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NATIONAL STANDARD
OF THE PEOPLE'S REPUBLIC OF CHINA

GB 16297–1996

Integrated emission standard of air pollutants

Issued on: April 12, 1996 **Implemented on: January 01, 1997**

Issued by: National Environmental Protection Bureau and National Technical Supervision Bureau

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Foreword

This standard was drafted according to the stipulation of clause 7 of “Prevention and Cure Law for Air Pollution of the People’s Republic of China”.

This standard is based upon waste gas of previous “Emission Proposed Standard of Industrial 3-wastes” (GBJ 4-73) and related Emission Standard of National Air Pollution of Other Trades. This standard has inherited some technical contents from all the previous standards. And it has been revised and changed significantly.

This standard contains emission limits of 33 kinds of air pollutants. It’s indicator system is the highest allowable emission concentration, the highest allowable emission rate and concentration limits of non-regulation at emission surveillance and control.

Except that this standard is the integrated emission standard, the Nation has several other industry common emission standards in respect of control emission of air pollutants. That is, except that some industries execute their own industry emission standards of air pollutants, all the rest industries execute this standard.

Execution date of this standard is January 1, 1997.

This standard replaces the portion of waste gas in the following standards. The portion of waste gas in the following standards shall be annulled from the execution date of this standard:

GBJ 4-73	Proposed standard of industrial “three wastes” emission
GB 3548-83	Pollutant emission standard of synthesis detergent industry
GB 4276-84	Sulfuric acid concentrated pollutants emission standard of gunpowder and explosive industry
GB 4277-84	Pollutants emission standard of mercury fulminate industry
GB 4282-84	Pollutants emission Standard of sulfuric acid industry
GB 4286-84	Pollutants emission standard of Shipping industry.
GB 4911-85	Pollutants emission standard of Iron and Steel Industry
GB 4912-85	Pollutants emission standard of light metal industry
GB 4913-85	Pollutants emission standard of heavy non-ferrous metal industry
GB 4916-85	Pollutants emission standard of pitch industry.
GB 4917-85	Pollutants emission standard of common calcium industry.

Annex A, B and C of this standard are normative.

This standard was proposed by the technical standard department of National Environmental Protection Bureau.

National Environmental Protection Bureau shall be responsible for explaining this standard.

Integrated Emission Standard of Air Pollutants

Replacing the portions of waste gas in following standards:

GB3548-83, GB4276-84
GB4277-84, GB4282-84
GB4286-84, GB4911-85
GB4912-85, GB4913-85
GB4916-85, GB4917-85
GBJ4-73

1. Subject content and application scope

1.1 Subject content

This standard specifies the emission limit for 33 kinds of air pollutants. And it also specifies various requirements for executing this standard.

1.2 Application scope

1.2.1 In current Chinese national air pollutants emission standard system, and based on the principle that the integrated emission standard AND industry emission standard are not carried out crossly - boiler uses GB13271-91 “Boiler Air Pollutants Emission Standard”; industrial furnace uses GB9078-1996 “Industrial Furnace Air Pollutants Emission Standard”; thermal power plant uses GB 13223-1996 “Thermal Power Plant Air Pollutants Emission Standard”; coke furnace uses GB 16171-1996 “Coke oven Air Pollutants Emission Standard”; cement plant uses GB4915-1996 “Cement Plant Air Pollutants Emission Standard”; foul-smell substance emission uses GB 14554-93 “Foul Smell Pollutants emission Standard”; automobile emission uses GB14761.1 - 14761.7-93 “Automobile Air Pollutants Emission Standard”; motorcycle emission uses GB 14621-93 “Motorcycle Emission Gas Pollutants Emission Standard”; the other air pollutants emissions all use this standard.

1.2.2 After execution of this standard, if the industry air pollutants emission standard is re-issued, the pollution source stipulated by applicable scope shall not follow this standard.

1.2.3 This standard is suitable to the current pollution source air pollutants emission management; as well as environmental impact evaluation, design, environmental protection facilities, completion acceptance of construction project; and air pollutants emission management after it is put into operation.

2. Quoted standard

The articles contained in the following standards, through reference by this standard, have become the articles of this standard.

GB3095-1996 Environment Air Quality Standard

GB/T16157-1996 Detection of exhaust Grain matter of fixed pollution source and sampling methods of gaseous state pollutants.

3. Definition

This standard adopts the following definitions.

3.1 Standard state

It means such state - temperature is 273k, and pressure is 101 325Pa. Each standard value stipulated in this standard is based on dry air under the standard state.

3.2 Maximum allowable emission concentration

It means that the average value of concentration for any one hour of pollutants in exhaust tube after treatment facilities must not be over limitation; or the average value of concentration for any one hour of pollutants in exhaust tube under non-treatment facilities must not be over the limitation.

3.3 Maximum allowable emission rate

It means the mass of emission pollutants for any one hour in exhaust tube at specific height must not be over the limitation.

3.4 Non-regulated emission

It means the emission of air pollutants which does not pass through the exhaust tube. Emission of low and short exhaust tubes belongs to regulated emission, but under certain conditions, it can create the same consequence as non-regulated emission. Therefore when the indicator of “Non-regulated emission surveillance and control concentration limit” is executed, the concentration of surveillance and control point pollutants caused by low and short exhaust tubes shall not be excluded (deducted).

3.5 Non-regulated emission surveillance and control point

On the basis of the stipulation of annex C in this standard, it is an established surveillance and control point, in order to distinguish if the non-regulated emission is over the standard’s requirements.

3.6 Non-regulated emission surveillance and control concentration limit

It means that the average value for any one hour of pollutants concentration of surveillance and control point must not be over the limitation.

3.7 Pollution source

It means the facilities or building constructions (such as workshop etc.) which emit air pollutants.

3.8 Organization’s boundary

It means a border which is connected with external environmental boundary. Border is generally defined on the basis of legal formalities. If there is no legal formalities, it can be defined by the current actual border.

3.9 Non-regulated emission source

It means the non-regulated emission facilities which is installed in open-air environment, or building constructions of non-regulated emission (such as workshop, work shed etc.).

3.10 Height of exhaust tube

It means the height from the horizon plane located at exhaust tube (or main building construction) to the outlet of exhaust tube.

at radius of 200 meters. If the discharge pipe can not satisfy this requirement, it shall be carried out according to 50% stricter than the discharge rate standard value as listed in the corresponding tables and at the corresponding height.

7.2 For 2 pieces of gas discharge pipes with the same pollutants (regardless whether it is discharged from the same production process), if their distance is less than the sum of their geometric height, these 2 pieces of pipes shall be merged and deemed as one piece of equivalent gas discharge pipe. If there are more than 3 pieces of gas discharge pipes in near distance, which discharge the same pollutants, it shall take the equivalent value of the first 2 pipes, then calculate the equivalent value with 3rd pipe and 4th pipe respectively and in sequence. Related parameter calculation method of the equivalent gas discharge pipe is shown in Annex A.

7.3 If the height of a gas discharge pipe is between the 2 values listed in this standard, the maximum allowable discharge rate to be carried out shall be calculated by the interpolation. For the interpolation calculation formula, see Annex B of this standard. If the height of gas discharge pipe is more than the maximum or less than the minimum values listed in this standard, the maximum allowable discharge rate shall be calculated by the extrapolation. For extrapolation calculation formula, see Annex B of this standard.

7.4 The gas discharge pipes with the new polluting source is not less than 15 meter in general. If the gas discharge pipes with the new polluting source must be lower than 15 meter, the discharge rate standard value shall be in accordance with the extrapolation calculation result as specified in clause 7.3, plus 50%.

7.5 The new polluting source which discharges without regulation shall be controlled strictly. In general the discharge without regulation shall not be allowed. If the discharge without regulation can not be avoided, its discharge shall satisfy the standard value as specified in Table 2.

7.6 If the tail gas from industrial production is required to combust, the black of flue gas shall not exceed Ringelmann class I.

8. Monitoring

8.1 Distributing points

8.1.1 The sampling points and sampling point locations of particles in the gas discharge pipe or gaseous polluting substance shall be provided according to the standard GB/T 16157-1996.

8.1.2 The quantity and locations of sampling points (monitoring points) for monitoring of the discharge without regulation shall be executed according to the methods specified in Annex C.

8.2 Sampling time and frequency

The 3 indicators specified in this standard refer to that the average value per any one hour shall not exceed the limit. When sampling, it shall meet:

8.2.1 Sampling of waste gas in the gas discharge pipe

The average value shall be obtained in the continuous one hour; or 4 pieces of samples are taken in one hour at equal time. And average value is calculated.

8.2.2 Sampling at monitoring point of non-regulation discharge

For sampling at monitoring point and reference point of non-regulated discharge, the average value shall be calculated and based on the samples taken in continuous one hour;

If concentration is at low-side, sampling time can be extended when it is required;

If the sensitivity of the analysis method is high, and when it only needs a short time to collect the

No	Pollutant	maximum allowable discharge concentration mg/m^3	maximum allowable discharge rate, kg/h			concentration limit of non-regulated discharge monitoring	
			height of discharge pipe m	Grade 2	Grade 3	monitoring point	concentration mg/ m^3
4	hydrogen chloride	100	15 20 30 40 50 60 70 80	0.26 0.43 1.4 2.6 3.8 5.4 7.7 10	0.39 0.65 2.2 3.8 5.9 8.3 12 16	maximum concentration point outside the boundary	0.20
5	chromic acid mist	0.070	15 20 30 40 50 60	0.008 0.013 0.043 0.076 0.12 0.16	0.012 0.020 0.066 0.12 0.18 0.25	maximum concentration point outside the boundary	0.0060
6	sulfuric acid mist	430 (powder and explosive factory)	15 20 30 40 50 60 70 80	1.5 2.6 8.8 15 23 33 46 63	2.4 3.9 13 23 35 50 70 95	maximum concentration point outside the boundary	1.2
		45 (others)					
7	fluoride	90 (common calcium industry)	15 20 30 40 50 60 70 80	0.10 0.17 0.59 1.0 1.5 2.2 3.1 4.2	0.15 0.26 0.88 1.5 2.3 3.3 4.7 6.3	maximum concentration point outside the boundary	20 μg/m^3
		9.0 (others)					

Annex A

(Normative)

Parameter Calculation of Equivalent Discharge Pipe

A1 When discharge pipes 1 and 2 discharge the same kind of pollutant, and the distance between the 2 pipes is less than the sum of 2 heights, the 2 pipes shall be represented by 1 equivalent discharge pipe.

A2 The calculating method for relevant parameters of the equivalent discharge pipe is as follows:

A2.1 Pollutant discharging flow-rate of the equivalent discharge pipe shall be calculated as per following equation:

$$Q = Q_1 + Q_2$$

Where

Q - pollutant discharging flow-rate of the equivalent discharge pipe;

Q_1, Q_2 - discharging flow-rate of a pollutant of pipe 1 and pipe 2.

A2.2 The height of equivalent discharge pipe shall be calculated as per following equation:

$$h = \sqrt{\tfrac{1}{2}(h_1^2 + h_2^2)}$$

Where

h - height of the equivalent discharge pipe;

h_1, h_2 - heights of pipe 1 and pipe 2.

A2.3 Location of equivalent discharge pipe

The equivalent discharge pipe shall be located on the connection line between discharge pipe 1 and 2. Assuming that the discharge pipe 1 is as the origin, the distance from the equivalent discharge pipe to the origin shall be as:

$$x = a\,(Q-Q_1)/Q = 2\,Q_2/Q$$

Where

x - distance from the equivalent discharge pipe to discharge pipe 1;

a - distance from discharge pipe 1 to 2;

Q_1, Q_2, Q - same as those in A 2.1.

C2.3 The highest concentration measured at the 4 points shall be taken as calculation.

C3 The method of setting-up reference point and monitoring point at upwind and downwind of discharge source.

C3.1 Following provisions are mandatory principle.

C3.1.1 The reference point shall be setup at upwind of non-regulated discharge source, and monitoring point at downwind.

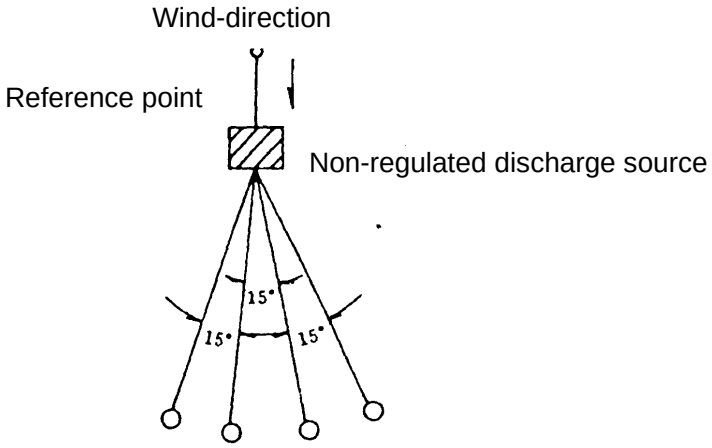
C3.1.2 The monitoring point shall be setup at the point with the maximum concentration at downwind of discharge source. It is not limited by the organization boundary.

C3.1.3 In order to determine the maximum concentration point, up to 4 monitoring points can be setup.

C3.1.4 The principle is that the reference points shall not be affected by non-regulated discharge source to be measured, and it can represent the background concentration of monitoring points. Only one reference point shall be setup.

C3.2 The following setup-point plan is for illustration, and for reference in actual monitoring and measurement.

C3.2.1 When there is obvious wind-direction and wind-rate, it may refer to Figure C2 for setup-point.



C3.3 From the monitoring and measuring results of the above reference plan, the difference BETWEEN the highest measured concentration of the 4 monitoring points AND the concentration of the reference point shall be taken as the calculation value.

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