

The Co-firing Ratio and Component Standard for Fuel Used in Stationary Pollution Source

Draft Version and General Description

The Air Pollution Control Act (hereinafter referred to as “This Law”) was promulgated for enactment on August 1 2018 after amendment. Pursuant to Paragraph 1 in Article 28 of This Law, the use fuels and auxiliary fuels that contain bituminous coal or other substances designated and officially announced by the central competent authority and are also used by public or private premises shall meet the standards provided by the central competent authority for fuel types, ratio of fuels in combustion and fuel composition. In addition, the use of these fuels may begin only after application for and acquisition of a use permit issued by the special municipality, county or city competent. In enforcing Paragraph 2 in Article 28 of This Law by the Environmental Protection Administration, Executive Yuan, the proposal of “The Co-firing Ratio and Component Standard for Fuel Used in Stationary Pollution Source ” (hereinafter referred to as “the Standards”) was drafted with general description specified below:

- I. Legal reference. (Article 1 of the draft)
- II. Scope of application of the Standards. (Article 2 of the draft)
- III. Terms and definitions used in the Standards. (Article 3 of the draft)
- IV. Standards for the fuels used in public and private premises. (Article 4 of the draft)
- V. The scope of using auxiliary fuels in public and private premises. (Article 5 of the draft)
- VI. The co-firing ratio of waste derived fuels in public and private premises. (Article 6 of the draft)
- VII. The sampling and test methods adopted by the competent authority at the municipal, county (city) levels on different types of fuels mixed for combustion in public and private premises. (Article 7 of the draft)
- VIII. The enactment date of the Standard. (Article 8 of the draft)

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The provision	Description
Article 1: These Standards are instituted pursuant to Paragraph 2 in Article 28 of the Air Pollution Control Act (hereinafter referred to as “This Law”).	Legal reference of the Standards.
Article 2: The Standards shall be applicable to the use of bituminous coal and other fuels designated and announced by the competent authority at the central level pursuant to Paragraph 1 in Article 28 of This Law with stationary pollution source in public or private premises.	Scope of application of the Standards.
<p>Article 3: The terms and definitions used in the Standards:</p> <p>(I) Fuels: including bituminous coal and fuels designated and announced by the competent authority at the central level pursuant to Paragraph 1 in Article 28 of This Law.</p> <p>(II) Bituminous coal: coal not refining with fixed carbon and volatile content at the ratio of less than 4.</p> <p>(III) Fuel oil: all liquid fuels except fuels reclaimed from liquid wastes.</p> <p>(IV) Petroleum coke: The heavy oil produced in petroleum refining, which has been coked with or without calcining.</p> <p>(V) Solid biofuels: forestry or wood residue without chemical treatment or treated used as fuel directly or after processing.</p> <p>(VI) Waste derived fuels: fuels reclaimed from solid waste or direct ruse of solid and liquid waste.</p> <p>(VII) Auxiliary fuels: the wastes that could be re-used as auxiliary fuels which are designated by the central competent authority or the competent authority of the relevant</p>	Terms and definitions used in the Standards.

<p>industry.</p> <p>(VIII) Co-firing: the combustion of 2 kinds or more of fuels from a stationary pollution source.</p> <p>(IX) Lower heating value: the heat energy generated from fixed quantity of solid or liquid fuel combusted under 1atm, and the water vapor before, during, and after the combustion is maintained at vapor state.</p> <p>(X) Wet basis: the original test specimen without air-dried which indicated the state with total water content.</p> <p>(XI) Air dried basis: the specimen for testing after air dried to show the result of analysis.</p> <p>(XII) Dried basis: the test specimen is based on anhydrous state to show the result of analysis.</p>	
<p>Article IV: The use of fuels and auxiliary fuels in public and private premises shall conform to the standards in content specified in the table attached.</p>	<p>According to Article 28 of This Law, the use of fuels of stationary pollution source shall conform to the standard value in the content specified in the attached table.</p>
<p>Article V: The wet basis lower heating value entered for the use of auxiliary fuels with stationary pollution sources in public or private premises shall not be greater than or equal to 50% of the total lower heating value input.</p>	<p>The wet basis low calorific value is limited to the total low calorific value entered.</p>
<p>Article VI: For waste derived fuels co-firing in stationary pollution source of public and private premises, and the emission standard of stationary pollution source is not as strict as the standard of waste incinerators, the co-firing ratio shall be based on the emission standards of sulfur oxides and nitrogen oxides. The equation is specified below:</p> $H_w = \frac{(C - C_f \times H_f)}{C_w}$ $H_f = 1 - H_w$ <p>H_w : ratio of lower heating value input from waste derived fuels.</p> <p>H_f : ratio of lower heating</p>	<p>I. In paragraph I, the stationary pollution source from combustion of wastes practiced in the EU was adopted in setting the equation of the co-firing ratio of the use of waste derived fuels. If the use of waste derived fuels in public and private premises and the emission standard from stationary pollution source is greater than the standard of waste incinerators, the ratio for co-firing should be set.</p> <p>II. In consideration of using incinerators for the treatment of different forms of wastes in Paragraph I that the sources and the components are more complicated such that stricter</p>

<p>value with the use of fuels other than waste derived fuels from stationary pollution source.</p> <p>C_w : emission standard of incinerators expressed by ppm.</p> <p>C_f : The emission standards of stationary pollution source with the use of waste derived fuels in co-firing, expressed by ppm.</p> <p>C : the concentration of exhaust from co-firing with waste derived fuels, expressed by ppm.</p> <p>If the ratios of sulfur oxides and nitrogen oxides from the calculation of using waste derived fuels in co-firing in public or private premises are different, the lower ratio should be used for regulating the co-firing ratio.</p>	<p>regulations and standard are required. Therefore, the emission standard of incinerators is adopted as the basis. If the emission standard of stationary pollution source is not as strict as incinerators, the ratio of co-firing with waste derived fuels should be regulated, to control air pollution emission by the source regulation.</p> <p>III. Paragraph II shows the method of calculation to find out the ratio of co-firing whereby the stricter standard should be used.</p>
<p>Article VII: When fuel checked by local municipal authority are mixture of different batches, sampling should follow the record near the time of inspection and collect sufficient fuel sample at proper location in front of combustion facility. The sample should be tested with standard method specified by central authority to sample and test.</p>	<p>The methods of sampling and testing on same types of fuels but from different batches for co-firing in public and private premises by the authority at the municipal, county (level) are regulated.</p>
<p>Article VIII: The Standards shall be effective on promulgation day except specified.</p>	<p>The enactment of the Standard.</p>

Rules					Description
Standards of fuel content					<ol style="list-style-type: none"> The regulations and standards adopted by EU , USA and the other countries. The results of analyzing the current coal usage permit information and the domestic coal purchase orders are used as the reference basis for setting the standards. The standards of the content of different kinds of fuels were specified in the table attached by fuel type for purpose of source management. Using bituminous coal as the fuel, the exhaust temperature of each kiln exceeds the condensation temperature of water vapor. Therefore, the water vapor in the flue gas will generally not condense into water, and the lower heating value is used as the basis for determining the heating value . According to “The announcement on the use of liquid fuels with a sulfur content of more than 0.5% as prone to air pollutants”, thereby the fuel oil content sulfur standard is controlled at smaller or equal to 0.5%.Therefore, fuel oils with sulfur content more than 0.5% are prohibited for using at public and private premises of stationary pollution sources. Some countries have banned the burning and use of petroleum coke and substances liable to cause air pollution by their regulations. In addition, there is no public and private premises using petroleum coke as fuels in Taiwan. To avoid evasion of This Law in certain public and private premises, the content of sulfur contained in petroleum coke shall be controlled at less than or equal to 0.5%, and the lower heating value shall be greater than or equal to 8,000 kcal/kg. The ISO 17225 specifications are used as the reference basis for setting solid biomass fuel composition standards.
Fuel type	Items for control	Standard content	Remark	Enactment date	
Bituminous coal	Sulfur content	≤ 1 Wt%	Air dried basis	Promulgation day	
	Ash content	≤ 20 Wt%	Percentage of residues after combustion or residues after heating by weight.		
	Lower heating value	$\geq 4,700$ kcal/kg	Air dried basis		
	Mercury Content	≤ 0.15 $\mu\text{g/g}$	Dried basis		
Fuel oil	Sulfur content	≤ 0.5 %		Promulgation day	
Petroleum coke	Sulfur content	≤ 0.5 Wt%	Air dried basis	Promulgation day	
	Lower heating value	$\geq 8,000$ kcal/kg	Air dried basis		
Solid biofuels	Chlorine content	≤ 0.1 Wt%	Dried basis	To be enacted on January 1 2021	
	Sulfur content	≤ 0.05 Wt%	Dried basis		
	Lead content	≤ 20 $\mu\text{g/g}$	Dried basis		
	Cadmium content	≤ 1 $\mu\text{g/g}$	Dried basis		
	Mercury content	≤ 0.1 $\mu\text{g/g}$	Dried basis		
	Lower heating value	$\geq 3,600$ kcal/kg	Wet basis		