

National Standard of the People's Republic of China

Integrated Emission Standard of Air Pollutants

GB16297 – 1996

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Preface

We have laid down this standard 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 part of original <<Emission Proposed Standard of Industrial three wastes>> (GBJ4-73) and related Emission Standard of National Air Pollution of Other Trades. This standard has inherited some technical contents from all original standard, and has been revised and changed largely.

This standard contains emission limitation values of 33 kinds of air pollutants, it's target system is the highest allowable emission density, the highest allowable emission rate and density limitation values of non-organization at emission surveillance and control.

The state also has several professional common emission standards in respect of control emission of air pollutants, except that this standard is integrated emission standard, the others all executes this standard except that several trades execute their own professional national emission standards of air pollutants.

Execution date of this standard is 1997.01.01.

It replaces waste gas parts of following standards by this standard, the waste gas parts of following standards shall be annulled from execution date of this standard:

GBJ4-73	Proposed standard of industrial "three wastes" emission
GB3548-83	Pollutant emission standard of synthesis detergent industry
GB4276-84	Sulfuric acid concentrated pollutants emission standard of gunpowder and explosive industry
GB4277-84	Pollutants emission standard of mercury fulminate industry
GB4282-84	Pollutants emission Standard of sulfuric acid industry
GB4286-84	Pollutants emission standard of Shipping industry.
GB4911-85	Pollutants emission standard of Iron and Steel Industry

- GB4912-85 Pollutants emission standard of light metal industry
- GB4913-85 Pollutants emission standard of heavy non-ferrous metal industry
- GB4916-85 Pollutants emission standard of pitch industry.
- GB4917-85 Pollutants emission standard of common calcium industry.

Appendix A, B and C of this standard all belong to this standards' appendixes.

This standard has issued by scientific and technical standard department of National Environmental Protection Bureau.

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

Integrated Emission Standard of Air Pollutants

Waste gas parts in following standard as:

GB3548-83, GB4276-84

GB4277-84, GB4282-84

GB4286-84, GB4911-85

GB4912-85, GB4913-85

GB4916-85, GB4917-85

GBJ4-73 replaced by GB16297-1996.

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1. **Subject content and suitable scope**
 - 1.1 Subject content
This standard contains emission limitation value for 33 kinds of air pollutants and also contains various requirements for executing this standard.
 - 1.2 Suitable scope
 - 1.2.1 Integrated emission standard and professional emission standard don't be carried crossly out on the basis of principle in Chinese present national air pollutants emission standard system, such as: boiler uses GB13271-91 <<Boiler Air Pollutants Emission Standard>>, industrial furnace uses GB9078-1996 <<Industrial Furnace Air Pollutants Emission Standard>>. thermal power plant uses GB13223-1996 << Thermal Power Plant Air Pollutants Emission Standard>>, coke oven uses GB16171-1996 <<Coke oven Air Pollutants Emission Standard>>, cement plant uses GB4915-1996 <<Cement Plant Air Pollutants Emission Standard>>, foul smell matter emission used GB14554-93 <<Foul Smell Pollutants emission Standard>>, automobile emission uses GB14761.1~14761.7-93 << Automobile Air Pollutants Emission Standard>>, motorcycle emission uses GB14621-93 <<Motorcycle Emission Gas Pollutants Emission Standard>>, the other air pollutants emission all use this standard.
 - 1.2.2 If the professional National Air pollutants Emission Standard is reissued after this standard is executed, pollution source stipulated by suitable scope shall not fellow this standard.

1.2.3 This standard is suitable to the present 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 puts into operation.

2. Adduced standard

Following standards include same articles, which are quoted by this standard as this standards' articles.

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 uses the following definition.

3.1 Standard state

It means such states; 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 density

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

3.3 Maximum allowable emission rate

It means quality of emission pollutants for any one hour in exhaust tube of fixed height must not be over limitation.

3.4 Non-organizational emission

It means the emission of air pollutants do not pass through exhaust tube. Emission of low and short exhaust tubes belongs to organizational emission, but under certain conditions, it can create the same consequence as non-organizational emission. Therefore when the target of "Non-organizational emission surveillance and control density limitation value" is executed, the density of surveillance and control point pollutants caused by low and short exhaust tubes shall not be deducted.

- 3.5 Non-organization emission surveillance and control point
On the basis of the stipulation of appendix C in this standard, it is an established surveillance and control point in order to distinguish between right and above standard of non-organization emission.
- 3.6 Non-organization emission surveillance and control density limitation value
It means average value for any one hour of pollutants density of surveillance and control point must not be over limitation.
- 3.7 Pollution source
It means facilities or building construction (as workshop etc.) of emission air pollutants.
- 3.8 Unit boundary unit (unit scope)
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 present actual border.
- 3.9 Non-organizational emission source
It means non-organizational emission facilities which is installed in open-air environment, or building construction of non-organizational emission (as workshop, builders' temporary shed etc).
- 3.10 Height of exhaust tube
It means height from horizon plane located at exhaust tube (or main building construction) to exhaust tube exit.

4. Target system

This standard covers the following three targets:

- 4.1 Maximum allowable emission density of pollutants which passes through exhaust tube emission.
- 4.2 Maximum allowable emission rate of pollutants which passes through exhaust tube is based on the stipulation of exhaust tube height.

Any exhaust tube must be at the same time in accordance with above two targets. Any emission among them which exceed the standard belongs to over the standard.

- 4.3 For pollutants exhausted by non-organizational way, surveillance and control point of non-organizational emission and relative surveillance and control density limitation value shall be stipulated.

This target shall be in accordance with stipulation of clause 9.2 in this standard.

5. **Standard grades of emission rate**

Maximum allowable emission rate stipulated in this standard is divided into present pollution source of grade I, II and III, and new pollution source of grade II and III. On the basis of classification which pollution source is located at function area of environmental air quality, relevant grade emission rate in the standard shall be executed, that is:

Pollution source located at class I area should execute grade I standard (It forbids class I area to do new construction and extension pollution source, when present pollution source located at class I area is reconstructed, it should execute grade I standard of present pollution source); pollution source located at class II area should execute 2 grade II standard;

Pollution source located at class II area shall follow grade II standard;

Pollution source located at class III area shall follow grade III standard.

6. **Standard Value**

- 6.1 Standard value listed in the polluting source (Hereinafter referred to as "polluting source") execution Table one set up before Jan. 1, 1997.

- 6.2 Standard value Listed in the polluting source (Herein after referred to as "new polluting source") execution table two (including new construction, extension and reconstruction) set up on Jan. 1, 1997.

- 6.3 Set-up date shall be judged and decided according to the following regulations:

- 6.3.1 The approval date of the environment impact report (table) for the project set-up is taken as set-up date.

6.3.2 For the polluting source which is not reviewed and approved by the competent department of the environment protection administration management, environment influence report (table) shall be made up to prepare and approval date taken as set-up date.

7. Other regulations

- 7.1 Except for that the height of discharge pipe shall be in accordance with the standard value of discharge velocity, it shall be more than 5 meters higher than that of the building at the radius around 200 meters scope. If the discharge pipe can not satisfy this requirement, it shall be carried out according to 50% stricter than the discharge velocity standard value listed in the table which is corresponding to the height.
- 7.2 For two pieces of gas discharge pipes with the same pollutants (No matter whether it is discharged from the same production process), if their distance is less than the sum of their geometric height, these two pieces of pipes shall be merged and taken as one piece of equivalent gas discharge pipe. If there are more than three pieces of gas discharge pipes in near distance, which discharge the same pollutants, the equivalent value shall be taken based on previous two pieces of the equivalent gas discharge pipes, secondly the third and fourth pieces of gas discharge pipes. For related parameter calculation method of the equivalent gas discharge pipe, see Appendix A.
- 7.3 If the height of one gas discharge pipe is between two values listed in this standard, the max. allowable discharge velocity to be carried out shall be calculated by the interpolation. For the interpolation calculation formula, see Appendix B of this standard. If the height of gas discharge pipe is more than or less than the max or min. values listed in this standard, the max. allowable discharge velocity shall be calculated by the extrapolation. For extrapolation calculation formula, see Appendix B of this standard.
- 7.4 The gas discharge pipes with the new polluting source is not less than 15 meters in general. If the gas discharge pipes with the new polluting source must be lower than 15 meters, the discharge velocity 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 discharge without organization shall be controlled strictly. In general the discharge without organization shall not

allowed. If the discharge without organization can not avoid; 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 class I of Lingeman.

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 organization shall be provided according to the methods as specified Appendix C of this standard.

8.2 Sampling time and frequency

Three items of figures as specified in this standard means that average value per any one hour shall not exceed the limitation value.

When sampling is carried out, follows shall be done:

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 with equal time and average value is calculated.

8.2.2 Sampling at monitoring point of non-organization discharge

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

If concentration is a bit low, sampling time can be prolonged when it is required;

If analysis method is sensitive highly and samples are required to take in a short time, sampling in equal time interval shall be taken and average value shall be calculated based on four pieces of samples.

8.2.3 Sampling time and frequency under the special condition

If discharge of gas discharge pipe is interrupted and discharge time is less than one hour, continuous sampling in discharge time section shall be taken or 2~4 pieces of 2-4 samples shall be taken by equal time interval in discharge time section and average value calculated.

If discharge of gas discharge pipe is interrupted and discharge time is more than one hour, sampling shall be carried out in discharge time section according to requirements as specified in Clause 8.2.1.

When monitoring of pollution emergency discharge is carried out, sampling time and sampling frequency can be decided as requirement, which is not limited by above requirements;

If sampling time and frequency are decided for monitoring of completion acceptance of the environment protection facilities of the construction project, they shall be in accordance with the completion acceptance monitoring methods for the environment protection facilities of the construction project prepared by the State Environment Protection Bureau.

8.3 Requirements for monitoring cases

8.3.1 During day-to-day monitoring of polluting source, the cases in sampling period shall be the same as cases in operation period. The personnel of pollution discharge unit and personnel of monitoring execution shall not change the operation case at that time wilfully.

8.3.2 Requirement for the completion acceptance cases for the environment protection facilities of the construction projection shall be in accordance with the completion acceptance monitoring methods for the environment protection facilities of the construction project prepared by the State Environment Protection Bureau.

8.4 Sampling and analysis methods

8.4.1 The analysis methods of pollutants shall be in accordance with the regulations specified by the State Environment Protection Bureau.

8.4.2 The sampling methods of pollutants shall be in accordance with the standard GB/T 16157-1996 and related parts of the analysis methods as specified by the State Environment Protection Bureau.

8.5 Measuring of gas discharge amount

The monitoring of gas discharge amount shall be carried out together with sampling and monitoring of discharge concentration.

The measuring methods of the gas discharge amount shall be in accordance with the standard GB/T16157-1996.

9. Standard execution

9.1 If the pollutants are located at the acid rain control area and sulphuric dioxide pollution control area approved and specified by the State Council, it shall be in accordance with the control standard of the total discharge amount except for that the sulphuric dioxide discharge is conformed with this standard.

9.2 The competent department of the people's government's environment protection administration administration of the province, autonomous prefecture, municipalities directly under the central government shall decide whether non organized discharge monitoring concentration limitation value in this standard is carried out in its area and reported to the environment protection administration competent department of the State Council for the record.

9.3 This standard shall be supervised and executed by the environment protection administration competent departments of the people's governments beyond the counties.

Table 1

Limit values of pollutants from existing contamination sources

No	Pollutant	max. allowable emission concentration mg/m ³	max. allowable emission rate, kg/h			concentration limit of non-organized discharge monitoring		
			height of discharge pipe m	1st grade	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
1	sulfur dioxide	1200 (production of sulfur dioxide sulfuric acid and other sulfur-containing compounds)	15	1.6	3.0	4.1	reference point provide upwind of non-organized discharge source and monitoring point downwind	0.50 (difference between concentration at the monitoring point and reference point)
			20	2.6	5.1	7.7		
			30	8.8	17	26		
			40	15	30	45		
			50	23	45	69		
		700 (using sulphur, sulphur dioxide sulfuric acid and other sulfur-containing compounds)	60	33	64	98		
			70	47	91	140		
			80	63	120	190		
			90	82	160	240		
			100	100	200	310		
2	nitrogen oxide	1700 (nitric acid, nitrogenous fertilizer and powder and explosive production)	15	0.47	0.91	1.4	reference point provide upwind of non-organized discharge source and monitoring point downwind	0.15 (difference between concentration at the monitoring point and reference point)
			20	0.77	1.5	2.3		
			30	2.6	5.1	7.7		
			40	4.6	8.9	14		
			50	7.0	14	21		
		420 (nitric acid using and other)	60	9.9	19	29		
			70	14	27	41		
			80	19	37	56		
			90	24	47	72		
			100	31	61	92		

No	Pollutant	max. allowable emission concentration mg/m ³	max. allowable emission rate, kg/h				concentration limit of non-organized discharge monitoring	
			height of discharge pipe m	1st grade	2nd grade	3rd grade	monitoring point	concentration mg/m ³
3	particles	22 (carbon black dust and dye dust)	15	no discharge	0.60	0.87	max. concentration point outside the scope	not seen visually
			20		1.0	1.5		
			30		4.0	5.9		
			40		6.8	10		
		80 *** (glass wool, quartz dust, mineral wool dust)	15	no discharge	2.2	3.1	reference point provide upwind of non-organized discharge source and monitoring point downwind	2.0 (difference between concentration at the monitoring point and reference point)
			20		3.7	5.3		
			30		14	21		
			40		25	37		
		150 (others)	15	no discharge	2.1	4.1	reference point provide upwind of non-organized discharge source and monitoring point downwind	5.0 (difference between concentration at the monitoring point and reference point)
			20		3.5	6.9		
			30		14	27		
			40		24	46		
50	36		70					
60	51	100	150					

* Reference point shall be provided in 2-50m scope at upwind of non-organized discharge source and monitoring point provided in 2~50m scope at downwind. For details, see Appendix C of this standard. The same below.

** The max. concentration point outside the scope shall be generally located at 10m outside the unit scope downwind of the non-organized discharge source. If it is estimated that the max. falling concentration point with non-organized discharge is beyond the scope of 10m, monitoring point can be moved to the foreseen max. concentration point. For details see Attachment c. The same below.

*** Referring to all kinds of dusts with free silicate more than 10%.

No.	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h				concentration limit of non-organized discharge monitoring	
			height of discharge pipe m	1st grade	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
4	hydrogen chloride	150	15	no discharge	0.30	0.46	max. concentration point outside the scope	0.25
			20		0.51	0.77		
			30		1.7	2.6		
			40		3.0	4.5		
			50		4.5	6.9		
			60		6.4	9.8		
			70		9.1	14		
			80		12	19		
5	chromic acid mist	0.080	15	no discharge	0.009	0.014	max. concentration point outside the scope	0.0075
			20		0.015	0.023		
			30		0.051	0.078		
			40		0.089	0.13		
			50		0.14	0.21		
			60		0.19	0.29		
6	sulfuric acid mist	1000 (powder or explosive factory)	15	no discharge	1.8	2.8	max. concentration point outside the scope	1.5
			20		3.1	4.6		
			30		10	16		
			40		18	27		
		70 (others)	50		27	41		
			60		39	59		
			70		55	83		
			80		74	110		
7	fluoride	100 (common calcium industry)	15	no discharge	0.12	0.18	reference points provide for upwind of non-organized discharge source and monitoring point for downwind	20 µg/m ³ (difference between concentration at the monitoring point and reference point)
			20		0.20	0.31		
			30		0.69	1.0		
			40		1.2	1.8		
		11 (others)	50		1.8	2.7		
			60		2.6	3.9		
			70		3.6	5.5		
			80		4.9	7.5		

No	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h			concentration limit of non-organized discharge monitoring		
			height of discharge pipe m	1st grade	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
8	*gaseous chlorine	85	25	no discharge	0.60	0.90	max. concentration point outside the scope	0.50
			30		1.0	1.5		
			40		3.4	5.2		
			50		5.9	9.0		
			60		9.1	14		
			70		13	20		
			80		18	28		

* The discharge pipe for chlorine cannot be lower than 25m.

No	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h			concentration limit of non-organized discharge monitoring		
			height of discharge pipe	1st grade	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
9	lead and its compounds	0.90	15	no discharge	0.005	0.007	max. concentration point outside the scope	0.0075
			20		0.007	0.011		
			30		0.031	0.048		
			40		0.055	0.083		
			50		0.085	0.13		
			60		0.12	0.18		
			70		0.17	0.26		
			80		0.23	0.35		
			90		0.31	0.47		
10	mercury and its compounds	0.015	15	no discharge	1.8x10 ⁻³	2.8x10 ⁻³	max. concentration point outside the scope	0.0015
			20		3.1x10 ⁻³	4.6x10 ⁻³		
			30		10x10 ⁻³	16x10 ⁻³		
			40		18x10 ⁻³	27x10 ⁻³		
			50		27x10 ⁻³	41x10 ⁻³		
			60		39x10 ⁻³	59x10 ⁻³		

No	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h			concentration limit of non-organized discharge monitoring		
			height of discharge pipe	1st grade	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
11	cadmium and its compounds	1.0	15	no discharge	0.060	0.090	max. concentration point outside the scope	0.050
			20		0.10	0.15		
			30		0.34	0.52		
			40		0.59	0.90		
			50		1.3	1.4		
			60		1.8	2.0		
			70		2.5	2.8		
			80			3.7		
12	beryllium and its compounds	0.015	15	no discharge	1.3×10 ⁻³	2.0×10 ⁻³	max. concentration point outside the scope	0.0010
			20		2.2×10 ⁻³	3.3×10 ⁻³		
			30		7.3×10 ⁻³	11×10 ⁻³		
			40		13×10 ⁻³	19×10 ⁻³		
			50		19×10 ⁻³	29×10 ⁻³		
			60		27×10 ⁻³	41×10 ⁻³		
			70		39×10 ⁻³	58×10 ⁻³		
			80		52×10 ⁻³	79×10 ⁻³		
13	nickel and its compounds	5.0	15	no discharge	0.18	0.28	max. concentration point outside the scope	0.050
			20		0.31	0.46		
			30		1.0	1.6		
			40		1.8	2.7		
			50		2.7	4.1		
			60		3.9	5.9		
			70		5.5	8.2		
			80		7.4	11		
14	tin and its compounds	10	15	no discharge	0.36	0.55	max. concentration point outside the scope	0.30
			20		0.61	0.93		
			30		2.1	3.1		
			40		3.5	5.4		
			50		5.4	8.2		
			60		7.7	12		
			70		11	17		
			80		15	22		

No	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h			concentration limit of non-organized discharge monitoring		
			height of discharge pipe	1st grade	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
15	benzene	17	15 20 30 40	no discharge	0.60 0.10 3.3 6.0	0.90 1.5 5.2 9.0	max. concentration point outside the scope	0.50
16	methylbenzene	60	15 20 30 40	no discharge	3.6 6.1 21 36	5.5 9.3 31 54	max. concentration point outside the scope	3.0
17	dimethylbenzene	90	15 20 30 40	no discharge	1.2 2.0 6.9 12	1.8 3.1 10 18	max. concentration point outside the scope	1.5
18	phenols	115	15 20 30 40 50 60	no discharge	0.12 0.20 0.68 1.2 1.8 2.6	0.18 0.31 1.0 1.8 2.7 3.9	max. concentration point outside the scope	0.10
19	formaldehyde	30	15 20 30 40 50 60	no discharge	0.30 0.51 1.7 3.0 4.5 6.4	0.46 0.77 2.6 4.5 6.9 9.8	max. concentration point outside the scope	0.25

No	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h				concentration limit of non-organized discharge monitoring	
			height of discharge pipe	1st grade	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
20	acetaldehyde	150	15	no discharge	0.060	0.090	max. concentration point outside the scope	0.050
			20		0.10	0.15		
			30		0.34	0.52		
			40		0.59	0.90		
			50		0.91	1.4		
			60		1.3	2.0		
21	acrylic cyanogan	26	15	no discharge	0.91	1.4	max. concentration point outside the scope	0.75
			20		1.5	2.3		
			30		5.1	7.8		
			40		8.9	13		
			50		14	21		
			60		19	29		
22	acrylic aldehyde	20	15	no discharge	0.61	0.92	max. concentration point outside the scope	0.50
			20		1.0	1.5		
			30		3.4	5.2		
			40		5.9	9.0		
			50		9.1	14		
			60		13	20		
23	hydrogen cyanide	2.3	15	no discharge	0.18	0.28	max. concentration point outside the scope	0.030
			20		0.31	0.46		
			30		1.0	1.6		
			40		1.8	2.7		
			50		2.7	4.1		
			60		3.9	5.9		
24	methanol	220	15	no discharge	6.1	9.2	max. concentration point outside the scope	15
			20		10	15		
			30		34	52		
			40		59	90		
			50		91	140		
			60		130	200		

No	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h			concentration limit of non-organized discharge monitoring		
			height of discharge pipe	1st grade	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
25	anilines	25	15	no discharge	0.61	0.92	max. concentration point outside the scope	0.50
			20		1.0	1.5		
			30		3.4	5.2		
			40		5.9	9.0		
			50		9.1	14		
			60		13	20		
26	chlorobenzenes	85	15	no discharge	0.67	0.92	max. concentration point outside the scope	0.50
			20		1.0	1.5		
			30		2.9	4.4		
			40		5.0	7.6		
			50		7.7	12		
			60		11	17		
			70		15	23		
			80		21	32		
			90		27	41		
			100		34	52		

* The discharge pipe for hydrogen cyanide cannot be lower than 25m.

No	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h			concentration limit of non-organized discharge monitoring		
			height of discharge pipe	1st grade	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
27	nitrobenzene I	20	15	no discharge	0.060	0.090	max. concentration point outside the scope	0.050
			20		0.10	0.15		
			30		0.34	0.52		
			40		0.59	0.90		
			50		0.91	1.4		
			60		1.3	2.0		

No	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h				concentration limit of non-organized discharge monitoring	
			height of discharge pipe	1st grade	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
28	chloro ethylene	65	15 20 30 40 50 60	no discharge	0.91 1.5 5.0 8.9 14 19	1.4 2.3 7.8 13 21 29	max. concentration point outside the scope	0.75
29	benzopyrene [a]	0.50x10 ⁻³ (asphalt and carbon product producing and processing)	15 20 30 40 50 60	no discharge	0.06x10 ⁻³ 0.10x10 ⁻³ 0.34x10 ⁻³ 0.59x10 ⁻³ 0.90x10 ⁻³ 1.3x10 ⁻³	0.09x10 ⁻³ 0.15x10 ⁻³ 0.51x10 ⁻³ 0.89x10 ⁻³ 1.4x10 ⁻³ 2.0x10 ⁻³	max. concentration point outside the scope	0.01 μgxm ³
30	phosgene	5.0	25 30 40 50	no discharge	0.12 0.20 0.69 1.2	0.18 0.31 1.0 1.8	max. concentration point outside the scope	0.10
31	bitumen smoke	280 (asphalt blow-making) 80 (smelting and immersing) 150 (mixing for construction)	15 20 30 40 50 60 70 80	0.11 0.19 0.82 1.4 2.2 3.0 4.5 6.2	0.22 0.36 1.6 2.8 4.3 5.9 8.7 12	0.34 0.55 2.4 4.2 6.6 9.0 13 18	no obvious non-organized discharge for production equipment	
32	asbestos dust	2 pieces (fiber) or 20mg/m ³	15 20 30 40	no discharge	0.65 1.1 4.2 7.2 11	0.98 1.7 6.4 11 17	no obvious non-organized discharge for production equipment	
33	total hydrocarbon without non-methane	150 (using solvent gasoline or other mixed hydrocarbons)	15 20 30 40 50	6.3 10 35 61	12 20 63 120	18 30 100 170	max. concentration point outside the scope	5.0

* The discharge pipe for phosgene cannot be lower than 25m.

Table 2

Limit values of pollutants from new pollution sources

No.	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h			concentration limit of non-organized discharge monitoring	
			height of discharge pipe m	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
1	sulfur dioxide	960 (production of sulfur, sulfur dioxide, sulfuric acid and other sulfur-containing compounds)	15	2.6	3.5	max. concentration point outside the scope	0.40
			20	4.3	6.6		
			30	15	22		
			40	25	38		
			50	39	58		
		850 (using sulfur, sulfur dioxide, sulfuric acid and other sulfur-containing compounds)	60	55	83		
			70	77	120		
			80	110	160		
			90	130	200		
			100	170	270		
2	nitrogen oxide	1400 (nitric acid, nitrogenous fertilizer and powder and explosive production)	15	0.77	1.2	max. concentration point outside the scope	0.12
			20	1.3	2.0		
			30	4.4	6.6		
			40	7.5	11		
			50	12	18		
		240 (nitric acid using and other)	60	16	25		
			70	23	35		
			80	31	47		
			90	40	61		
			100	52	78		
3	particles	18 (carbon black dust and dye dust)	15	0.51	0.74	max. concentration point outside the scope	not seen visually
			20	0.85	1.3		
			30	3.4	5.0		
			40	5.8	8.5		
		60** (glass wool, quartz dust, mineral wool dust)	15	1.9	2.6	max. concentration point outside the scope	1.0
			20	3.1	4.5		
			30	12	18		
			40	21	31		
		120 (others)	15	3.5	5.0	max. concentration point outside the scope	1.0
			20	5.9	8.5		
			30	23	34		
			40	39	59		
			50	60	94		
			60	85	130		

* The max. concentration point outside the scope shall be generally located at 10m outside the unit scope downwind of the non-organized discharge source. If it is estimated that the max. falling concentration point with non-organized discharge is beyond the scope of 10m, monitoring point can be moved to the foreseen max. concentration point. For details see Appendix C. (the same below)

** Referring to all kinds of dusts with free silicate more than 10%.

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

No	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h			concentration limit of non-organized discharge monitoring	
			height of discharge pipe m	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
8	gaseous	65	25	0.52	0.78	max. concentration point outside the scope	0.40
			30	0.87	1.3		
			40	2.9	4.4		
			50	5.0	7.6		
			60	7.7	12		
			70	11	17		
			80	15	23		

* The discharge pipe for chlorine cannot be lower than 25m.

No	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h			concentration limit of non-organized discharge monitoring	
			height of discharge pipe m	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
9	lead and its compounds	0.7	15	0.004	0.006	max. concentration point outside the scope	0.0060
			20	0.006	0.009		
			30	0.027	0.041		
			40	0.047	0.071		
			50	0.072	0.11		
			60	0.10	0.15		
			70	0.15	0.22		
			80	0.20	0.30		
			90	0.26	0.40		
			100	0.33	0.51		
10	mercury and any its compounds	0.012	15	1.5x10 ⁻³	2.4 x10 ⁻³	max. concentration point outside the scope	0.0012
			20	2.6 x10 ⁻³	3.9 x10 ⁻³		
			30	7.8 x10 ⁻³	13 x10 ⁻³		
			40	15 x10 ⁻³	23 x10 ⁻³		
			50	23 x10 ⁻³	35 x10 ⁻³		
			60	33 x10 ⁻³	50 x10 ⁻³		

No	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h			concentration limit of non-organized discharge monitoring	
			height of discharge pipe m	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
11	cadmium and its compounds	0.85	15	0.050	0.080	max. concentration point outside the scope	0.040
			20	0.090	0.13		
			30	0.29	0.44		
			40	0.50	0.77		
			50	0.77	1.2		
			60	1.1	1.7		
			70	1.5	2.3		
			80	2.1	3.2		
12	beryllium and its compounds	0.012	15	1.1x10 ⁻³	1.7 x10 ⁻³	max. concentration point outside the scope	0.0008
			20	1.8 x10 ⁻³	2.8 x10 ⁻³		
			30	6.2 x10 ⁻³	9.4x10 ⁻³		
			40	11 x10 ⁻³	16x10 ⁻³		
			50	16 x10 ⁻³	25x10 ⁻³		
			60	23 x10 ⁻³	35 x10 ⁻³		
			70	33 x10 ⁻³	50 x10 ⁻³		
			80	44 x10 ⁻³	67 x10 ⁻³		
13	nickel and its compounds	4.3	15	0.15	0.24	max. concentration point outside the scope	0.040
			20	0.26	0.34		
			30	0.88	1.3		
			40	1.5	2.3		
			50	2.3	3.5		
			60	3.3	5.0		
			70	4.6	7.0		
			80	6.3	10		
14	tin and its compounds	8.5	15	0.31	0.47	max. concentration point outside the scope	0.24
			20	0.52	0.79		
			30	1.8	2.7		
			40	3.0	4.6		
			50	4.6	7.0		
			60	6.6	10		
			70	9.3	14		
			80	13	19		

No	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h			concentration limit of non-organized discharge monitoring	
			height of discharge pipe m	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
15	benzene	12	15	0.50	0.80	max. concentration point outside the scope	0.40
			20	0.90	1.3		
			30	2.9	4.4		
			40	5.6	7.6		
16	methylbenzene	40	15	3.1	4.7	max. concentration point outside the scope	2.4
			20	5.2	7.9		
			30	18	27		
			40	30	46		
17	dimethylbenzene	70	15	1.0	1.5	max. concentration point outside the scope	1.2
			20	1.7	2.6		
			30	5.9	8.8		
			40	10	15		
18	phenols	100	15	0.10	0.15	max. concentration point outside the scope	0.080
			20	0.17	0.26		
			30	0.58	0.88		
			40	1.0	1.5		
			50	1.5	2.3		
			60	2.2	3.3		
19	formaldehyde	25	15	0.26	0.39	max. concentration point outside the scope	0.20
			20	0.43	0.65		
			30	1.4	2.2		
			40	2.6	3.8		
			50	3.8	5.9		
			60	5.4	8.3		
20	acetaldehyde	125	15	0.0500	0.080	max. concentration point outside the scope	0.040
			20	0.090	0.13		
			30	0.29	0.44		
			40	0.50	0.77		
			50	0.77	1.2		
			60	1.1	1.6		

No	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h			concentration limit of non-organized discharge monitoring	
			height of discharge pipe m	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
21	acrylic cyanogan	22	15	0.77	1.2	max. concentration point outside the scope	0.60
			20	1.3	2.0		
			30	4.4	6.6		
			40	7.5	11		
			50	12	18		
			60	16	25		
22	acrylic aldehyde	16	15	0.52	0.78	max. concentration point outside the scope	0.40
			20	0.87	1.3		
			30	2.9	4.4		
			40	5.0	7.6		
			50	7.7	12		
			60	11	17		
23	hydrogen cyanide	1.9	25	0.15	0.24	max. concentration point outside the scope	0.024
			30	0.26	0.39		
			40	0.88	1.3		
			50	1.5	2.3		
			60	2.3	3.5		
			70	3.3	5.0		
24	methanol	190	15	5.1	7.8	max. concentration point outside the scope	12
			20	8.6	13		
			30	29	44		
			40	50	70		
			50	77	120		
			60	100	170		
25	anilines	20	15	0.52	0.78	max. concentration point outside the scope	0.40
			20	0.87	1.3		
			30	2.9	4.4		
			40	5.0	7.6		
			50	7.7	12		
			60	11	17		

* The discharge pipe for hydrogen cyanide cannot be lower than 25m.

No.	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h			concentration limit of non-organized discharge monitoring	
			height of discharge pipe m	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
26	chlorobenzenes	60	15	0.52	0.78	max. concentration point outside the scope	0.40
			20	0.87	1.3		
			30	2.5	3.8		
			40	4.3	6.5		
			50	6.6	9.9		
			60	9.3	14		
			70	13	20		
			80	18	27		
			90	23	35		
			100	29	44		
27	nitrobenzenes	16	15	0.050	0.080	max. concentration point outside the scope	0.040
			20	0.090	0.13		
			30	0.29	0.44		
			40	0.50	0.77		
			50	0.77	1.2		
			60	1.1	1.7		
28	chloro ethylene	36	15	0.77	1.2	max. concentration point outside the scope	0.60
			20	1.3	2.0		
			30	4.4	6.6		
			40	7.5	11		
			50	12	18		
			60	16	25		
29	benzopyrene [a] (asphalt and carbon product producing and processing)	0.30x10 ⁻³	15	0.050 x10 ⁻³	0.080 x10 ⁻³	max. concentration point outside the scope	0.008 μg/m ³
			20	0.085 x10 ⁻³	0.13 x10 ⁻³		
			30	0.29 x10 ⁻³	0.43 x10 ⁻³		
			40	0.50 x10 ⁻³	0.76 x10 ⁻³		
			50	0.77 x10 ⁻³	1.2 x10 ⁻³		
			60	1.1x10 ⁻³	1.7 x10 ⁻³		
30	phosgene	3.0	25	0.10	0.15	max. concentration point outside the scope	0.080
			30	0.17	0.26		
			40	0.59	0.88		
			50	1.0	1.5		

* The discharge pipe for phosgene cannot be lower than 25m.

No	Pollutant	max. allowable discharge concentration mg/m ³	max. allowable discharge rate, kg/h			concentration limit of non-organized discharge monitoring	
			height of discharge pipe m	2 nd grade	3 rd grade	monitoring point	concentration mg/m ³
31	asphalt smoke	140 (asphalt blow-making)	15	0.18	0.27	no obvious non-organized discharge for production equipment	
			20	0.30	0.45		
		40 (smelting and immersing)	30	1.3	2.0		
			40	2.3	3.5		
		75 (mixing for construction)	50	3.6	5.4		
			60	5.6	7.5		
			70	7.4	11		
80	10	15					
32	asbestos dust	1 piece (fiber)/cm ³ or 10 mg/m ³	15	0.55	0.83	no obvious non-organized discharge for production equipment	
			20	0.93	1.4		
			30	3.6	5.4		
			40	6.2	9.3		
			50	9.4	14		
33	total hydrocarbon without methane	120 (using solvent gasoline or other mixed hydrocarbons)	15	10	16	max. concentration point outside the scope	4.0
			20	17	27		
			30	53	83		
			40	100	100		

Appendix A (Appendix of the Standard)

Parameter Calculation for the Equivalent Discharge Pipe

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

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

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

$$Q = Q_1 + Q_2$$

Where

Q- pollutant discharging flowrate of the equivalent discharge pipe;

Q₁, Q₂ –discharging flowrate of a pollutant of pipe 1 and pipe 2.

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

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

Where

h - height of the equivalent discharge pipe;

h₁, h₂ – 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. If discharge pipe is as original point, the distance from the equivalent discharge pipe to original point 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.

Appendix B (Appendix of the Standard)

Interpolation and Extrapolation Determining

Max. Allowable Discharging Flowrate of a Discharge Pipe

- B1 When the height of a discharge pipe is between the two heights listed in the Table, interpolation shall be used to calculate max. allowable discharge flowrate as per following equation:

$$Q = Q_0 + (Q_{a+1} - Q_a)(h - h_a)/(h_{a+1} - h_a)$$

Where:

Q-max. allowable discharging flowrate of a discharge pipe;

Q_a- max. value less than the limitation of a discharge pipe listed in Table ;

Q_{a+1} – min. value more than the limitation of a discharge pipe listed in Table;

h- geometric height of a discharge pipe;

h₀-max. value less than the height of a discharge pipe listed in the Table;

h_{a+1}- min. value more than the height of a discharge pipe listed in the Table;

- B2 When the height of a discharge pipe is more than max. value of the limitation of the discharge pipe listed in this standard, extrapolation shall be used to calculate max. allowable discharging flowrate as per following equation:

$$Q = Q_b (h/h_b)^2$$

Where

Q-max. allowable discharging flowrate of a discharge pipe;

Q_b-max. allowable discharging flowrate corresponding to max height of the discharge pipe listed in the Table;

h- height of a discharge pipe;

h_b-max. height of the discharge pipe listed in the Table.

- B3 When the height of a discharge pipe is less than min. value of the height of the discharge pipe listed in this standard, extrapolation shall be used to calculate max. allowable discharging flowrate as per following equation:

$$Q = Q_c(h/h_c)^2$$

Where:

- Q-max. allowable discharging flowrate of a discharge pipe;
- Q_c-max. allowable discharging flowrate corresponding to min. height of the discharge pipe in the Table.
- h- height of a discharge pipe,
- h_c-min. height of the discharge pipe listed in the Table.

Appendix C (Appendix of the Standard)

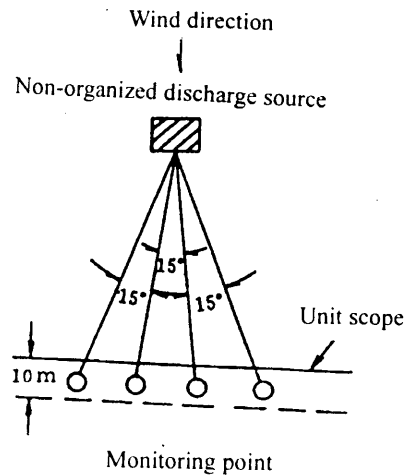
Arrangement of Monitoring Points for Non-organized Discharge

- C1 In this appendix, only guideline is given for arrangement of monitoring points in non-organized discharge since there are various cases of non-organized discharge. Monitoring points shall be provided according to actual situations in monitoring and measurement.
- C2 Arrangement of monitoring points at unit scope boundary
When this standard stipulates that monitoring points are provided at unit scope, the monitoring points shall be arranged as the following principle and method:
- C2.1 The following provisions are mandatory principles.
- C2.1.1 Monitoring points shall be in general provided within 10 meters out of the scope. But if site conditions are not permissible (i.e the scope is arranged alonge a river bank) monitoring points can be moved inside the scope.
- C2.1.2 Monitoring points shall be provided at the point with max. concentration within the scope.
- C2.1.3 If max. falling concentration zone of non-organized discharge is more than 10 meters after estimation, monitoring points shall be provided within the zone.
- C2.1.4 In order to determine the point with max. concentration, four monitoring points shall be provided as a maximum.
- C2.1.5 Height scope of monitoring points shall be within 1.5m to 15m.
- C2.2 Following points are only schematic and for reference in actual monitoring and measurement.
- C2.2.1 In case of obvious wind direction and velocity, following points can be referred.

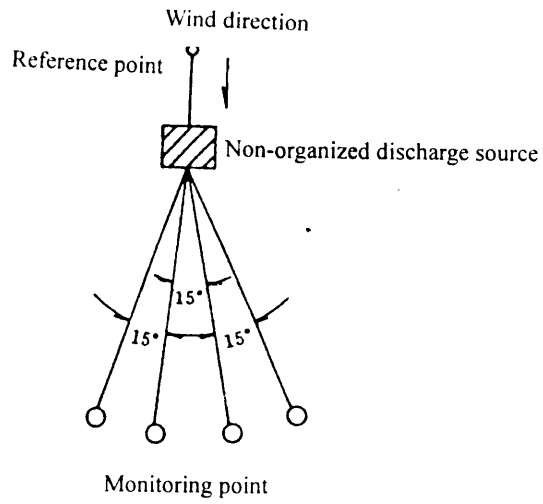
Appendix C (Appendix of the Standard)

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 - C2.1.2 Monitoring points shall be provided at the point with max. concentration within the scope.
 - C2.1.3 If max. falling concentration zone of non-organized discharge is more than 10 meters after estimation, monitoring points shall be provided within the zone.
 - C2.1.4 In order to determine the point with max. concentration, four monitoring points shall be provided as a maximum.
 - C2.1.5 Height scope of monitoring points shall be within 1.5m to 15m.
 - C2.2 Following points are only schematic and for reference in actual monitoring and measurement.
 - C2.2.1 In case of obvious wind direction and velocity, following points can be referred.



- C2.2.2 In case no obvious wind direction and velocity, 40 points can be provided at the point with max. possible concentration based on the actual situation.
- C2.3 The point with the highest concentration shall be taken as calculation figure from the measured figures at four monitoring points.
- C3 The method of providing reference point and monitoring point at up and down wind of discharge source.
- C3.1 Following provisions are mandatory principles.
- C3.1.1 The reference point shall be provided at upwind of unorganized discharge source, and monitoring point at downwind.
- C3.1.2 The monitoring point shall be provided at the point with the max. concentration downwind of discharge source and not be limited by unit scope boundary.
- C3.1.3 In order to determine the max. concentration point, 4 monitoring points can be provided as a maximum.
- C3.1.4 The reference points shall be provided in such principle that they will not be influenced by unorganized discharge source to be measured and can represent background concentration of monitoring points. Only one reference point shall be provided.
- C3.2 The following points are only schematic and for reference in actual monitoring and measurement.
- C3.2.1 In case wind direction and velocity are obvious, the points can be provided with reference to the Fig. below.



C3.3 From the monitoring and measuring results of the above reference scheme the figure shall be taken based on the difference between the max. concentration among the four monitoring points and the concentration of the reference point shall.