

## LG NOZZLE FLOW METERS

### Summary

The LG type flow measurement flow element is the most widely used flow measurement instrument. It has the advantages of simple structure, easy installation, stable performance, and high accuracy. It can be used for liquid, vapor and gas flow measurement in modern industry. The LG type flow measurement flow element produced by our company adopting advanced calculation methods and precise processing methods has a wide range of varieties (in line with GB/T2624-2006, ISO5167-1-2003, BS1042-1989, American Mechanical Engineering Association standards, etc.). With complete specifications, it is widely used in petroleum, chemical, electric power, light industry, water supply, gas transmission and other fields.



### Operating Principle

In the pipeline filled with single-phase continuous fluid, install a flow element (such as a nozzle). 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,  $\Delta P = P_1 - P_2$ . 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:

$$q_m = \alpha F \sqrt{\Delta P \rho} \quad \text{or} \quad q_v = \alpha F \sqrt{\Delta P / \rho}$$

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.

### Technical Parameters

- Nominal diameter: DN50~DN500 (standard nozzle)  
DN50~DN600 (long diameter nozzle)
- Nominal pressure: 0~42.0MPa
- Aperture ratio:  $0.3 \leq \beta \leq 0.8$  (standard nozzle)  
 $0.2 \leq \beta \leq 0.8$  (long diameter nozzle)
- Range ratio: 1 : 10
- Accuracy:  $\pm 1\%$
- Temperature:  $-196 \text{ C} \leq T \leq +650 \text{ C}$

### Model Selection Table

#### 1. Model

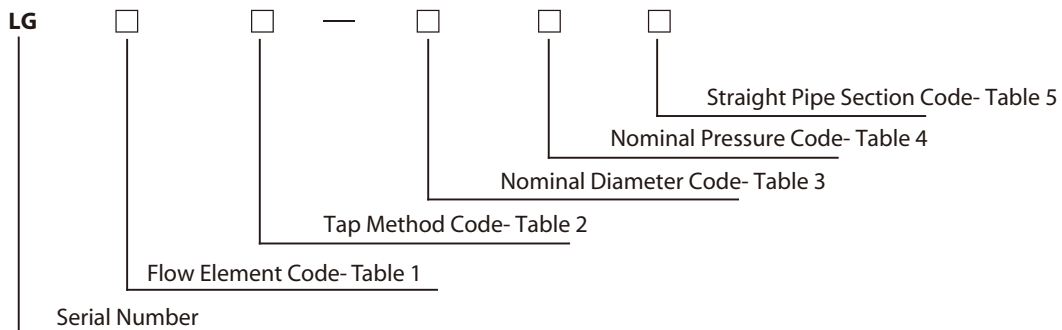


Table 1 Flow Element Code and Meaning

Code	Meaning	Code	Meaning
M	ISA1932 Nozzle	C	Long Diameter Nozzle

Table 2 Tap Method and Meaning

Code	H	D
Meaning	Corner Ring Tap	Diameter Tap

Table 3 Nominal Diameter Code and Meaning

Code		01	016	02	026	03	04	05	06	08	10
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		12	15	20	25	30	35	40	45	50	60
DN	mm	125	150	200	250	300	350	400	450	500	600
	in	5	6	8	10	12	14	16	18	20	24
Code		70	80	90	100	105	110	115	120	125	130
DN	mm	700	800	900	1000	1050	1100	1150	1200	1250	1300
	in	28	32	36	40	42	44	46	48	50	52

Table 4 Nominal Pressure Code and Meaning

Code		01	02	03	04	05	06	10	11	15	16
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		26	42								
PN	MPa	26.0	42.0								
	Class	1500	2500								

Table 5 Straight Pipe Section Code and Meaning

Code		A	B	C	D	E	F
Unit	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
M	ISA1932 Nozzle	GB/T2624—2006 ( ISO5167—1—2003 )
C	Long Diameter Nozzle	GB/T2624—2006 ( ISO5167—1—2003 )

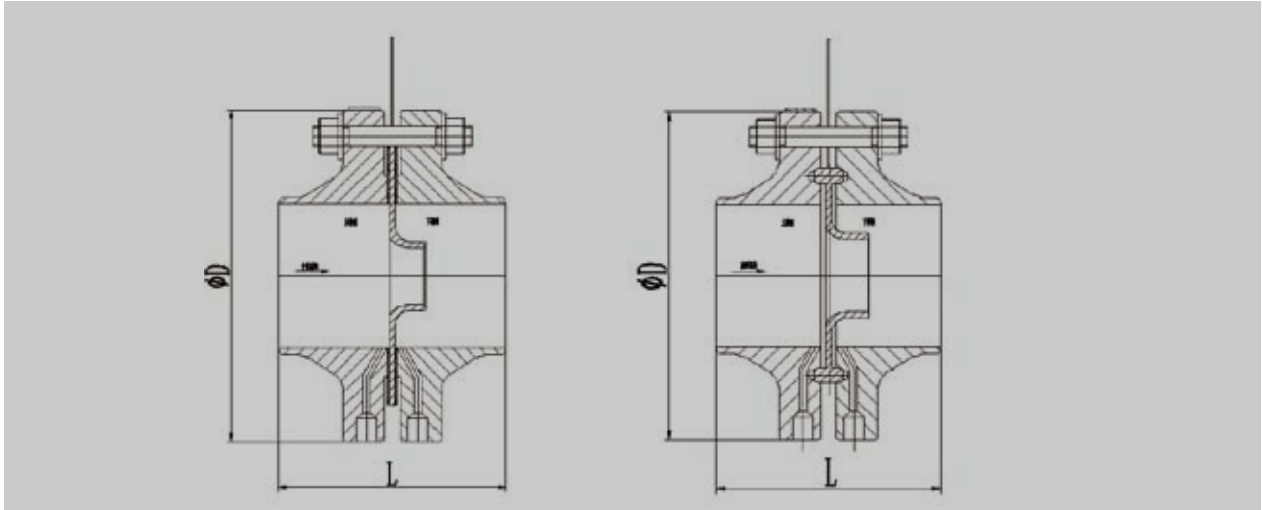
For example, corner tap standard nozzle selection of DN50 CL300 is LGMH-0505A.

### 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.

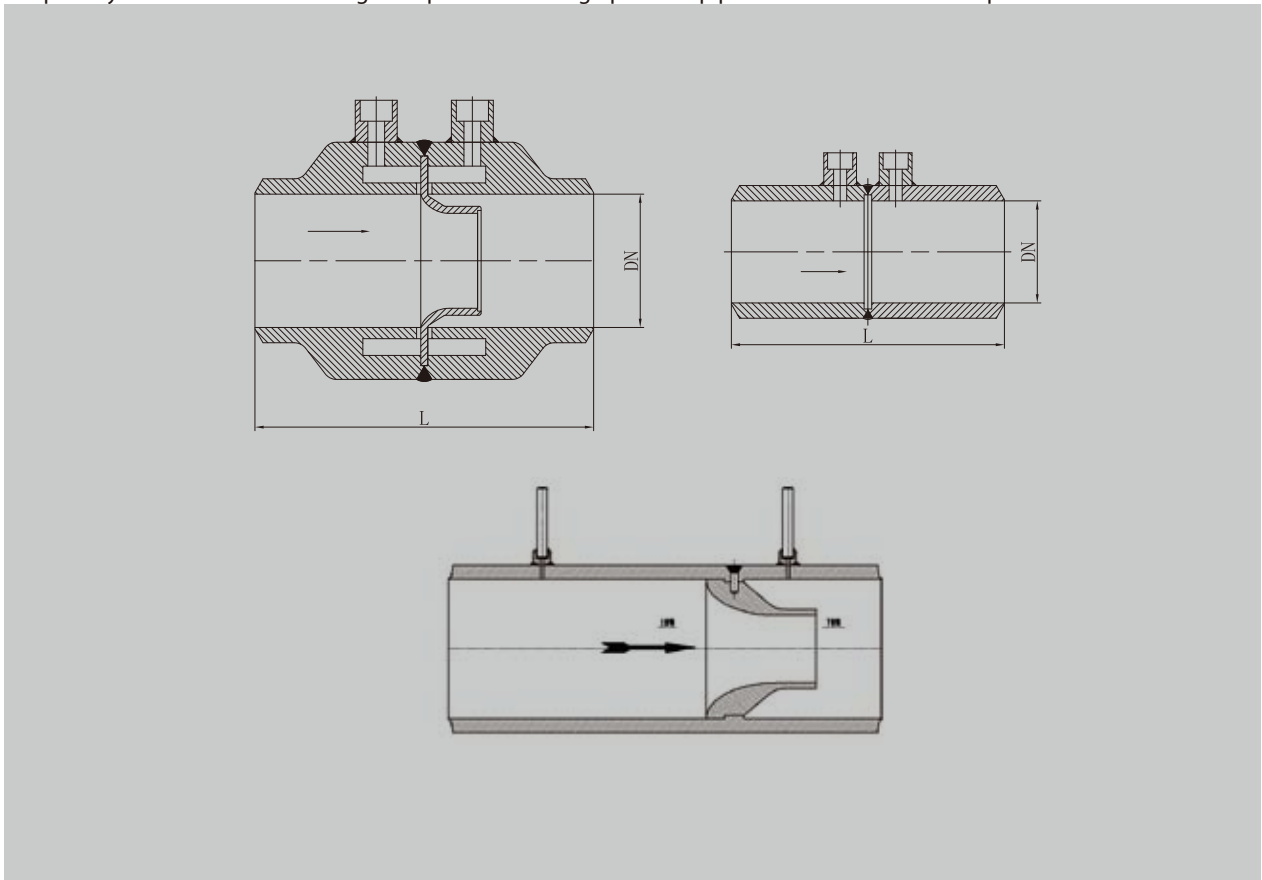
### 3. Basic Structure

#### 3.1 Flange to Clamp Type



#### 3.2 Welding Flow Element

This is a kind of flow element. It has the characteristics of simple structure, cost saving, short production cycle and no leakage. It is especially suitable for industrial high temperature and high pressure pipeline medium flow and vapor flow measurement.

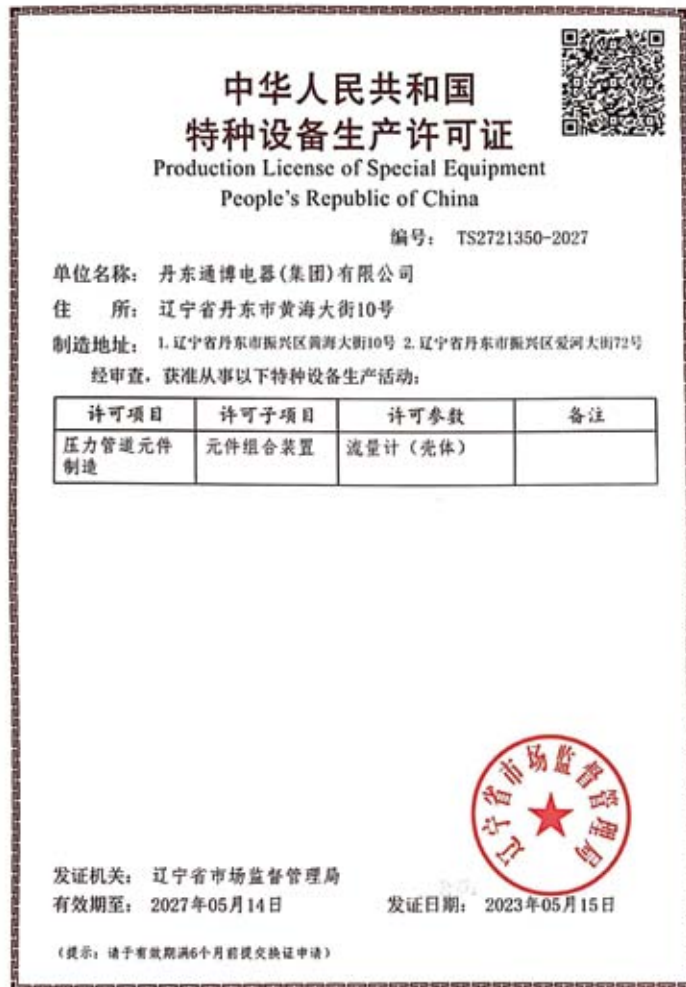


**4. Document No.515**

The notice of the General Office of the General Administration of Market Supervision on the Special Investigation and Repair of Potential Hazards within the Range of Power Station Boilers (Document No.515) stipulates that the pipelines within the range of power station boilers shall be in accordance with the "Boiler Safety Technical Supervision Regulations", "Boiler Supervision and Inspection Rules", and "Regular Boiler Inspection" Design, manufacture, installation, use management, inspection and testing according to regulations and related standards.

Standard nozzles and long-diameter nozzles are all standard flow elements, and there is no need for real flow calibration during processing. The flow element has the characteristics of low pressure loss and wear resistance, which is suitable for the measurement of high-pressure vapor flow of power station boilers. According to the requirements of the AQSIQ 2018 No.515 document for flow meters for power station boilers, our company is the first enterprise in Northeast to obtain the qualification for the production of pressure piping components for flow meter housings. All links are supervised and inspected by the local boiler inspection institute to ensure product quality.

The long-diameter nozzle adopts an embedded structure, and the flow meter (housing) is made of a whole section of seamless steel pipe, without large welds, and there is no welding of dissimilar steels, and the strength of the pipeline is calculated and checked. It is more reliable in the measurement of high pressure vapor flow in power station boilers.



## 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	Nm <sup>3</sup> /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 β t		
	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			
Note								

### 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

- Knowing the aperture diameter d20 of the flow element and the meter scale flow rate, under the new working conditions, find the new upper limit of the differential pressure Hmax of instrument
- Knowing the aperture diameter d20 of the flow element, the upper limit Hmax 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.