

Waste Incinerator Air Pollutant Emissions Standards

Original 14 articles promulgated by Environmental Protection Administration order on November 30, 1992; revisions to Article 3 promulgated on August 6, 1997; revisions to Articles 1, 11, and 13 promulgated on April 7, 1999
Revisions to Article 8, Tables 1 and 2, Article 10, the deletion of Article 9, and the addition of Article 12-1 promulgated on December 25, 2006.

Article 1

These Standards are determined pursuant to Article 20, Paragraph 2 of the Air Pollution Control Act.

Article 2

Terms and Symbols used in these Standards are defined as follows

- I. "mg" means 1 milligram, equal to 0.001 grams.
- II. "Nm³" means a cubic meter at a temperature of 273 K and a pressure of 1 atmosphere.
- III. "ppm" means parts per million.
- IV. "C" means pollutant concentration corrected to Standard Oxygen Basis, measured in ng-TEQ/Nm³ ppm or mg/Nm³.
- V. "Q" means emission quantity corrected to Basic Oxygen Standard, measured in Nm³/min.
- VI. "C_S" means the measured pollutant concentration based on test method, not corrected to Standard Oxygen Basis, measured in ng-TEQ/Nm³ ppm or mg/Nm³.
- VII. "O_S" means the actual measured oxygen concentration in emissions.
- VIII. "E" means the actual oxygen concentration of oxygen-enriched gases imported into incinerator.
- IX. "Variable one-hour average" means the average of continuously fluctuating values during a single hour.

Article 3

For matters not provided in these Standards, the regulations of other relevant standards shall apply; however, Waste Incinerator Dioxin Control and Emission Standards shall be determined separately.

Article 4

These Standards shall apply to stack emissions from general waste and industrial waste incinerators.

Article 5

Should there be particular other emission regulations for air pollutants from industrial waste incinerators such as in the Methods and Facilities Standards for the Storage, Clearance and Disposal of Industrial Waste, the more stringent regulations shall apply.

Article 6

In these Standards, the definitions of "general waste" and "industrial waste" are based on relevant regulations of the Waste Disposal Act. Pollutants produced by industrial units may be controlled in accordance with the General Waste Incinerator Emission Standards if the competent authority has authorized their disposal in a general waste incinerator.

Article 7

“Handling capacity”, as referred to in these Standards, means the maximum weight of waste fed into the said incinerator per hour (regardless of whether wet or dry).

Article 8

For values determined by these Standards view Table 1 and Table 2

Article 9

(deleted)

Article 10

The concentrations of all types of pollutants in stack emissions shall be calculated based on non-diluted dry emission volumes at a temperature of 273K and a pressure of 1 atmosphere. A 11% oxygen concentration shall serve as the reference standard. The correction formula is as follows:

$$C = \frac{21-11}{21-O_s} \cdot C_s$$

When the oxygen concentration of air introduced into an oxygen-enriched combustion system exceeds 21%, an oxygen concentration of 11% shall serve as the reference standard for emissions gases. The correction formula is as follows:

$$C = \frac{E-11}{E-O_s} \cdot C_s$$

If the values in the foregoing two paragraphs ($21-O_s$) or ($E-O_s$) are less than 1, they shall be calculated as 1.

Article 11

In these Standards, “existing incinerator” means:

- I. Construction was completed before December 2, 1992; and documentary proof thereof can be provided.
- II. Construction has been under way, project tender procedures were completed, or if no tenders were invited, project contracts were issued and signed before December 2, 1992. Moreover, such documentary proof was already submitted to the competent authority before March 1, 1993 in applying for verification and approval.

Incinerators not meeting the conditions of two foregoing paragraphs shall be considered newly installed incinerators.

Article 12

The local competent authority may, based on the particular needs of the local area, separately determine more stringent emission standards and submit such to the central competent authority for approval and official announcement.

Article 12-1

A stationary pollution source that uses regular or industrial waste as fuel or auxiliary fuel shall use such fuel in accordance with the usage quantities permitted by the local competent authority and the regulations in Article 8, Table 2 shall apply.

Article 13

Deleted

Article 14

These Standards shall take effect on the date of enforcement except for articles whose enforcement date has been set separately.

Table 1 Waste Incinerator Air Pollutant Emissions Standards

Pollutant Type	General Industrial Waste Incinerator				Industrial Waste Incinerator			
	Newly installed and existing incinerators with a handling capacity of less than 2 tons per hour	Existing or newly installed incinerators with a handling capacity of 2-10 tons per hour	Existing incinerators with a handling capacity of 10 tons or more per hour		Handling capacity does not reach 400 kg/hr		Handling capacity is greater than 400 kg/hr	
Item	Existing or Newly-Built Incinerators	Existing or Newly-Built Incinerators	Existing Incinerators	Newly-Built Incinerators	Existing Incinerators	Newly-Built Incinerators	Existing Incinerators	Newly-Built Incinerators
Opacity (%)	20	20	20	10	20	20	10	10
Particulate pollutants mg/Nm ³	220	Converted based on emission quantity $C = 1364.2 Q^{-0.386}$			180	180	80	80
Sulfur oxides ppm(SO ₂)	300	220	150	80	220	180	220	150
Nitrogen oxides ppm(NO ₂)	250	220	220	180	250	180	220	180
Hydrogen chloride ppm	60	60	60	40	60	60	60	40
Carbon monoxide ppm	350	350	150	120	350	220	350	120
Other pollutants	In accordance with relevant designated standard values							
Notes	<ol style="list-style-type: none"> When the value of C obtained in accordance with formula $C = 1364.2 Q^{-0.386}$ is greater than 220, 220 shall be the allowable emission value. The carbon monoxide standard value shall be the variable one-hour average. The emission standard value for all types of pollutants means the average value of sampling times that are standard in a test method unless other regulations apply. If an automatic continuous test method is adopted for testing all types of pollutants the one-hour average is taken as standard value unless other regulations apply. If there are multiple incinerator facilities within the premises of the same plant at the same time, then the sum of the handling capacities of each incinerator facility shall serve as a supporting basis to determine compliance with the law. 							

Table 2 Waste Incinerator Heavy Metal Air Pollutant Emissions Standards

Date of Promulgation	Handling capacity of 400 kg/hr and below		Handling capacity of 400 kg/hr and above	
Type	Waste incinerators established on or after January 1, 2007		Waste incinerators established prior to January 1, 2007	
Standard/Item	Handling capacity does not reach 4 tons/hr	Handling capacity is greater than 4 tons/hr	Handling capacity does not reach 4 tons/hr	Handling capacity is greater than 4 tons/hr
Lead and its compounds mg/Nm ³	0.5	0.2	0.5	0.2
Cadmium and its compounds mg/Nm ³	0.04	0.02	0.04	0.02
Mercury and its compounds mg/Nm ³	0.05	0.05	0.1	0.05
Notes	<ol style="list-style-type: none"> 1. The standard values for lead, cadmium, mercury and their compounds include solid-gases. 2. Except where other regulations apply, the emission standard value for each pollutant means the average taken during sampling as regulated in the testing method. 3. Except where other regulations apply, when employing continuous automatic testing to test for each pollutant the hourly average shall be the standard value. 4. When there is more than one set of incinerator equipment on the factory premises, the combined Handling capacity for all incinerator equipment shall be the legal standard. 5. Waste incinerators established prior to January 1, 2007, means incinerators whose construction was completed or under way, whose project tender procedures were completed, or if no tenders were invited, whose project contracts were given out and signed before January 1, 2007. All other incinerators shall be categorized as waste incinerators established on or after January 1, 2007. 			

Table 3 Sampling and Test Methods

Item	Test Methods
Opacity	<ol style="list-style-type: none"> 1. Visual determination of smoke 2. Opacity measuring facilities
Particulate pollutants	<ol style="list-style-type: none"> 1. Test methods, officially announced by the EPA, for particulate pollutant concentrations in duct emissions 2. According to Method 5 of EPA of the United States 3. According to JIS Z8808 of Japan 4. Analysis of gas components by Hempel or Orsat method: based on CNS K9018 or according to JIS K2301 5. Through opacity test facilities or other authorized continuous testing facilities that establishes conversion relationship
Sulfur oxides	<ol style="list-style-type: none"> 1. “Testing method for total sulfur oxides in emissions” officially announced by the EPA 2. CNS K9008 3. According to JIS K0103 4. According to Method 6 or Method 8 of EPA of the United States 5. Automatic continuous testing instruments according to JIS B7981
Nitrogen oxides	<ol style="list-style-type: none"> 1. “Testing method for total nitrogen oxides in emissions” officially announced by the EPA 2. According to JIS K0104 3. Automatic continuous testing instruments according to JIS B7982
Hydrogen chloride	<ol style="list-style-type: none"> 1. CNS K9063 2. According to JIS K0107
Carbon monoxide	<ol style="list-style-type: none"> 1. According to JIS K0098 (GC method and infrared method) 2. According to Method 10 of the EPA of United States
Lead and its components	<ol style="list-style-type: none"> 1. According to JIS Z8808 method (atomic absorption spectrophotometry) 2. According to Method 12 of the EPA of the United States
Cadmium and its components	<ol style="list-style-type: none"> 1. According to JIS Z8808 method (atomic absorption spectrophotometry) 2. According to Method 12 of the EPA of the United States
Mercury and its components	<ol style="list-style-type: none"> 1. According to Method 101A of the EPA of the United States 2. According to JIS K0222 of Japan
Notes	If there exists any contradiction between test methods for different types of air pollutants, the newest or revised method as officially announced by the central competent authority shall supersede.