particularly suitable for use as a sample counter.
- Compliance

The TRZ2 meters of Elster Instromet are built according to DIN EN ISO 9001: 2000 (DIN EN ISO 14001). They meet European requirements and international standards (EN 12261, OIML, etc.)
- Materials

Depending on the pressure, the case is made of ductile iron, steel or welded steel.

The meters meet the strictest safety standards and are fireproof (HTB). To achieve the highest measurement accuracy, the impeller is made of aluminum.

TRZ2 / Tax Turbine Gas Meter

Precision

Limitations

Low pressure (LP):

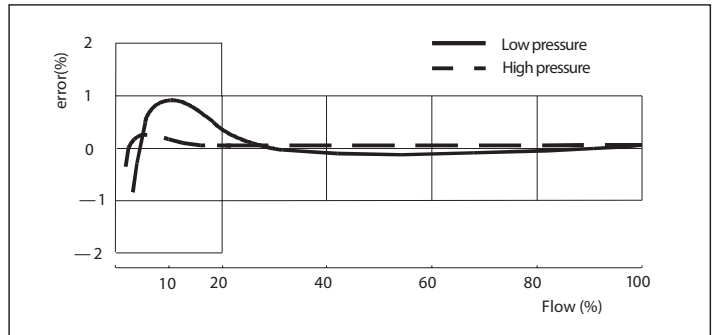
± 1% between $0,2 Q_{max}$ and $1,0 Q_{max}$

± 2% between Q_{min} and $0,2 Q_{max}$

High pressure (HP):

± 0,5% between $0,2 Q_{max}$ and $1,0 Q_{max}$

± 1% between Q_{min} and $0,2 Q_{max}$



Measuring range

The measuring range in low pressure is 1:20 and 1:30 (see technical data table).

As the pressure increases, the value of the minimum flow rate Q_{min} is lowered so the field actual measurement expands Q_{min} HP deduces from the table on the side.

G	Q_{max} m ³ /h	Q_{min} LP m ³ /h	Current pressure (absolute) in bar							
			5	10	15	20	25	30	35	40
			Q_{min} HP m ³ /h							
65	100	5	3	2	2	1	1	1	1	1
100	160	8	4	3	3	2	2	2	2	2
160	250	13	7	5	4	4	3	3	3	3
250	400	20	11	8	6	6	5	5	4	4
400	650	32	17	12	10	9	8	7	7	6
650	1000	50	27	19	16	13	12	11	10	10

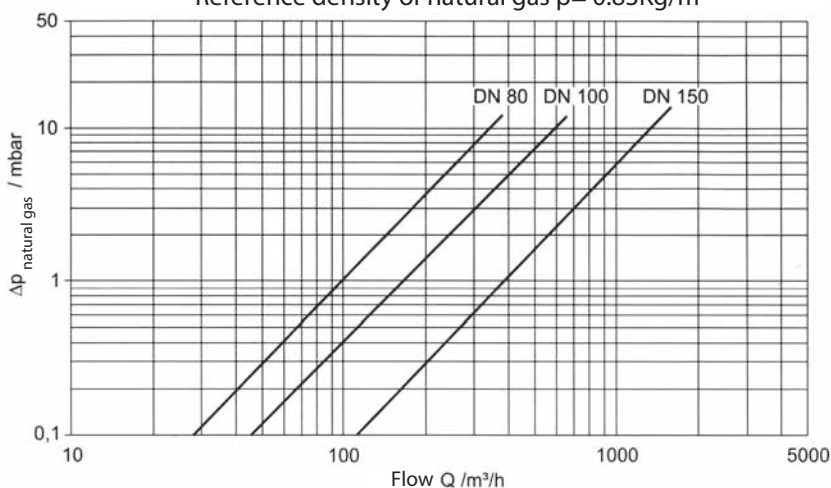
The measurement fields for other quantities are calculated by multiplying the values on the side by 10 or by 100. Eg to get the G1000 values, multiply those of the G100 by 10.

Pressure loss

Load loss diagram

Pressure loss TRZ2

Reference density of natural gas $p = 0.83 \text{ Kg/m}^3$



Loss of load under reference conditions

$$\Delta p_b = \Delta p_1 \cdot \rho_b$$

Density under operating conditions

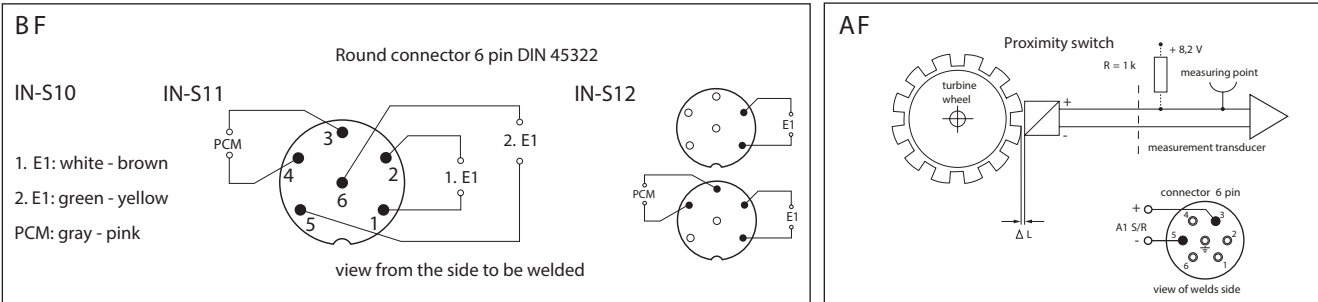
$$\rho_b = \rho_n \cdot \frac{p_b}{p_{atm}}$$

Pressure loss for any type of gas G

$$\Delta p_G = \Delta p_{ng} \cdot \frac{\rho_G}{\rho_{ng}}$$

Sign	Description	unità	Sign	Description	unità
ρ_b	Density under operating conditions	kg/m ³	p_b	Absolute operating pressure (overpressure)	bar
ρ_n	Density under standard conditions	kg/m ³	Δp_1	Pressure loss for natural gas at 1 bar	mbar
ρ_G	Density of any gas	kg/m ³	Δp_b	Loss of natural gas load at operating conditions	mbar
ρ_{ng}	Natural gas density	kg/m ³	Δp_{ng}	Pressure loss for natural gas	mbar
p_{atm}	Absolute atmospheric pressure	bar	Δp_G	Pressure loss for any gas	mbar

Pulse generators



Maintenance

• Self-lubricating version that does not require maintenance.
Recalibration: 8 years in Germany

• Version with oil pump: periodic lubrication (frequency depends on the type of gas) using the manual pump.
Recalibration: >12 years in Germany

Inspections and approvals

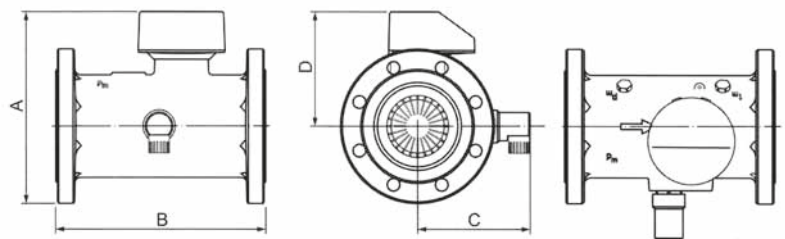
The ELSTER TR22 turbine gas meters are designed, built and tested in accordance with:

- EC 97/23 / EC directives concerning pressure equipment
- EC Directive 94/9 / EC concerning explosion protection
- EC Directives 71/318 / EC regarding volumetric meters
- Apply German and European regulations (EN 12261, AD 2000 flyers)
- Law provision OIML R 6 and R 32

All our produced meters are tested with test benches certified and approved by the PTB.
Depending on the customer's request, specific tests can be performed in low or high pressure.

Dimensions

Dimensions mm	Diameter			
	DN 50	DN 80	DN 100	DN 150
A	258	255	285	335
B	150	240	300	450
C	-	150	165	200
D	175	150	165	185
Weight (kg)	14	17	23	44,5



Technical Data													
Measuring data	Diameter	DN	50	80	80	80	100	100	100	150	150	150	150
	Meter size	G	65	100	160	250*	160	250	400*	250	400	650*	1000*
	Measuring rang	Q_{min}	5	8	12,5	20	12,5	20	32	20	32	50	80
		Q_{max}	100	160	250	400	250	400	650	400	650	1000	1600
	Δp ** at Q_{max}	[mbar]	11	2	5	12	2	5	13	1	2	6	15
Housing **	Temperature range	-25 °C to +70 °C											
	Pressure rates	PN 10, 16, 25, 40, 64, 100 / ANSI 150, 300, 600											
	Dimensions	A mm	165	215	215	215	273	273	273	356	356	356	356
		B mm	155	172	172	172	185	185	185	210	210	210	210
		C mm	150	240	240	240	300	300	300	450	450	450	450
		D mm	75	100	100	100	120	120	120	180	180	180	180
		E mm	135	157	157	157	170	170	170	193	193	193	193
F mm		280	200	200	200	210	210	210	235	235	235	235	
Weight [kg]***	PN10/16, ANSI150	(GGG)	10	21	21	21	29	29	29	53	53	53	53
	PN25/40, ANSI300	(steel)	13	32	32	32	50	50	50	91	91	91	91
	PN64/100, ANSI600	(steel)	15	33	33	33	50	50	50	97	97	97	97
Outputs / pulse values *** [imp/m ³]	LF-Type E1	(Reed switch)	10	1	1	1	1	1	1	1	1	1	0.1
	HF-Type A1R	(inductive)	28000	10500	10500	10500	6630	6630	6630	6630	2560	2560	2560
	HF-Type A1S	(inductive)	-	21000	21000	21000	13260	13260	13260	-	5120	5120	5120

* Meter also available with measuring range 1:30 ** Δp for natural gas at 1 bar abs. *** Small deviations are possible



SM-RI-X

DN200÷DN600

Many types of gas can be measured such as natural gas, manufactured gas, propane, butane, ethylene, air and nitrogen (other gases on request).

Measuring range

The measuring range of the SM-RI-X turbine meter, determined at atmospheric conditions, complies with European standards.

For higher operating pressures, the minimum flow rate Q_{\min} is given by the following formula:

$$Q = Q_m \sqrt{\frac{P(\text{atm})}{p} \times \frac{1.29}{\rho}}$$

Where is it:

Q = minimum flow rate under operating conditions

Q_m = minimum flow rate at atmospheric conditions (see Table)

p = operating absolute pressure

$p(\text{atm})$ = atmospheric pressure in bar ass.

ρ = density of the gas at atmospheric pressure

Applications

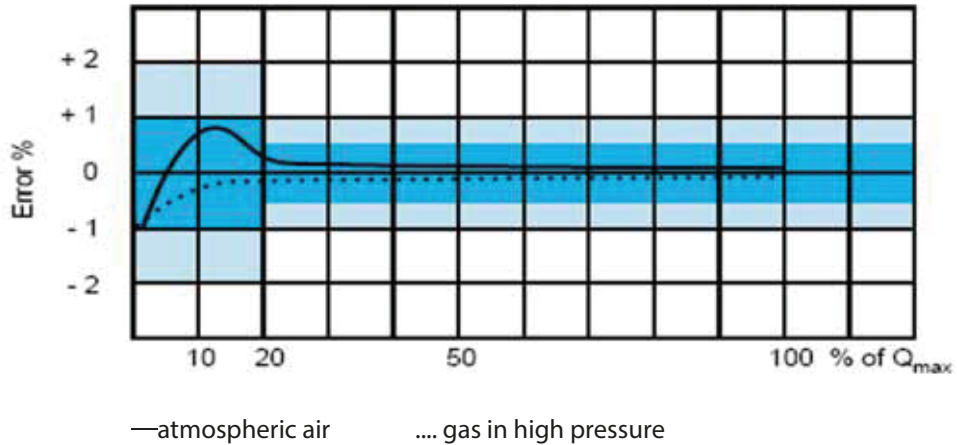
Gas transmission and distribution networks, master counter.

Type of fluid:

Natural gas, city gas, petroleum gas, propane, butane gas, ethylene, air, nitrogen.

- Pressure from PN10 to PN100 (ANSI 125 - ANSI 600)
- Measurement accuracy:
0.5% from $0.2 Q_{\max}$ to Q_{\max}
1% from Q_{\min} to $0.2 Q_{\max}$
- Repeatability: 0.1%
- Flow rates: up to 25.000 m³/h
- Report 1:20
- Sizes G1000 - G16.000
- Nominal diameters
DN 200 - DN 600
(higher diameters on request)
- Length 3 DN
- Possible combination with volume correctors:
- 2 BF pulse generators
- pressure outlet pr
- Lubrication: pump type
- Horizontal installation.
- PTB / NMI and European (CEE) approvals.
- Verified and certified by the Office National metric.

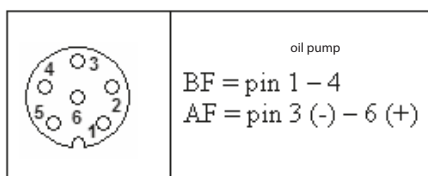
Measurement accuracy - Calibration curve



FIELD OF MEASUREMENT - PRESSURE LOSS - IMPULSE VALUES

DN mm (inch)	Size G	Measuring range m ³ /h Q _{min} - Q _{max}	Pressure loss at Q _{max} with natural gas r = 0.8 Kg/m ³	m ³ per lap	BF pulses per m ³		AF Index Hz a Q _{max}	n. of impeller blades	AF impeller Hz to Q _{max}
200 8"	G 650	100 - 1000	1.5	10	0.1	1	55	20	770
	G 1000	80-1600	3	10	0.1	1	85		1180
	G 1600	130-2500	8	10	0.1	1	83		1060
250 10"	G 1000	80-160	1.5	10	0.1	1	88	24	825
	G 1600	130-2500	4.5	10	0.1	1	142		1320
	G 2500	200-4000	10	10	0.1	1	126		1200
300 12"	G1600	130-2500	1.5	10	0.1	1	48	24	810
	G 2500	200-4000	5	10	0.1	1	76		1270
	G 4000	320-6500	14	10	0.1	1	70		1175
400 16"	G 2500	200-4000	1.5	10	0.1	1	160	24	660
	G 4000	320-6500	5	10	0.1	1	256		1055
	G 6500	500-10000	13	10	0.1	1	220		890
500 20"	G 4000	320-6500	1.5	10	0.1	1	130	24	530
	G 6500	320-6500	6.5	10	0.1	1	210		865
	G 10000	500-10000	15	10	0.1	1	192		770
600 24"	G 6500	500-10000	1.5	100	0.1	0.1	48	24	470
	G 10000	800-16000	5	100	0.01	0.1	75		720
	G 16000	1300-25000	10.5	100	0.01	0.1	68		650

ELECTRICAL CONNECTIONS



LUBRICATION

The gas turbine meters type TRZ-2 (DN50 DN150) are self-lubricated.
 The SM-RI-X type meters (DN200 DN600) are fitted as standard with the pump lubrication.
 The lubrication frequency depends on the operating conditions.
 If the gas is dirty, the meter must be lubricated more often.

Under normal conditions a counter should be lubricated 2-3 times a year.

It is recommended to respect the following table:

Nominal diameter		Quantity cc
mm	inc	
200	8	4
250	10	5
300	12	6
400	16	8
500	20	10
600	24	12

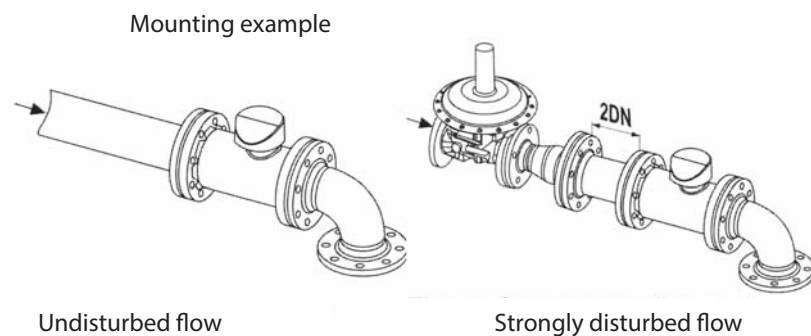
Lubrication oil: ISOFLEX PDP 38



INSTALLATION

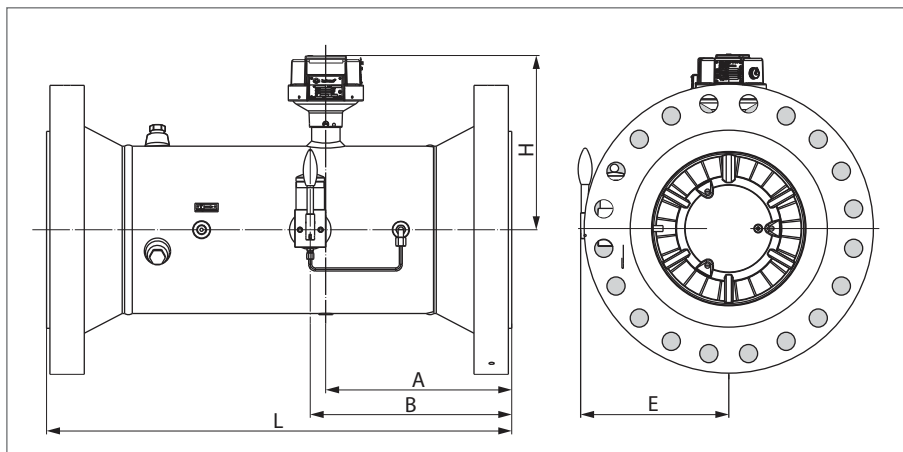
The gas turbine meters are built in accordance with European and even international directives, in particular OIML, ISO and DVGW.
 The gas turbine meters up to DN 200 can be installed both horizontally and vertically.
 For the DN200 if installed vertically it must be specified at the time of order.
 The metering head can be rotated by 350°
 From DN 250 to DN600 only horizontal installation is possible.

Inlet piping: ≥ 2 DN independent of flow disturbance
 Outgoing piping: same diameter as the meter



Dimensions and weights

Diameter	Meter size	Dimensions [mm]					Weight [Kg]					
		A	B	E	H	L	PN pressure rates	Housing material	Weight	ANSI pressure rates	Housing material	Weight
DN 200 8"	G 650 G 1000 G 1600	240	240	273	298	600	PN 10	GGG-40 (Steel)	70 (77)	ANSI150	GGG-40 (Steel)	70 (91)
							PN 16	GGG-40 (Steel)	70 (77)	ANSI300	Steel	117
							PN 25	Steel	89	ANSI400	Steel	135
							PN 40	Steel	98	ANSI600	Steel	155
							PN 64	Steel	125			
							PN 100	Steel	161			
DN 250 10"	G 1000 G 1600 G 2500	300	360	327	314	750	PN 10	Steel	90	ANSI150	Steel	108
							PN 16	Steel	95	ANSI300	Steel	148
							PN 25	Steel	108	ANSI400	Steel	170
							PN 40	Steel	128	ANSI600	Steel	236
							PN 64	Steel	156			
							PN 100	Steel	220			
DN 300 12"	G 1600 G 2500 G 4000	360	390	352	338	900	PN 10	Steel	120	ANSI150	Steel	160
							PN 16	Steel	130	ANSI300	Steel	210
							PN 25	Steel	150	ANSI400	Steel	240
							PN 40	Steel	180	ANSI600	Steel	290
							PN 64	Steel	240			
							PN 100	Steel	340			
DN 400 16"	G 2500 G 4000 G 6500	480	510	395	380	1200	PN 10	Steel	350	ANSI150	Steel	400
							PN 16	Steel	380	ANSI300	Steel	460
							PN 25	Steel	410	ANSI400	Steel	490
							PN 40	Steel	460	ANSI600	Steel	580
							PN 64	Steel	510			
DN 500 20"	G 4000 G 6500 G 10000	600	630	445	431	1500	PN 10	Steel	550	ANSI150	Steel	650
							PN 16	Steel	600	ANSI300	Steel	800
							PN 25	Steel	640	ANSI400	Steel	830
							PN 40	Steel	690	ANSI600	Steel	980
DN 600 24"	G 6500 G 10000 G 16000	720	750	495	482	1800	PN 10	Steel	900	ANSI150	Steel	1050
							PN 16	Steel	950	ANSI300	Steel	1300
							PN 25	Steel	1000	ANSI400	Steel	1350





3,200

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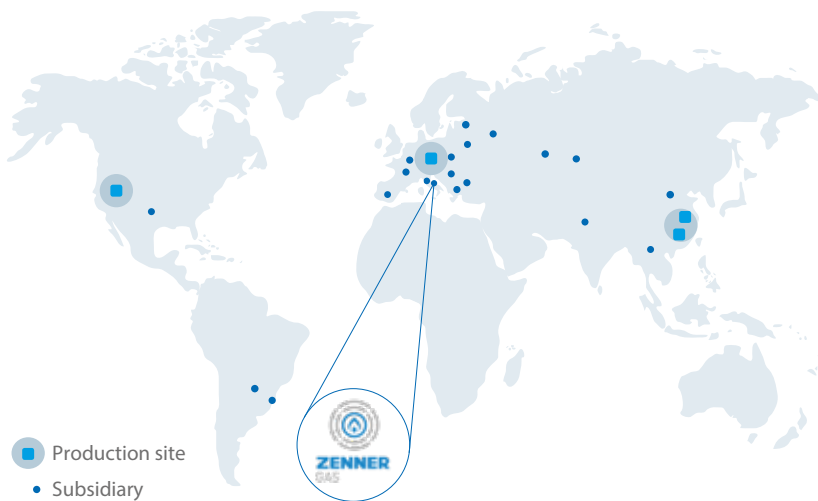
Locations in Europe

- Germany: Saarbrücken, Mulda, Mannheim
- Bulgaria: Sofia
- France: Limoges
- Italy: Bologna, Pescara
- Kazakhstan: Aktobe
- Poland: Warsaw
- Romania: Bucharest
- Russia: St. Petersburg, Moscow, Tjumen
- Spain: Madrid
- Hungary: Budapest
- Belarus: Minsk

We export our products in

90

countries.



- Production site
- Subsidiary

20

locations worldwide with four production sites in Europe, Asia and the US.

Locations worldwide

- Brazil: Novo Hamburgo
- Paraguay: Asunzion
- China: Fuzhou, Beijing, Shanghai
- Vietnam: Hanoi
- India: Faridabad
- USA: Banning, CA, Addison, TX

Innovative measuring equipment for global markets for over

110

years. Est. in 1903.

The data shown in the catalogs, the illustrations and the drawings are indicative and do not commit the ZENNER Gas S.r.l. It is also reserved the faculty to make to the models those changes that experience and technical advances suggest.

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