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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

JB/T 9249-1999

Vortex shedding flow transducers

涡街流量传感器

(English Translation)

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1 Scope

This Standard specifies the definition, product category, technical requirements, test methods and inspection rules of vortex shedding flow transducer.

This Standard is applicable to liquid and gas vortex shedding flow transducers with pulse signal output (hereinafter referred to as the transducer). It is also applicable to the transducer of vortex shedding flow transmitter with standardized signal output as well as the transducer of vortex shedding flowmeter with flow display.

2 Normative references

The following standards contain the provisions which, through reference in this

Standard, constitute the provisions of this Standard. At the publication of this

Standard, the editions indicated are valid. All standards shall be revised. The parties who use this Standard shall explore the possibility of using the latest version of the following standards.

GB 191-1990 Packaging - Pictorial marking for handling of goods

GB/T 2555-1981 Pipe flange connectors for ordinary use - Mounting dimensions

GB/T 2556-1981 Pipe flanges for ordinary use - Sealing surfaces - Forms and dimensions

GB 3836.1-1983 Electrical apparatus for explosive atmosphere - General requirements

GB 3836.2-1983 Electrical apparatus for explosive atmosphere - Flameproof electrical apparatus "d"

GB 3836.3-1983 Electrical apparatus for explosive atmosphere - Increased safety electrical apparatus "e"

GB 3836.4-1983 Electrical apparatus for explosive atmospheres -

Intrinsically safe circuits and electrical apparatus "i"

GB/T 9248-1988 Methods of evaluating the performance of flowmeters for incompressible fluids

GB/T 15464-1995 General-purpose specification for the packaging instrumentation products

JB/T 9329-1999 Basic environmental conditions and testing methods for instruments transportation and storage in the transportation

3 Definitions

This Standard uses the following definitions.

3.1 Vortex shedding flow transducer

Flow transducer that adopts placing an un-streamlined vortex body in fluid. The fluid alternatively separates and releases two strings of vortex on both sides of the vortex body, which are regularly and crisscross lined. Within a certain range, vortex's separation frequency is proportional to the flow. And the vortex frequency can be detected by various types of detectors.

It comprises of housing, vortex body, detecting element and amplifier.

3.2 Amplifier

The device that amplifies and reforms the signal output by detecting element.

3.3 Meter factor

The number of pulses output from per unit volume of fluid through the sensor.

3.4 Mean meter factor

The arithmetic mean value of the maximum value and the minimum value among meter factors of each measurement point, within the predetermined flow range, represented by K .

3.5 Resistance factor

Factor relating to pressure loss when the fluid goes through the transducer, represented by C_d .

3.6 Linearity

The degree of consistency between calibration curve and stipulated line, i.e., the ratio BETWEEN the half value of the maximum value and the minimum value AND the average meter factor, represented by percentage.

4.2.5 Range

The transducer's range shall be selected from the following numeral systems.

6, 7, 8, 10, 11, 12, 15, 20, 25, 30.

4.2.6 Measured mediums

The measured mediums shall comply with the requirements in Table 2.

Table 2

Measured medium Gas-liquid universal Liquid Gas

Mark number 1 2 3

4.2.7 Temperature range

The transducer's range of working temperature shall be selected among the following numeral systems of upper temperature limit and lower temperature limit.

Upper temperature limit: 50, 80, 120, 200, 250, 300, 400°C;

Lower temperature limit: 0, -10, -20, -40, -80, -120, -200°C.

Thermal vortex shedding flow transducer's absolute value of the difference between the upper limit and the lower limit temperature shall be greater than

50°C.

4.2.8 Power supply

The transducer's power supply shall use AC power supply of which the frequency is 50 HZ; the root-mean-square voltage is 220 V. It may also use DC power supply.

DC power supply voltage shall be selected from the following numeral systems.

12, 24, (36) V.

Note: Values in brackets are not recommended to use.

4.2.9 Output signal

The transducer's output signal is pulse signal, in which:

Voltage pulse: low level 2V; high level 6V.

Current pulse: low level is $4\text{mA} \pm 0.25\text{mA}$; high level is $20\text{mA} \pm 1\text{mA}$.

5.6 Compressive strength

The transducer shall be able to withstand the compressive strength test of 1.5 times nominal pressure and 5 min. There shall be no damage nor leakage.

5.7 Power supply voltage variation

When power supply voltage varies between -15% ~ +10% of nominal value, the deviation BETWEEN meter factors of the transducer's all measurements points

AND the original calibrated average meter factor of this transducer shall be within the permissible basic error limit range, and comply with the requirements of 5.2, 5.3 and 5.4.

5.8 Power supply frequency variation

When power supply frequency varies between -5% ~ +5% of rated value, the deviation BETWEEN meter factors of the transducer's all measurements points

AND the original calibrated average meter factor of this transducer shall be within the permissible basic error limit range, and comply with the requirements of 5.2, 5.3 and 5.4. (This article is only applicable to AC power supply transducer.)

5.9 Output signal

When the transducer's loading resistance varies within the range specified by the manufacturer, the level value of pulse signal shall comply with the requirements of 4.2.9.

5.10 Insulation resistance

The insulation resistance among the transducer's power supply terminal, output terminal and housing shall not be less than 20Mohm.

5.11.1 DC power supply transducer

Between the transducer's power supply terminal and housing, between output terminal and housing, it shall withstand the insulation strength test of which the frequency is 50Hz, the voltage is 500V and the time is 1min. There shall be no breakdown or arcing.