

Announcement of the Industrial Estate Authority of Thailand**No. 45/2541****Re: Wastewater discharge criteria for factory situated in the industrial estate**

By the virtue of section 10(4) and section 42 of the Industrial Estate Authority of Thailand Act B.E. 2522 (1979),

To ensure proper discharge of wastewater from a factory situated in the industrial estate, the Industrial Estate Authority of Thailand hereby issues this Announcement, prescribing the wastewater discharge criteria for a factory situated in the industrial estate, as follows:

Article 1 The Announcement of the Industrial Estate Authority of Thailand No.13/2530 regarding criteria for discharging wastewater to central wastewater treatment system shall be repealed.

Article 2 In this Announcement,

“Wastewater” shall mean the water after it has been fouled by a variety of uses from production process and other related activities including domestic usage by workers.

“Entrepreneur” shall mean a natural person or juristic person who is permitted to operate industrial business in the industrial estate.

Article 3 All entrepreneurs, except the ones in Bangshan industrial estate, Phadang industrial estate and Maptaput industrial estate who have permission from the Industrial Estate Authority of Thailand to discharge their wastewater directly to public receiving water, shall construct sewer systems for discharging their wastewater from all activities into a central wastewater sewer line of the industrial estate in accordance with the following criteria.

3.1 wastewater shall be discharged at a sufficient velocity to prevent deposition of solids and to ensure all being carried to the central wastewater sewer line of the industrial estate.

3.2 the sewer system shall be a closed system and not generate an odor that may emanate from wastewater.

3.3 the sewer system shall be completely separated from rainwater drainage system to prevent rainwater from entering the central wastewater sewer line of the industrial

estate and specifically to prevent wastewater being discharged into the rainwater drainage system of the industrial estate.

3.4 at least one manhole shall be constructed at wastewater discharging point in the factory premise to serve as a sampling point for quality analysis of discharged wastewater.

3.5 in case where there is a fluctuation of wastewater characteristics during a certain period, an equalization pond of appropriate capacity shall be provided and utilized to achieve uniform wastewater characteristic before being discharged into the central wastewater sewer line of the industrial estate.

3.6 a water gate shall be installed at the point of discharge to the central wastewater sewer line of the industrial estate.

3.7 the sewer system shall be connected to the central wastewater sewer line of the industrial estate at the position of manhole provided by the Industrial Estate Authority of Thailand, and the connection must be completely sealed to prevent leaks.

Article 4 The wastewater quality standard for a factory situated in the industrial estate shall be as established in the table annexed to this Announcement. A discharge of any substances, which may affect drainage and treatment of wastewater adversely, to the central wastewater sewer line of the industrial estate and the public receiving water shall be prohibited. Such substances are

- highly viscous substance,
- suspended solids or precipitates causing clog in the sewer,
- calcium carbide sludge,
- solvent etc.

Article 5 Analysis of parameters prescribed in the wastewater discharge standard in article 4 shall be conducted as follows:

(1) Determination of 5-day biochemical oxygen demand (BOD₅) shall be conducted using the azide modification method at a temperature of 20 °C for five successive days or other test methods approved by the Ministry of Science Technology and Environment or the Ministry of Industry.

(2) Determination of chemical oxygen demand (COD) shall be conducted using the potassium dichromate digestion method.

(3) Determination of suspended solids (SS) shall be conducted using the gravimetric analysis by filtration with glass fiber filter disc.

(4) Determination of total dissolved solids (TDS) shall be conducted using the gravimetric analysis by evaporation at temperature of 103-105 °C for one hour.

(5) Determination of total Kjeldahl nitrogen (TKN) shall be conducted using the Kjeldahl method.

(6) Determination of wastewater pH shall be conducted using pH meter.

(7) Determination of heavy metals shall be conducted using the following methods.

7.1 Determination of chromium (Cr), copper (Cu), cadmium (Cd), barium (Ba), lead (Pb), nickel (Ni), manganese (Mn), and silver (Ag) shall be performed using atomic absorption spectrophotometry; direct aspiration method or plasma emission spectroscopy; inductively coupled plasma (ICP).

7.2 Determination of arsenic (As) and selenium (Se) shall be performed using atomic absorption spectrophotometry; hydride generation method or plasma emission spectroscopy; inductively coupled plasma (ICP).

7.3 Determination of mercury (Hg) shall be performed using atomic absorption spectrophotometry; cold vapor technique.

(8) Determination of total iron shall be conducted using atomic absorption spectrophotometry; direct aspiration method or plasma emission spectroscopy; inductively coupled plasma (ICP).

(9) Determination of fluoride shall be conducted using spectrophotometry.

(10) Determination of sulfide shall be conducted by titration.

(11) Determination of cyanide shall be conducted using distillation method followed by pyridine barbituric acid method.

(12) Determination of formaldehyde shall be conducted using spectrophotometry.

(13) Determination of phenolic compounds shall be conducted using distillation method followed by 4-aminoantipyrine method.

(14) Determination of free chlorine shall be conducted using iodometric method.

(15) Determination of chloride as chlorine (Cl₂) shall be conducted by titration.

(16) Determination of pesticides shall be conducted using gas chromatography.

(17) Determination of water temperature shall be conducted during sampling by using a thermometer.

(18) Determination of oil and grease shall be conducted using solvent extraction followed by separate mass determination of oil and grease.

(19) Determination of radioactive compounds shall be conducted using methods in accordance with Standard Methods for the Examination of Water and Wastewater by American Public Health Association, American Water Works Association, and Water Environment Federation.

Article 6 Analysis of the parameters in article 5 shall be performed in accordance with Manual for Water and Wastewater Analysis by the Environmental Engineering Association of Thailand or Standard Methods for the Examination of Water and Wastewater by American Public Health Association, American Water Works Association, and Water Environment Federation.

If wastewater quality of any factory exceeds standard value set by the Industrial Estate Authority of Thailand in article 4 of this Announcement, a wastewater pretreatment system shall be required before discharging wastewater into the central wastewater treatment system.

Other announcements or orders, issued by the Industrial Estate Authority of Thailand, in so far as they deal with matters governed by this announcement or are contrary to or inconsistent with the provisions of this announcement, shall be replaced by this announcement.

Effective from the 1st January B.E. 2542 (1999), onwards.

Announced on the 11th November B.E. 2541 (1998)

(signed) _____

(Mr. Somjet Thinnapong)

Governor of the Industrial Estate Authority of Thailand

Table annexed to the Announcement of the Industrial Estate Authority of Thailand No.45/2541 Re: Wastewater discharge criteria for factory situated in the industrial estate

Wastewater Quality Standard (unit: mg/l)

Industrial Estates	BOD5 at 20 °C	COD	SS	TDS	TKN	pH	Heavy Metals												Total Iron	Fluoride	Sulphide	Cyanide as HCN	Formaldehyde	Phenols Compound	Chloride as Cl ⁻	Free Chlorine	Pesticide	Temperature °C	Color	Odour	Oil & Grease	Radioactive	Surfactants	
							Hg	Sc	Cd	Pb	As	Cr ³⁺	Cr ⁶⁺	Ba	Ni	Cu	Zn	Mn																Ag
1. Bangchan industrial estate ¹⁾	20	120	50	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	-	-	5	1	0.2	1	1	-	1	*	40	**	**	5	*	-
2. Lamchabang industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
3. Northern region industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
4. Mabtaput industrial estate																																		
- discharged to central wastewater treatment plant	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
- discharged to public channel ^{1),2)}	20	120	50	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	-	-	5	1	0.2	1	1	-	1	*	40	**	**	5	*	-
5. Ladkrabang industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
6. Kangkoy industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
7. Plangyao industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
8. Banwah industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
9. Bangpa-in industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
10. Bangpli industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
11. Padaeng industrial estate ^{1),2)}	20	120	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	-	-	5	1	0.2	1	1	-	1	*	40	**	**	5	*	-
12. Wellgrow industrial estate	50	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
13. Eastern industrial estate	750	1,000	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
14. Bo-win industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
15. Nongkhae industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
16. Samutsakorn industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
17. Saharatana nakorn industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
18. Eastern seaboard industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	1.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
19. Anyathani industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
20. Southern region industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
21. Bangpoo industrial estate																																		
- general industrial zone (existing phase)	1,000	1,500	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
- general industrial zone	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
(extension A zone), export industrial zone																																		
22. Phichit industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
23. Amata nakorn industrial estate																																		
- phase 1, 2, 3, 4	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30

- phase 5, 6	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	1.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
24. Pinthong industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	2.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30
25. Amata city industrial estate	500	750	200	3,000	100	5.5-9.0	0.005	0.02	0.03	0.2	0.25	0.75	0.25	1	1	1.0	5	5	1	10	5	1	0.2	1	1	2,000	1	*	45	**	**	10	*	30

Note: ¹⁾ For the factory situated in Bangchan, Padaeng, and Mabtaput industrial estates, allowed by IEAT to discharge wastewater to public channels, its COD value can be different from this announcement but shall be complied with the Notification of MOI No. 2 (B.E. 2539) and the Notification of Ministry of Science, Technology and Environment No. 3 (B.E. 2539) depending on quantity of wastewater and receiveing water source but shall not exceed 400 mg/

²⁾ Wastewater discharged to public water source that has salinity exceeding 2,000 mg/l, maximum value of TDS in wastewater shall not be higher than 5,000 mg/l

* means it cannot detected by the specified method

** means it must not be in disgusting condition