

HG

CHEMICAL INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HG/T 20510-2014

Replacing HG/T 20510-2000

Design code for instrument air engineering

仪表供气设计规范

(English Translation)

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Table of Contents

1	General provisions
2	Terms
3	Quality of instrument air
4	Air source units
4.1	Capacity of air source units
4.2	Pressure delivered by the air source unit to the battery limits of each unit
4.3	Safe air supply
4.4	Determination of air receiver volume
5	Air supply modes for field instruments
5.1	Single-line air supply
5.2	Trunk-and-branch air supply
5.3	Loop air supply
6	Air supply to the control room
6.1	Air supply mode
6.2	Air supply header specifications and piping behind panels
6.3	Arrangement of air supply valves
7	Air supply system piping
7.1	Pipe routing
7.2	Air take-off from pipelines
7.3	Drainage
7.4	Piping at instrument ends
7.5	Air supply system connections
7.6	Number of spare take-off points and treatment of pipeline ends
8	Piping material and pipe size selection
8.1	Material selection
8.2	Pipe size selection
	Explanation of wording in this code
	List of quoted standards
	Addition: Explanation of provisions

Foreword

This code was revised in accordance with the requirements of the "Notice on Issuing the First Batch of Industry Standard Development and Revision Plans for 2010" of the Ministry of Industry and Information Technology (Gong Xin Ting Ke [2010] No. 74) and of the "Notice on Forwarding the Notice of the General Office of the Ministry of Industry and Information Technology on Issuing the First Batch of Industry Standard Development and Revision Plans for 2010" of the China Petroleum and Chemical Industry Federation (Zhong Shi Hua Lian Zhi Fa [2010] No. 222). The revision was organized by the National Chemical Industry Automatic Control Design Technical Center Station, entrusted by the China Petroleum and Chemical Engineering Survey and Design Association.

From its date of implementation, this code replaces "Regulations for instrument air supply design" HG/T 20510-2000.

The drafting group revised this code after extensive investigation and research, conscientious summarizing of practical experience, reference to relevant international standards and advanced foreign standards, and wide consultation.

The main technical contents of this code are: the design methods and requirements for the air supply of measuring and control instruments in chemical plants.

Compared with HG/T 20510-2000, the main changes of this code are as follows:

1. The formulas for conversion between standard conditions and operating conditions in the calculation of air consumption have been deleted.
2. The formula for calculating the capacity of the air source unit and the formula for calculating the volume of the air receiver have been revised.
3. "Outlet pressure of the air source unit" has been revised.
4. "Safe air supply" has been revised.
5. "Table of selection ranges of pipe sizes for air supply system piping" has been revised.

This code was proposed by and is under the jurisdiction of the China Petroleum and Chemical Industry Federation.

Sedin Engineering Co., Ltd. is responsible for the interpretation of the technical contents of this code. Any comments and suggestions arising in the course of implementing this code should be sent to Sedin Engineering Co., Ltd. (address: No. 1 Saiding Road, Hi-tech Zone, Taiyuan, Shanxi Province; postcode: 030006) for reference in future revisions.

Chief editorial organization of this code: Sedin Engineering Co., Ltd.

1 General provisions

1.0.1

This code is formulated in order to unify the technical requirements for instrument air supply in the chemical industry, to promote the standardization of instrument air supply engineering design, and to achieve the objectives of advanced technology, economic rationality, safety and suitability for use.

1.0.2

This code is applicable to the air supply design of measuring and control instruments of chemical plants.

1.0.3

The loads of the instrument air supply system include air for pneumatic equipment such as pneumatic instruments, pneumatic actuators and electro-pneumatic converters, air for pressurized ventilation for explosion protection, air for the commissioning and repair of pneumatic instruments in the instrument repair workshop, air for instrument purging, etc.

1.0.4

Clean and dry compressed air shall be used as the instrument air source. In emergencies, nitrogen may be used as a temporary air source.

1.0.5

In addition to complying with the requirements of this code, instrument air supply design shall also comply with the provisions of the current relevant national standards.

2.0.1 instrument air

Pressurized gas that maintains the operation of instruments and actuators.

2.0.2 air supply system

The piping network that connects the air source with the instruments and supplies air to the instruments.

2.0.3 air consumption

The air flow consumed by an instrument when in operation.

2.0.4 static air consumption

The maximum flow of air consumed by an instrument within its working range in the steady state, usually expressed in standard cubic metres per hour.

2.0.5 lowest pressure of air supply

The lower limit of the air supply network pressure required to maintain the normal operation of instruments and actuators.

3 Quality of instrument air

3.0.1

The dew point of the air source of the air supply system at operating (line) pressure shall be at least 10 °C lower than the extreme minimum temperature of the working environment or the historical local annual (seasonal) extreme minimum temperature. For dew point conversion see Figure 3.0.1.

Figure 3.0.1 Dew point conversion chart (dew point at operating pressure, °C, against dew point at atmospheric pressure, °C)

3.0.2

The particle size of dust in instrument air shall not exceed 3 µm, and the dust content shall be less than 1 mg/m³.

3.0.3

The oil content of instrument air shall be less than 1 ppm.

5.1 Single-line air supply

5.1.1

Air supply points that are dispersed or whose air consumption fluctuates greatly should be supplied by the single-line air supply mode (see Figure 5.1.1). For air consumption points with large fluctuations in air consumption, air may be taken from the air supply header, provided that the air supply of adjacent loads is not affected.

Figure 5.1.1 Single-line air supply piping system diagram (1 - air supply main; 2 - air supply stop valve; 3 - air supply ball valve; 4 - air filter regulator; 5 - field air-consuming equipment)

5.2 Trunk-and-branch air supply

5.2.1

Where there are several instruments or the instruments are densely arranged, the trunk-and-branch air supply mode should be used, with branches led to the air supply points (see Figure 5.2.1).

Figure 5.2.1 Trunk-and-branch air supply system diagram (1 - air supply main; 2 - air supply stop valve; 3 - air supply ball valve; 4 - air filter regulator; 5 - instrument air supply point; 6 - drain valve)