

**Notification of Ministry of Industry**

**Re: Requirement for Installation of an Automatic Instrument or Equipment to Measure Quality of Air Emissions from Stacks B.E. 2544 (2001)**

**Translation**

By the virtue of Clause 16 (tri) of the Ministerial Regulation (No. 2) B.E. 2535 (1992) and amended by Clause 3 of the Ministerial Regulation (No. 11) B.E. 2539 (1996) issued pursuant to the Factory Act, B.E. 2535 (1992), which contains some provisions concerning the limitation of the people rights and liberties that is permissible by the provisions of Section 29 together with Section 35, Section 48 and Section 50 of the Constitution of the Kingdom of Thailand, the Minister of Industry hereby issues the Ministerial Notification as follows:

**Article 1**

In this Notification, an automatic instrument or equipment for measuring the quality of air emissions from stacks means Continuous Emission Monitoring Systems (CEMS) for measuring concentration of air pollutants emitting from a stack. There are three main components as follows:

- (1) Sampling interface/Sampling delivery system
- (2) Analyzer
- (3) Data acquisition system

**Article 2**

The specified factories under this Notification shall install the automatic instrument or equipment to measure quality of air emissions from stacks as follows;

No.	Production Capacity	Type of Industry	Monitored Substances	Remarks
1	Power plant with production capacity per unit of at least 29 MW	Type 88 as specified by Ministerial Regulation (B.E. 2535) or other types of industry having similar pollution source	Opacity or Particulate, Sulfur Dioxide(SO <sub>2</sub> ), Oxides of Nitrogen(NO <sub>x</sub> ), and Oxygen(O <sub>2</sub> )	1. If fuel used has no sulfur, no SO <sub>2</sub> measurement is required. 2. If using natural gas as fuel, no SO <sub>2</sub> and opacity or particulate measurements are required.
2	Boiler or heat source having capacity of at least 30 tons of steam per hour or 100 MMBTU per hour	All types of industry as specified by Ministerial Regulation (B.E. 2535)	Opacity or Particulate, Sulfur Dioxide(SO <sub>2</sub> ), Oxides of Nitrogen(NO <sub>x</sub> ), and Oxygen(O <sub>2</sub> )	1. If fuel used has no sulfur, no SO <sub>2</sub> measurement is required. 2. If using
				natural gas as fuel, no SO <sub>2</sub> and opacity or particulate measurements are required.

No.	Production Capacity	Type of Industry	Monitored Substances	Remarks
3	Any or mixture of cement, lime, or plaster production plants of all sizes, at kiln and clinker cooler	Type 57 as specified by Ministerial Regulation (B.E. 2535)	Opacity or Particulate	-
4	Any or mixture of pulp or paper production plants of all sizes, at recovery furnace, lime kiln, digester brown stock washer, evaporator and condensate stripper system	Type 38 as specified by Ministerial Regulation (B.E. 2535)	Opacity or Particulate and Total Reduced Sulfur(TRS)	-
5	Petroleum refineries of all sizes, at fluid catalytic cracking unit (FCCU), fuel oil combustion unit, sulfur recovery unit (SRU)	Type 49 as specified by Ministerial Regulation (B.E. 2535)	For FCCU: Opacity or Particulate, Sulfur Dioxide (SO <sub>2</sub> ) and Carbon Monoxide (CO); For Fuel oil combustion unit : Sulfur Dioxide (SO <sub>2</sub> ) and Oxygen (O <sub>2</sub> ); For SRU : SO <sub>2</sub> and O <sub>2</sub>	-
6	Smelting, melting, casting, rolling, drawing or producing of primary iron and steel product of at least 100 tons per day, at electric arc furnace, or blast furnace, or any preheat unit using oil or coal as heat source	Type 59 as specified by Ministerial Regulation (B.E. 2535)	Opacity or Particulate	-
7	Smelting, mixing, refining, melting, casting, rolling, drawing or producing of primary metal other than iron or steel, at roaster dryer of copper smelter or sintering machine of zinc smelter of all sizes	Type 60 as specified by Ministerial Regulation (B.E. 2535)	For Roaster : Sulfur Dioxide (SO <sub>2</sub> ); For Dryer of copper smelter : Opacity or Particulate; For Sintering machine of zinc smelter : Opacity or Particulate	-
8	Lead smelter of all sizes using furnace sintering machine or converter	Type 60 as specified by Ministerial Regulation (B.E. 2535)	Opacity or Particulate and Sulfur Dioxide (SO <sub>2</sub> )	-
9	Incinerator of all sizes for waste treatment center	Type 101 as specified by Ministerial Regulation (B.E. 2535)	Oxygen (O <sub>2</sub> ), Carbon Monoxide (CO), and Temperature	-
10	Sulfuric acid production of all sizes	Type 42 as specified by Ministerial Regulation (B.E. 2535) or other types of industry having similar pollution source	Sulfur Dioxide (SO <sub>2</sub> )	-

Units for measurement of the instrument or special equipment are as follows:

Pollutants Measured by Instrument or Equipment	Units
Opacity	Percent (%)
Particulate	mg/m <sup>3</sup>
Sulfur dioxide : SO <sub>2</sub>	ppm
Oxides of nitrogen : NO <sub>x</sub> as Nitrogen dioxide	ppm
Oxygen : O <sub>2</sub>	Percent (%) by volume
Carbon monoxide : CO	ppm
Total Reduced Sulfur (TRS)	ppm
Temperature	Degree Celsius (°C)

### Article 3

Requirement for installation of an automatic instrument or equipment for measuring the quality of air emissions from stack including analytical methods must be as specified by United States Environmental Protection Agency (USEPA) or other methods approved by the Department of Industrial Works.

Continuous measurement of a time sharing concentration of air pollutants from a stack, a same set of monitoring equipment can be used with up to three stacks. However, the quality of air emitting from those stacks must have the comparable characteristics and conditions, such as similar production line, using the same fuel, having similar concentration of air pollutants.

### Article 4

The quality of monitored stack emissions should be reported at standard condition, i.e., at 1 atmospheric pressure (atm) or 760 mmHg, 25 degree Celsius, and on a dry basis having 50% (by volume) of excess air or 7% of excess oxygen. It also should be 1-hour average concentration for 24 consecutive hours. The report must contain data collected from more than 80% of the total time period (0.00-24.00 hrs). In any case that submission of a monitoring report cannot be done or less than 80% of data of 24-hour period are available, a report on causes and corrective measures must be submitted to the Data Receiver Center of Industrial Estate Authority of Thailand within the same day or the next day, counting official holidays.

Monitoring reports submitted to the Data Receiver Center of Industrial Estate Authority of Thailand, to Pollution Control Department, or to Department of Industrial Works shall be done via a communication network as designated by Department of Industrial Works.

### Article 5

This Notification is enforced particularly for factories located in Mab Ta Phut, Padaeng, Eastern, and Asian Industrial Estates of Rayong province, and other factories designated by Department of Industrial Works.

### Article 6

Factories acquiring permits for operation after the published enforceable date must finish the installation of an automatic instrument or equipment before notification of commencing of operation. Factories having permits for operation before the effective date of this Notification, the installation must be finished within one year.

This Notification shall, thus, enter into force on the day following the date of its publication in the Government Gazette.

Announced on the 11th day of December B.E.2544 (2001)

Signed by Mr. Suriya Jungrungreangkit

Minister of Ministry of Industry

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