

## Chapter NR 296

**INTERIM EFFLUENT LIMITATIONS FOR  
THE TEXTILES  
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 296.01 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 296.02 Applicability.** These interim limitations apply to Standard Industrial Classification Code 22, except 229. The Textile Industry is considered to include the processing, finishing and manufacturing of cotton, wool, blended, and various synthetic textile goods.

(1) Subcategories included. The following subcategories are included:

- (a) Wool scour and finish mills (integrated),
- (b) Wool finish mills,
- (c) Greige goods mills—woven and knitted goods,
- (d) Finishing mills—woven products of cotton synthetics and blends,
- (e) Finishing mills—knitted products of cotton, synthetics, and blends,
- (f) Integrated woven goods mills (includes manufacture of greige goods),
- (g) Integrated carpet mills, and
- (h) Yarn dyeing plants—all yarns.

(2) Operations excluded. These limitations apply only to the listed operations. Specifically excluded are SIC Code 229, "Miscellaneous Textile Goods," and the basic manufacture of synthetic fibers, which is covered under plastic and synthetics industry.

(3) 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 296.03 Application of interim limitations.** (1) Limitations for Categories (1) and (2) (wool scouring and finishing, respectively) should be used only after economic impact analysis.

(2) The pH of final effluents shall be within the range 6.0 to 9.0, with no free hydroxyl alkalinity present. Oil and grease should be limited where applicable, at an effluent limitation based on 10 mg/l.

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

**NR 296.04 Effluent characteristics and abatement models.** Description of Abatement Models—the following paragraphs describe in general terms the characteristics of process effluents and the type of treatment facilities considered to be best practicable treatment technology may be acceptable.

(1) Wool Processing. Wastewater is characterized by brown color, high grease content and high alkalinity (pH 10). The treatment control model is:

- (a) Solvent extraction of grease and suint
- (b) Screening
- (c) Dissolved air flotation
- (d) pH adjustment
- (e) Equalization
- (f) Chemical coagulation
- (g) Settling
- (h) Aerated lagoon

(2) Cotton-Synthetics Integrated Mill. Wastewater characteristics are high BOD, COD and alkalinity, and possibly high color. The treatment control model is:

- (a) Caustic recovery and reuse
- (b) Equalizing pond
- (c) pH adjustment
- (d) Bar and fine screens
- (e) Chemical coagulation and sedimentation
- (f) Carbon absorption
- (g) Biological oxidation

(3) Carpet Integrated Mill Wastewater characteristics may include high color, COD, temperature, latex emulsion and solvent content. The treatment control model is:

- (a) Equalization
- (b) Fine screening
- (c) Chemical coagulation and sedimentation
- (d) Carbon absorption
- (e) Biological oxidation

(3m) Because of the high temperatures associated with carpet processes heat recovery from wastewaters is recommended. Again, the treatment operations may vary in hydraulic order and importance depending on the needs of the specific carpet mill.

(4) In-Plant Control. It is considered quite important that measures be taken to limit or control the discharge of dyestuff and waste

caustic. For this reason, caustic recovery and reuse, where applicable, has been included in the treatment model. Supplementary process controls include: improved control over wet process operations to permit reduced excess chemical usage, improved water usage controls, and improved housekeeping.

(a) Printing operations. Excess paste colors should be separated from the print room wastewaters and the pastes collected manually or automatically into barrels or other suitable containers rather than be allowed to enter floor drains in the print rooms or the screen cleaning/repair rooms. The viscous printing pastes clog drain lines, sewers, and treatment works appurtenances, and further settle out on the sides of aerated basins and in other areas where least desired. Print pastes may exhibit considerable toxicity but conversely, certain pastes have extremely high BOD's from 200,000 mg/l to more than 400,000 mg/l. The collected mass should be incinerated with strict caution in preventing air pollution; or should be partially refined or recovered.

(b) Wool Processing. Recovery of wool grease and suint are essential in achieving effluent limits. Recovery of wool greases by solvent systems and conversion into lanolin was practiced when the lanolin market was favorable. Calcium chloride cracking or acid cracking are possible alternatives. Solvent systems with recovery of the solvents can reduce scour waste loads by 96-97 percent.

(c) Caustic Recovery. Substantial waste reduction can be effected by recovery of caustic solution by means of dialysis, filtration, and multiple-stage evaporation. Countercurrent washing and rinsing following scouring and mercerizing are feasible. A number of textile mills are currently practicing evaporation and reuse of mercerizing solutions with various forms of countercurrent washing.

(5) Cooling Water. Disposal of spent cooling waters, evaporator condensates, air conditioning waters, and cooling tower blowdown constitute additional pollution problems in textile mills. Air conditioning systems which use scrubbers for incoming air will contain lint, oils, and extraneous contaminants. Cooling tower blowdown and spent cooling waters will probably contain chromates, phosphates, or other rust inhibitors, and probably fungicides and biocides.

(6) Load Equalization. Extensive equalization and balancing facilities will be required for smoothing out the abrupt changes and highly-variable characteristics of the raw wastewaters generated by textile mills prior to entering the treatment works. Physical-chemical treatment units are generally less vulnerable to random fluctuations than biological treatment units, but flow equalization will serve to promote most efficient treatment.

(7) Screening. Fine mesh screening of plant wastewaters to remove lint and extraneous fibers can be incorporated into some textile mills. Natural and synthetic fibers, if not removed from wastewaters, may comprise up to 10 percent of the weight of biological sludges. Screening is considered necessary for protecting trickling filtration, carbon adsorption, reverse osmosis and other forms of waste treatment. Solids are disposed of via sanitary landfill, incinerated, or possibly converted into useful by-products.

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

**NR 296.05 Table of Interim Effluent Limitations  
(Pounds of Pollutant per 1000 Pounds of Product)**

Mill Type <sup>1</sup>	Product	Gals/lb <sup>2</sup>	BOD <sub>5</sub>	TSS <sup>4</sup>	Chromium		Phenolics	Sulfide
					Total	Hexavalent		
(1)	Wool.....	35	8	8	.07	.0015	.07	.15
(2)	Wool.....	25	6	6	.05	.0010	.05	.10
(3)	Greige Goods..	5	1.5	2	.01	.0002	.01	.02
(4)	Cloth.....	16	6	6	.03	.0007	.03	.06
(5)	Cloth.....	11	4	5	.02	.0005	.02	.04
(6)	Cloth.....	20	7	7	.04	.0008	.04	.08
(7)	Carpet.....	22	6	6	.05	.0009	.05	.09
(8)	Yarn.....	18	2.5	2.5	.04	.0008	.04	.08

**NOTES:**<sup>1</sup>As defined in NR 296.02 (1).<sup>2</sup>Fecal coliform are not to exceed 1000 organisms per 100 ml in the various effluents when sanitary sewage is present in the system.<sup>3</sup>Estimated water use in gallons per pound of product for good operation.<sup>4</sup>Total suspended solids.**History:** Emerg. cr. eff. 2-1-74.