

JIS

JAPANESE INDUSTRIAL STANDARD

Clean work station

JIS B 9922—1992

Translated and Published

by

Japanese Standards Association

Printed in Japan

In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

JAPANESE INDUSTRIAL STANDARD

J I S

Clean work station

B 9922-1992

1. Scope This Japanese Industrial Standard specifies the clean work stations⁽¹⁾ for maintaining the work space at definite air cleanliness (hereafter referred to "cleanliness"), incorporating blowers and HEPA filters or ULPA filters. However, these are not applicable to those of which work space are so constructed as to generate negative pressure.

Note ⁽¹⁾ These may also be applicable to the tunnel units, fan filter units and clean booths.

Remarks: The following standards are cited in this Standard.

- JIS B 9920 Measuring methods for airborne particles in clean room and evaluating methods for air cleanliness of clean room
- JIS B 9921 Light scattering automatic particle counter
- JIS C 0903 Electrical apparatus for explosive atmospheres in general industry
- JIS C 1302 Insulation resistance testers (Battery operated)
- JIS C 1502 Sound level meters
- JIS C 1505 Precision sound level meters
- JIS C 1510 Vibration level meters
- JIS C 1609 Illuminance meters
- JIS T 8202 Portable type thermal anemometer
- JIS Z 8122 Glossary of terms for contamination control
- JIS Z 8731 Methods of measurement and description of A-weighted sound pressure level
- JIS Z 8901 Dusts and aerosols for industrial testing

2. Definitions For the purposes this Standard, the following definitions apply, and others are in accordance with JIS Z 8122.

- (1) work space A space wherein a cleaning work is performed, and it is the space between the air discharge face and the work face where an air current flows unidirectionally.
- (2) scanning test The test on the presence of the aerosol leakage caused from the pinholes on the face of HEPA filter or ULPA filter, maladherance of the adhered part of the air filter to the air filter mounting frame, malmounting of the airfilter and others. When the particle concentration at the air-inlet opening of the clean work station is not sufficient, the test is carried out scanning the total area of the down stream side of the air filter by the probe of a light scattering automatic counter, while supplying the atmospheric dust being mixed with the particles specified in class 14 of JIS Z 8901, in this test a photometer may also be used.
- (3) fan filter unit The air cleaner in which a fan, a motor and a filter have been incorporated in one casing as a unit.

2
B 9922-1992

- (4) tunnel unit The air cleaner which has formed the tunnel shaped continuous work space, by connecting many fan filter units on the upper part of a work space to form a line shaped unit, installing two units of this line to allow these to face each other, mounting a panel on the back of these fan filter units, and providing the cleaning space zone for travelling of operators at the center.
- (5) clean booth The air cleaner which prepares a clean space, by arranging one or several fan filter units on the ceiling, attaching plastic curtains or simple panels on the periphery, allowing the clean air to flow unidirectionally, and allow the clean air to flow out from the clearances between the curtains or the panels and the floor.
3. Types and symbols The types and symbols of the clean work stations shall be classified as given in Table 1 according to the air flows to be fed into the work spaces and air filters to be used.

Table 1. Types and symbols for clean work stations

Type	Symbol
Horizontal flow type using HEPA filter	H-HEPA
Horizontal flow type using ULPA filter	H-ULPA
Vertical flow type using HEPA filter	V-HEPA
Vertical flow type using ULPA filter	V-ULPA
Universal type using HEPA filter	U-HEPA
Universal type using ULPA filter	U-ULPA

Remarks: The universal types (U) shall mean the types available for preparing horizontal flow types, vertical flow types or arbitrary air flows, according to installing methods.

4. Performances

4.1 Wind velocity The rated wind velocity of the clean work station shall be the range of 0.3 m/s to 0.6 m/s. The tolerances on the wind velocity in the work space, when the test of 6.2 has been carried out, shall be the range of $\pm 20\%$ in the mean wind velocity with respect to the rated wind velocity.

The mean wind velocity range, when a heat generating body exists in the cleaning work space, may be as agreed between the purchaser and supplier.

The tolerances on the wind velocity at each measuring point shall be $\pm 20\%$ with respect to the mean wind velocity.

4.2 Cleanliness

4.2.1 Attraction of aerosol The attraction of the aerosol shall be tested in accordance with 6.3, and no attraction of the aerosol shall be measured.

4.2.2 Scanning test The scanning test shall be carried out in accordance with 6.3, and there shall be no leakage of particles on overall measuring surfaces or lines.

4.2.3 Cleanliness of work space As to the cleanliness of the work space, when tested in accordance with 6.3, the cleanliness Cu of the overall measuring points, when the HEPA filter has been used, shall be 10^4 pieces/ m^3 or under (equivalent to class 5) for the particles of $0.3 \mu m$ or over in particle size, and, when the ULPA filter has been used, shall be 10^3 pieces/ m^3 or under (class 3) for the particles of $0.1 \mu m$ or over in particle size.

4.2.4 Cleanliness classes of work space The cleanliness classes of the work space may be expressed by the maximum values of the cleanliness class of each measuring point, as given in Table 2.

Table 2. Upper limit concentrations for cleanliness classes (pieces/ m^3) (JIS B 9920)

Particle size (μm)	Cleanliness classes							
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8
0.1	10^1	10^2	10^3	10^4	10^5	—	—	—
0.3	1	10	101	1 010	10 100	101 000	1 010 000	10 100 000
0.5	(0.35)	(3.5)	35	350	3 500	35 000	350 000	3 500 000
Particle size range of cleanliness class	0.1to0.3		0.1to0.5		0.1to5.0	0.3to5.0		

- Remarks 1. The class 3, class 4, class 5, class 6, class 7 and class 8 are respectively equivalent to the class 1, class 10, class 100, class 1000, class 10000 and class 100000 of the Federal Standard 209 D (Clean Room and Work Station Requirements, Controlled Environments)
2. The digits given in () are the values for the particle sizes other than the objective particle sizes intended for evaluating the cleanliness classes, and are the Informative reference values.

4.3 Insulation resistance The insulation resistance, when subjected to the test of 6.4, shall be $1 M\Omega$ or over.

4.4 Withstand voltage As to the withstand voltage, when subjected to the test of 6.5, there shall be no abnormality for one minute.

When it is liable to cause damage because an electronic device is being used, this test may be omitted.

4.5 Electric power consumption The electric power consumption, when subjected to the test of 6.6, shall be within $\pm 20 \%$ for that of its value is 100 W (or VA) or under with respect to the rated electric power consumption, shall be within $\pm 15 \%$ for that of over 100 W (or VA) to 1000 W (or VA) or under, and shall be within $\pm 10 \%$ for that of over 1000 W (or VA).

4.6 Illuminance The illuminance, when subjected to the test of 6.7, shall be not less than the value in illuminance (lx) as agreed between the purchaser and supplier on each measuring point.

4.7 Vibration The vibration, when subjected to the test of 6.8, shall be not larger than the value as agreed between the purchaser and supplier.

4.8 Noise The noise, when subjected to the test of 6.9, shall be not larger than 65 dB in value on the clean work station. However, when the clean work stations have been used in multiple linkage and for the clean booth, it shall be as agreed between the purchaser and supplier.

5. Construction The construction of the clean work station shall be in accordance with the following:

- (1) It shall be so constructed that the maintenance, and inspection and adjustment can readily be performed.
- (2) The wall surfaces of the work space shall not be those which generate exfoliation or rust easily.
- (3) It shall be so constructed that the unfiltered air does not flow into the work space.
- (4) The clean work station shall be so constructed as to be capable of being earthed, and care shall be taken to prevent the surface from electrification.
- (5) The main air filter shall be the HEPA or ULPA filter.
- (6) The filter, under the ordinary air conditions, shall not be that easily metamorphosed and corroded.

The filter shall be capable of being disassembled and assembled for maintenance or adjustment and exchange.

- (7) The mounting part of the main filter shall be so constructed that the leakage of aerosol may not occur against secular change.
- (8) For the type of machine in which acid, organic solvent, biological particles, noxious gas, etc. are handled, it shall be so constructed that the air containing these is capable of being exhausted from a prescribed passage.
- (9) That of the explosion preventive structure shall be of the construction specified in JIS C 0903.

6. Test methods

6.1 General The environmental conditions under which each test is carried out should preferably be $23 \pm 5^{\circ}\text{C}$ in temperature and $(50 \pm 20) \%$ in humidity.

6.2 Wind velocity test

6.2.1 Instrument for test The instrument for wind velocity measurement in the work space shall be the anemometer specified in JIS T 8202, or the measuring instrument having the accuracy equal to or superior to that.