

## LG VENTURI FLOW METERS

### Summary

LG type venturi standard flow element has a long history and it is a widely used flow measuring instrument, with high accuracy, stable performance, low pressure loss (generally between 5% to 20% of the differential pressure value), easy to maintain, especially in the energy-saving work condition, it has the advantages of accurate measurement and reduced energy consumption, and has broad prospects in use.



### Operating Principle

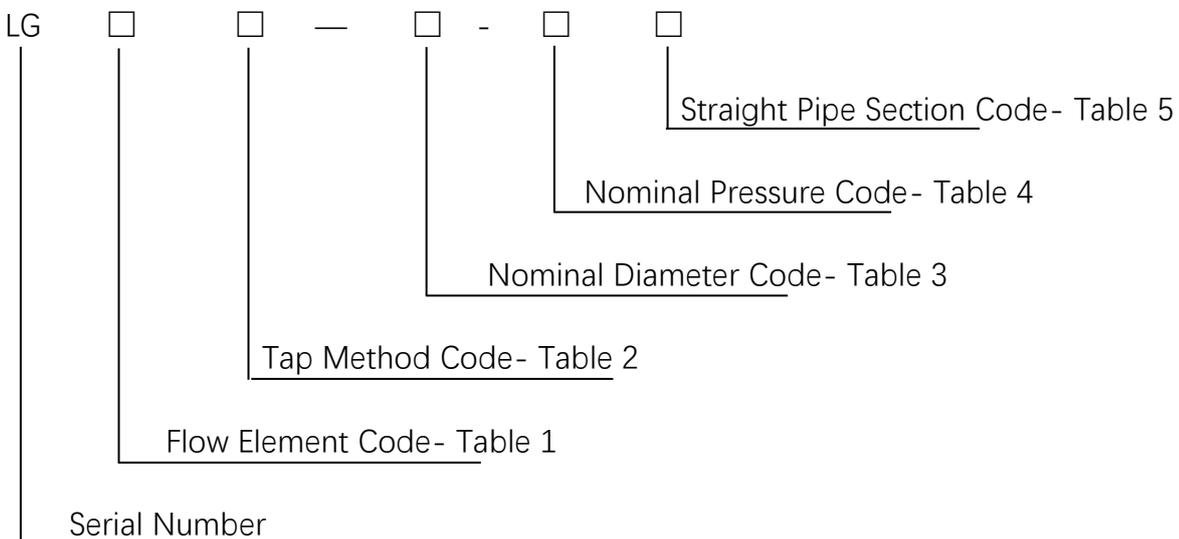
In the pipeline filled with single-phase continuous fluid, install a flow element (such as a venturi). When the fluid passes through the orifice of the flow element, the vapor forms a local contraction, the flow velocity increases, the kinetic energy increases, and the static pressure decreases. There is a static pressure difference between the front and back of the flow element, that is,  $\Delta P = P1 - P2$ . If the area of the orifice is  $F$ , the mass flow of the fluid is  $q_m$ , the volume flow is  $q_v$ , and the density is  $\rho$ , according to the principle of flow continuity and Bernoulli equation can derive the relationship between pressure difference and fluid flow:

$$q_m = \alpha F \sqrt{\Delta p \rho} \text{ or } Q_v = \alpha F \sqrt{\Delta p / \rho}$$

In the formula,  $\alpha$  is the flow coefficient. It can be seen from the above relationship that if the orifice area and fluid density are constant, the flow rate is proportional to the square root of the pressure difference, that is, as long as the pressure difference is measured, the flow rate can be calculated. The flow element measures the fluid flow rate based on this principle.

### Model Selection Table

1. Model



**Table 1 Flow Element Code and Meaning**

Code	Meaning	Caliber
J	Classic Venturi Tube with Machined Shrinkage Section	DN50-DN250
H	Classic Venturi Tube for Shrinking Section of Thick Welded Iron Plate	More than DN350

**Table 2 Tap Method and Meaning**

Code	Meaning
T	Tap Equalizing Ring
Z	Drilling Tap

**Table 3 Nominal Diameter Code and Meaning**

Code		1	2/11	3/12	4/13	5/14	6/15	7/16	8/17	9/18	10/19
DN	mm	10	15	20	25	32	40	50	65	80	100
	in		1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4
Code		20/51	21/52	22/53	23/54	24/55	25/56	26/57	27/58	28/59	30/61
DN	mm	125	150	200	250	300	350	400	450	500	600
	in	5	6	8	10	12	14	16	18	20	24
Code		32/63	34/65	36/67	38/69	40/71	42/73				
DN	mm	700	800	900	1000	1100	1200				
	in	28	32	36	40	44	48				

**Table 4 Nominal Pressure Code and Meaning**

Code		3	4	5	6	7	8	9	10	11	12
PN	MPa	1.6	2.0	2.5	4.0	5.0	6.3	10.0	11.0	15.0	16.0
	Class		150			300			600	900	
Code		13	14	15/16							
PN	MPa	25.0	26.0	42.0							
	Class		1500	2500							

**Table 5 Straight Pipe Section Code and Meaning**

Code		A	B	C	D	E	F
Meaning	Flow Element	Flow Element, Mounting Flange	Flow Element, Mounting Flange, Upstream and downstream straight pipe section	Flow Element, Mounting Flange, Upstream and downstream straight pipe section, Upstream and downstream connection flange	Flow Element, Mounting Flange, Upstream and downstream straight pipe section, Upstream connection flange	Flow Element, Mounting Flange, Upstream and downstream straight pipe section, Downstream connection flange	Welding Structure

2. Executive Standard

2.1 Flow Element Executive Standard

Code	Meaning	Standard Code
J	Classic Venturi Tube for Machined Shrinkage Section	GB/T2624—2006 (ISO5167—1—2003)
H	Classic Venturi Tube for Shrinking Section of Thick Welded Iron Plate	GB/T2624—2006 (ISO5167—1—2003)

For example, DN50 CL300 flange connection tap equalizing ring venturi tube model is LGJT-7-7A

2.2 Flange and Gasket Executive Standard

Flange and gasket standards can be selected from HG/T20592 ~ 20614-09 (European system) or HG/T20615 ~ 20635-09 (American system) or other standards.

Order Requirements

1. When ordering flow element, please fill in the flow element specification table

(Refer to the table below)

		Flow Element Order Parameters Table		Project No.	
				Document No.	
				Page No.	
Data			Calculation		
Operating Conditions	Medium Name		Flow Element Type		
	Process Temperature °C		Tap Method		
	Operation Pressure MPa		Instrument Scale		
			Instrument Differential Pressure kPa		
	Flow	Liquid kg/h	Max	Limitation of Min Flow	
		Vapor kg/h	Normal	Reynolds number(normal flow) Re	
		Gas Nm3/h	Min	Area of Expansion Correction Coefficient Fa	
				Expansion Coefficient ε	
			Flow Coefficient α		
			Uncertainty %		
			Permanent Pressure Loss Pa		
	Operating Density kg/m <sup>3</sup>		Diameter Ratio βt		
	Dynamic Viscosity mPa·s		Flow Element Hole Diameter or Round Height mm		
	Kinematic Viscosity mm <sup>2</sup> /s		1/4 Arc Radius Or Eccentricity mm		
Relative Humidity (φ) %					
Compression Factor (Z)		Flow Element Standard			
Isentropic Index (cp/cv)					

Allowable Pressure Loss Pa		Specification	
Pipe	Nominal Diameter(DN)	Model	
	Pipeline No.	Nominal Diameter(DN)	
	Outer Diameter/Inner Diameter	Nominal Pressure(PN) MPa	
	Material	Flange Standard	
		Flange Inner Diameter	mm
		Structure Length	mm
		Tap Dimension	mm
		Tap Position	
		Material	Flow Element
			Flange
			Bolt
			Nut
			Gasket
Notes			

2. Our company can provide users with the following services:

2.1 Provide a complete set of the above-mentioned various specifications of flow element.

2.2 Provide flow element calculation for users, including:

- 1) Knowing the aperture diameter  $d_{20}$  of the flow element and the meter scale flow rate, under the new working conditions, find the new upper limit of the differential pressure  $H_{max}$  of instrument;
- 2) Knowing the aperture diameter  $d_{20}$  of the flow element, the upper limit  $H_{max}$  of the instrument differential pressure and the scale flow rate of the original design instrument, under the new working conditions, find the new scale flow rate of instrument.

2.3 According to user requirements or drawings to manufacture the flow element.