Chapter NR 280

INTERIM EFFLUENT LIMITATIONS FOR THE PLASTIC AND SYNTHETIC MATERIAL MANUFACTURE WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM

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Note: Pursuant to Chapter 74, Laws of 1973, in sections 147.04 (3) and (5) and under the procedure of section 227.027, Wis. Stats., the department of natural resources has promulgated interim effluent limitations which become effective February 1, 1974 and will remain in effect for a period of one year. These interim effluent limitations will be periodically replaced by permanent effluent limitations.

NR 280.01 Purpose. The purpose of this chapter is to establish interim effluent limitations for discharges from industrial point sources identified herein as authorized by section 147.04 (5), Wis. Stats.

History: Emerg. cr. eff. 2-1-74.

NR 280.02 Applicability. These interim limitations apply to Standard Industrial Classification Codes 2821, 2823 and to some extent to 2851 and 2891 (Epoxy Resins).

(1) Subcategories included. The following subcategories are included: polyvinyl acetate resins, polypropylene resins, urethane resins, polyethylene-low density, cellulose acetate fibers and resins, cellulose triacetate fibers, polyacetal resins, nylon resins and fibers, phenolic resins, polyvinyl alcohol resins, ABS and SAN resins, acrylic resins and fibers, polyester resins and fibers, cellophane, rayon fibers, urea plastics, melamine plastics, epoxy resins, polyethylene-high density, and polyvinyl chloride resins.

(2) Other Limitations. Other interim effluent limitations in accordance with chapter NR 217, Wis. Adm. Code, are applicable to discharges from facilities which belong in the classifications of this section but are excluded from, or not specifically included in, its provisions.

History: Emerg. cr. eff. 2-1-74.

NR 280.03 Application of interim limitations. (1) The limitations are for those dischargers that can be handled on a building block approach in the categories covered.

(2) Waste from several different plants (nylon polyethylene, polystyrene, etc.) may all go to the same waste treatment system. A weighted average based on production levels for each of the plants is to be used in applying each of the effluent limits using an additive approach.

(3) The BOD and COD limits represent a 4–5/1 COD/BOD ratio for the treated effluent. In certain cases this ratio may be higher. If the biological system which is used can meet the BOD limit, but not the limit for COD, some flexibility may be allowable.

History: Emerg. cr. eff. 2–1–74.

NR 280.04 Other limitations. (1) Process wastes from the Plastic Materials and Synthetics Industry contain BOD_5, COD, suspended solids, oil, monomers, and/or raw materials, and chemicals used in initiators (sulfates), solvents, (xylene, acetone toluene, etc.), modifiers (dodecyl mercaptans), inhibitors (hydroquinone), plasticizers (phosphate), and polymerizing catalyst (boron fluoride). Utility blowdown wastes include suspended solids, phosphorus, zinc, chromium, and free chlorine. Parameters such as iron, vanadium, nickel, cobalt, titanium, aluminum, chromium, lithium, molybdenum, and cyanide are introduced in water treatment chemicals, catalysts, and from equipment corrosion products (stainless steel and stabilizers). If any of these parameters are present they should be limited.

(2) Suspended solids for the glass reinforced polyvinyl acetate or polyester resin, or any other glass reinforcing industry, should be kept as low as possible because of the adverse effect the glass particles have on fish and other aquatic animals (TSS should be 10 mg/l).

History: Emerg. cr. eff. 2–1–74.

NR 280.05 Description of abatement models. The following subsections describe in general terms the type of treatment facilities considered to be best practicable treatment technology for the purpose of establishing the interim effluent limitations of this chapter. This description is included to illustrate the type of treatment required. Other treatment technology may be acceptable.

(1) Removal of BOD_5, COD, and Suspended Solids. The basic model wastewater treatment system includes chemical coagulation and settling followed by a biological treatment system, usually completely mixed activated sludge. Because of variations in the waste stream certain pretreatments may have to precede biological treatment. Flow equalization is desirable and often necessary. Phosphoric acid and ammonia provide the supplemental nutrients and should be held to 10 and 5 ppm respectively in the effluent. For very high influent concentrations, multiple biological systems may be needed. The activated sludge system may be preceded with a trickling filter or followed with a stabilization pond or polishing lagoon.

(2) Removal of Heavy Metals. Where removal of heavy metals is necessary the methods include adjustment of pH with lime and reduction or oxidation followed by precipitation of the hydroxide. Coagulating aids are often required.

(3) Oil and Grease. The biological system described for removing BOD will effectively remove oil from effluents down to a range of 5–10 ppm. Coagulation-precipitation methods using coagulating aids can also effectively remove emulsified oil to the range of 5–10 ppm.

(4) Phenols. Activated sludge systems, as described above, effectively remove phenols from waste streams. Systems using activated sludge with nutrients, preceded by trickling filters, have achieved 99.9+% removal of phenol.

(5) Cyanide. The reduction of cyanides in effluent streams is accomplished by chlorination. The system consists of oxidizing the cyanide to cyanate with chlorine or sodium hypochlorite at a pH of 10 or more. The cyanate can be oxidized to carbon dioxide and nitrogen through additional chlorination or by acid hydrolysis.

(6) Organic Nitrogen. Organic nitrogen in the form of urea can be treated by hydrolizing the urea to ammonia with biological or chemical treatment. If necessary, the ammonia can then be removed by steam stripping.

(7) Other Treatment Process. Other methods are being used for certain wastewater streams which have exceptionally high influent concentrations of BOD and COD or that have waste constituents which may interfere with biological treatment. One such method is fluidized-bed incineration. In applying this method to waste from the paint (including phenolic and epoxy resins) and plastics (polyvinyl chloride and polystyrene) industries, the COD concentrations in the scrubber effluent (the only liquid waste) range from 8 to 24 mg/l. This effluent can be recycled to the scrubber continuously and incinerated concurrently with the other waste.

History: Emerg. cr. eff. 2–1–74.

NR 280.06 Table of interim effluent limitations *(In Pounds per 1000 Pounds of Product)*

Subcategory	BOD	COD	Suspended Solids	Other	
(1) Polyvinyl Acetate Resins	0.38	1.88	0.38		
(2) Polypropylene Resins	0.62	3.00	0.62	Vanadium	0.021
				Titanium	0.042
				Aluminum	0.021
(3) Polypropylene Fiber	No Discharge				
(4) Urethane Resins	No Discharge				
(5) Polyethelene—Low Density (ICI Process—O_2 Catalyst)	0.21	1.06	0.26		
(6) Polystyrene Resins	0.19	0.87	0.24	Iron	0.01
				Aluminum	0.01
				Nickel	0.005
				Total Chromium	0.001
(7) Cellulose Triacetate Fibers	0.90	3.12	0.90		
(8) Polyacetal Resins	1.38	6.90	1.38		
(9) Nylon Resins	1.30	6.50	1.30	Phenols	0.008
(10) Nylon Fiber	0.83	4.2	1.10		
(11) Phenolic Resins	0.38	1.90	0.38	Phenols	0.0024
(12) Polyvinyl Alcohol Resins	0.38	1.90	0.38		
(13) ABS, SAN Resins	0.46	2.36	0.46	Total Chromium	0.0016
				Iron	0.016
				Aluminum	0.016
				Nickel	0.008
				Cyanide	0.0008
(14) Acrylic Resins and Fibers	0.78	5.22	0.78	Cyanide	0.0015
				Heavy Metals	0.01
(15) Polyester Resins and Fibers (Alkyd Resins)	0.62	3.00	0.62	Heavy Metals	0.031
(16) Cellophane	10.1	50.0	10.1		
(17) Rayon Fibers	4.5	22.5	4.5	Zinc	0.15
(18) Urea Plastics	0.055	0.27	0.055	Organic Nitrogen[1]	0.0144
				Nickel—Stab.	0.0009
				Cobalt—Stab.	0.0018
(19) Melamine Plastics	0.040	0.20	0.04	Organic Nitrogen[1]	0.01
(20) Epoxy Resins	0.11	0.54	0.09		

NOTES:
[1]As Urea.

History: Emerg. cr. eff. 2–1–74.