

# JJG

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

### JJG 1037-2008

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#### Verification Regulation of turbine Flowmeter (English Translation)

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## 1 Scope

This Regulation applies to the type evaluation, initial verification and subsequent verification of turbine flowmeters (hereinafter referred to as flowmeters).

## 2 References

JJF 1004-2004 Metrological terms and their definitions for flow rate

GB/T 18940-2003/ISO 9951.1993 Measurement of gas flow in closed conduits -

Turbine flowmeters

GB 17820-1999 Natural gas

## GB/T 13609-1999 Natural gas - Sampling guidelines

When using this Regulation, it is important to use the current valid version of the above references.

### 3 Terms and definitions

This Regulation uses the following terms, in addition to the metrological terms and their definitions for flow rate in JJF 1004-2004.

#### 3.1 K-coefficient

The number of pulses per unit volume of the fluid flowing through the flowmeter.

#### 3.2 flow conditioner

A component that reduces vortices and improves velocity distribution.

#### 3.3 transitional flow-rate $q_t$

The flow value between the maximum flow and the minimum flow, which divides the flow range into two different zones of the maximum allowable error, namely "high zone" and "low zone".

- d. Sign and number of license of manufacturing metrological instruments;
- e. Nominal pressure;
- f. Applicable working pressure and working temperature range;
- g. Flow range;
- h. Accuracy grade;
- i. Date of manufacture.

As well as other relevant technical indicators.

### 6.3 Appearance

#### 6.3.1

The newly manufactured flowmeter shall have a good surface treatment, and shall not have burrs, scratches, cracks, rusts, mildews and coating peelings. The interior of the flowmeter shall be clean, and the turbine rotor shall rotate flexibly. The seal surface shall be smooth and no damage.

#### 6.3.2

The welding of the connection part of the flowmeter surface shall be flat and smooth, no faulty soldering, desoldering, etc.

### **6.3.3**

The connectors must be solid and reliable, and shall not be loose or fall off due to vibration.

### **6.3.4**

The indicated figures shall be striking, neat, and the characters and symbols that represent the function shall be complete, clear and correct.

### **6.3.5**

The button shall have moderate hand-fell and no adhesion phenomenon.

### **6.3.6**

Each mark of the flowmeter shall be correct; the protective glass on the reading device shall have a good transparency and no defects such as distortion of the reading that obstruct reading.

## **7 Metrological instrument control**

The metrological instrument control includes type evaluation, initial verification and subsequent verification. "Type evaluation outline" is given in Annex A.

### **7.1.1.1 The flow standard device (hereinafter referred to as device) and its supporting**

instruments shall have a valid verification certificate.

temperature.

(2) During the verification of each flow point, the liquid temperature variation shall not exceed  $\pm 0.5\text{ }^{\circ}\text{C}$ .

(3) The liquid shall not be mixed with gas; if necessary, a getter can be installed on the upstream of the flowmeter.

### **7.1.2.3 Gas for verification**

(1) The gas shall be free of free water or oil and other impurities.

(2) If using air as a verification medium, under any conditions, the condensation caused by water vapor in air shall not appear.

(3) If using the natural gas as a verification medium, the gas component shall be relatively stable, complying with the requirements of Type 2 gas in GB 17820.

The sampling is carried out according to GB/T 13609.

(4) During each verification of each flow point, the temperature variation of the gas for verification shall not exceed  $\pm 0.5\text{ }^{\circ}\text{C}$ .

(5) During each verification of each flow point, the pressure variation of the gas for verification shall not exceed  $\pm 0.5\%$ .

### **7.1.3 Environmental conditions of verification**

#### **7.1.3.1**

The ambient temperature is  $(5 \sim 45)^\circ\text{C}$ ; the relative humidity is generally  $15\% \sim 95\%$ ; the atmospheric pressure is generally  $(70 \sim 106)\text{ kPa}$ .

#### **7.1.3.2**

The AC supply voltage shall be  $(220 \pm 22)\text{ V}$ , the power supply frequency shall be  $(50 \pm 2.5)\text{ Hz}$ , or use a suitable AC or DC power supply (e.g.  $24\text{ V DC}$  power supply) according to the requirements of the flowmeter.

#### **7.1.3.3**

The effect of the external magnetic field on the flowmeter shall be small enough to be negligible.

#### **7.1.3.4**

The effect of the mechanical vibration and noise on the flowmeter shall be small enough to be negligible.

### **7.1.4 Flowmeter under verification**

#### **7.1.4.1**

The flowmeter shall be coaxially installed with the front and rear straight pipe sections, and the connection part of the test pipe section shall be free from leakage.

The gasket at the connection shall not penetrate into the fluid pipe.

#### **7.1.4.2 When measuring the temperature of the fluid flowing through the flowmeter, it**

according to the method specified in the flowmeter instructions.

7.2.3.2 The flowmeter shall be operated for at least  $5\text{ min}$  in the range of  $70\%$  to  $100\%$  of the achievable maximum verification flow, and be verified after the fluid temperature, pressure and flow are stabilized.

### **7.2.3.3 Flowmeter verification**

(1) The verification of the flowmeter shall contain the following flow points.  $q_{\min}$ ,  $q_t$ ,  $0.40 q_{\max}$  and  $q_{\max}$ ; for flowmeters with an accuracy grade of more than  $0.5\%$ , add the flow points of  $0.25 q_{\max}$  and  $0.70 q_{\max}$ ; for flowmeters with an accuracy grade of more