All glass syringe

1. Product models/specifications and their classification

1.1 All glass syringes are divided into 1ml, 2ml, 5ml, 10ml, 20ml, 30ml, 50ml, 100ml There are eight specifications in total, made of colorless borosilicate aluminum glass.

1.2 The type, specification and basic dimensions of the syringe shall conform to the 1 or Figure 2 And table 1 regulations.

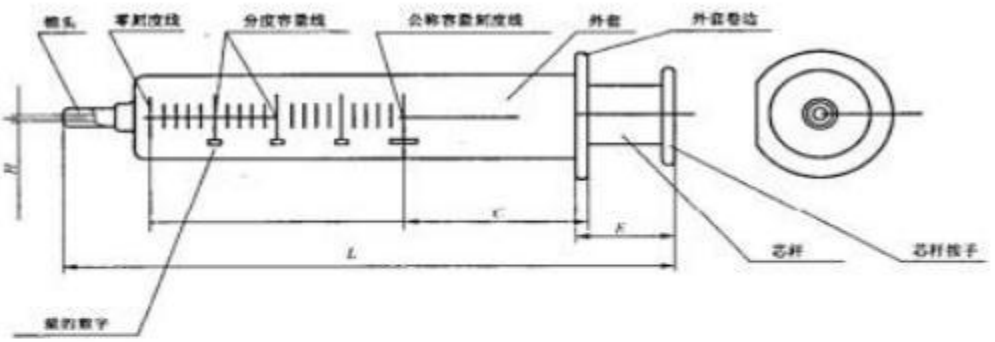

图 1 中头式

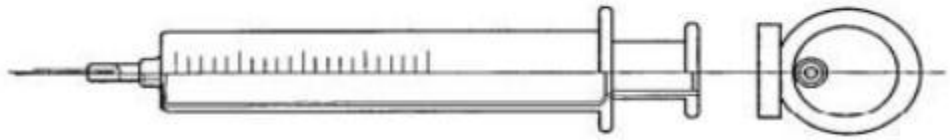

图 2 偏头式

surface 1 Specifications and basic dimensions

Specification	Nominal capacity	Maximum Total long	Total volume from beginning to end Minimum line length	Capacity end line to outer jacket edge Minimum distance to outer end	From the inner end of the outer sleeve to the handle end of the core Minimum distance between faces	Cone head Aperture
		L	B	C	E	H
1	1	95	twenty two	25	10	≥0.7
2	2	100	twenty three			
5	5	125	35		13	
10	10	140	45	30	15	≥1.0
20	20	165	50			
30	30	180	63	35		
50	50	202	71	40	30	
100	100	245	91			

1.3 Graduation value and graduation line

The graduation value of the syringe and the minimum length of the main graduation line should comply with the table 2 stipulates that the length of the secondary division line is approximately equal to half the length of the main division line.

surface 2 Graduation value and main graduation line size

Specification	Graduation value / mL	Minimum length of main dividing line / mm
1	0.05 or 0.1	5
2	0.1, 0.2 or 0.5	6
5	0.2 or 0.5	8
10	0.5 or 1	10
20	1 or 2	13
30		
50	2 or 5	16

100	5	20

1.4 Syringes are divided into two types: center head and offset head according to the position of the connector.

2. Performance Indicators

2.1 size

The maximum total length and cone diameter of the syringe should comply with the table 1 According to the provisions of conform to GB/T1962.1-2001 requirements.

2.2 Capacity tolerance

The capacity tolerance of the syringe shall comply with the table 3 Requirements:

surface 3 Capacity tolerance

Specification	1	2	5	10	20	30	50	100
Equal to or greater than 1/2 Main scale for nominal capacity Maximum allowable error on the line /（%）	± 3							
Less than 1/2 On the main graduation line of nominal capacity Maximum allowable error /（%）	± 5							

2.3 Graduation lines and measurement digit positions

The graduation lines and measurement numbers of the syringe should be complete, uniform in thickness, durable, straight and equally divided. The graduation line should be perpendicular to the axis of the syringe. The measurement number should be located at the bisector position of the main graduation line. Close to but not touching the main graduation lines.

The graduation line and measurement number of the offset syringe should be printed on the side opposite to the syringe cone. The graduation lines and metering numbers of the syringe should be printed on the side opposite to the cut edge of the syringe.

2.4 Metrics

The position of the metering numbers of the syringe is shown in the figure 1, the writing direction is parallel to the axis of the syringe body. The arrangement of measurement numbers starts from the zero line, "0" can be omitted, and the measurement figures of syringes of various specifications should be consistent with Combined table 4 requirements.

surface 4 Measuring numbers

Specification	Measuring numbers	Specification	Measuring numbers
1	0.2、0.4、0.6、0.8、1	20	5、10、15、20
2	0.5、1、1.5、2	30	10、20、30
5	1、2、3、4、5	50	10、20、30、40、50
10	2、4、6、8、10	100	20, 40, 60, 80, 100

2.5 Baseline

The bottom end surface of the syringe core should be flat with clear edges. This plane serves as the reference line for reading the capacity value .

2.6 Adhesion

The jacket and core of the syringe should fit tightly and according to the table 5 The specified water pressure is injected into the syringe. 10s There should be no water underneath.

surface 5 Water pressure value

Specification	Water pressure value / kPa	Specification	Water pressure value / kPa
1	300	20	200
2		30	
5		50	150
10		100	130

2.7 Sliding performance

The syringe jacket and core should be easy to install and remove, have good sliding properties after fitting, and should not get stuck. Phenomenon.

2.8 Cone head tightness

The cone of the syringe should fit tightly with the injection needle. 300 kPa Water pressure, 30s There should be no water drops inside Down.

2.9 Resistance to thermal shock

The syringe should be able to resist thermal shock. 80° C There should be no bursting when the water temperature difference

2.10 stress

The syringe should be well annealed and have an orange-red color with minimal internal stress.

2.11Residual liquid volume

The residual liquid in the syringe should not be greater than the 6 requirements.

surface 6Residual liquid volume

Specification	Residual liquid volume / mL	Specification	Residual liquid volume / mL
1	0.06	20	0.50
2	0.09	30	0.60
5	0.15	50	0.90
10	0.30	100	1.81

2.12 Matching code

The jacket and core of the same syringe should be marked with the same markings that are clearly visible in dry and wet conditions. The same matching number.

2.13 Natural explosion and cone head falling off

The syringe should not burst spontaneously or have the cone tip fall off.

2.14 Welding firmness

The syringe jacket and cone should be welded firmly and straight, as shown in the table. 7 The specified force acts on the middle of the frosted surface of the cone head The two should not be separated.

surface 7 Welding force

Specification	Force /N	Specification	Force /N
1	44	20	59
2		30	
5	49	50	64
10		100	

2.15 Appearance

The surface of the syringe should not have worn gas lines, cracks, severe cold lines, bumps, scratches , abrasions, hair There should be no obvious debris inside the core and sleeve, and no obvious leakage on the outer sleeve.

3. Inspection methods

3.1 Appearance (division lines, measurement numbers, reference lines)

Normal or corrected vision should be 2.3, 2.4 , 2.5, 2.12, 2.13, 2.15 Required beg.

3.2 size

Measurements with general or special measuring tools should comply with 2.1 requirements.

3.3 performance

3.3.1 Capacity tolerance test

3.3.1.1 The detection points of capacity tolerance test are : nominal capacity and At 20% nominal capacity, If there is no main dividing line at 20% of the nominal capacity, it should be changed to a line close to Carry out at the secondary graduation line of 20% of the nominal capacity.

3.3.1.2 The capacity test is carried out by weighing method or standard glass measuring instrument (volume ball method). Weighing method. The weighing method is calculated as shown in formula (1):

$$\delta(\%) = \frac{V_0 - V_1}{V_1} \times 100$$

Where: δ ----Capacity tolerance

V0----Scale capacity, unit is milliliter (mL)

V1----actual capacity, in milliliters (mL)

The results should be consistent with 2.2 Requirements.

3.3.2 Durability test of graduation lines and metering numbers

The syringe is completely immersed in the liquid containing a mass concentration of 9g/L of sodium chloride solution in a glass beaker. 120° C ± 5° C In saturated steam, the steam pressure 30min After the temperature of the contents of the beaker drops to room temperature, Repeat the autoclave once, and the result should meet the 2.3 requirements.

3.3.3 Fit test

according to YY91017 The test results should meet the 2.6 requirements.

3.3.4 Sliding performance test

Clean the syringe jacket and core, and after assembly in a wet condition, push and pull the core in the jacket. and rotation, the result should conform to 2.7 requirements.

3.3.5 Cone head tightness test

First fill the syringe with a quarter of the water , Then put the syringe cone and Clean and dry the taper hole of the standard plug gauge specified in GB/T1962.1-2001 and tighten it.

Place it on the tightness tester and pass the specified water pressure value through the gauge sleeve . It should meet the requirements. 2.8 regulations.

3.3.6 Thermal shock test

Remove the syringe jacket and core, place the syringe vertically in a mesh basket with the cone facing upwards, and immerse it at a temperature of 20; tc water, and then put it into boiling water (the water temperature should not drop by more than 2 ℃ at this time), boiled 5 min , then

The net basket is quickly placed back into the 20gc water (the water temperature should not rise more than 2 ℃), Take out the net basket. Observe the burst of the syringe visually, and the result should meet the requirements. 2.9 requirements.

3.3.7 Stress test

Observed in the polarization stress meter, the results should meet the 2.10 requirements.

3.3.8 Residual liquid test

Drain the dry syringe to the nominal capacity, then remove the air, push the core to the bottom of the jacket and pull out. out, so that the water on the core and the jacket wall can fully flow and concentrate at the bottom of the jacket, and use appropriate specifications (0.25ml , 1 ml 2 ml) syringe with a long injection needle and completely aspirate the water remaining in the jacket (including the cone hole). The value read out is the residual liquid volume, and the result should meet the 2.44 requirements.

3.3.9 Welding strength test

load the gauge at a uniform speed in the middle of the frosted surface of the cone . 7 The specified force is then removed and the cone head is rotated along the axis. 180 ° , Repeat the force once more, and the result should meet the requirements. 2.14 requirements.