

## Chapter NR 284

## PULP AND PAPER MANUFACTURING

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**NR 284.01 Purpose.** The purpose of this chapter is to establish effluent limitations for discharges of process wastes from various subcategories of the pulp and paper manufacturing category of point sources.

**History:** Cr. Register, February, 1978, No. 266, eff. 3-1-78.

**Note:** The authority for promulgation of this chapter is set forth in ch. NR 205.

**NR 284.02 Applicability.** The effluent limitations and other provisions in this chapter are applicable to pollutants or pollutant properties in discharges of process waste resulting from activities in any or a combination of any of the following subcategories of the pulp and paper manufacturing point source category as defined in s. NR 284.03:

(1) Integrated production of pulp and paper by:

- (a) BCT bleached kraft mills;
- (b) Fine bleached kraft mills;
- (c) Papergrade sulfite (blow-pit wash) mills;
- (d) Groundwood chemi-mechanical mills;
- (e) Groundwood thermo-mechanical mills;
- (f) Groundwood CMN paper mills;
- (g) Groundwood fine paper mills;
- (h) Soda mills;
- (i) Deink mills; and
- (j) Papergrade sulfite (drum wash) mills.

(2) Non-integrated production of paper by:

- (a) Fine paper mills;
- (b) Tissue paper mills; and
- (c) Tissue FWP paper mills.

(3) Production of pulp by:

- (a) Dissolving kraft mills;
- (b) Bleached kraft mills; and

## (c) Dissolving sulfite mills.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

**NR 284.03 Definitions.** The following definitions are applicable to terms used in this chapter. Definitions of other terms and meanings of abbreviations are set forth in ch. NR 205.

(1) "BCT bleached kraft mills" means those mills at which bleached kraft pulp is produced in a full cook process utilizing a highly alkaline sodium hydroxide and sodium sulfide cooking liquor. The principal products at these mills include paperboard (B), coarse papers (C), tissue papers (T) and market pulp.

(2) "Fine bleached kraft mills" means those mills at which bleached kraft pulp is produced in a full cook process utilizing highly alkaline sodium hydroxide and sodium sulfide cooking liquor. The principal products at these mills include business, writing and printing papers and market pulp.

(3) "Papergrade sulfite (blow-pit wash) mills" means those mills at which sulfite pulp is produced in a full cook process using an acidic cooking liquor of sulfites of calcium, magnesium, ammonia or sodium. Following the cooking operations the spent cooking liquor is separated from the pulp in blow-pits. The principal products at these mills include tissue papers, newspapers, fine papers and market pulp.

(4) "Groundwood chemical mills" means those mills at which pulp is produced utilizing a chemical cooking liquor to partially cook the wood followed by mechanical defibration by refining with or without brightening, resulting in yields of 90% or greater. The principal products at these mills include fine papers, newsprint, molded fiber products and market pulp.

(5) "Groundwood thermo-mechanical mills" means those mills at which pulp is produced by a brief cook utilizing steam, with or without the addition of cooking chemicals, followed by mechanical defibration by refiners which are frequently under pressure, with or without brightening and resulting in yields of approximately 95% or greater. The principal products include market pulp, fine papers, newsprint and tissue papers.

(6) "Groundwood CMN paper mills" means those mills at which groundwood pulp is produced with or without brightening, utilizing only mechanical defibration by either stone grinders or refiners. The principal products at these mills include coarse papers (C), molded fiber products (M), newsprint (N) and market pulp.

(7) "Groundwood fine paper mills" means those mills at which groundwood pulp is produced, with or without brightening, utilizing only mechanical defibration by either stone grinders or refiners. The principal products at these mills include business, writing and printing papers and market pulp.

(8) "Soda mills" means those mills at which bleached soda pulp is produced by a full cook process utilizing a highly alkaline sodium hydroxide cooking liquor. The principal products at these mills include printing, writing and business papers and market pulp.

(9) "Deink mills" means those mills at which deinked pulp is usually brightened or bleached from waste papers in which an alkaline treatment is utilized to remove contaminants such as ink and coating pigments. The principal products at these mills include printing, writing and business papers, tissue papers, newsprint, and market pulp.

(10) "Paper grade sulfite (drum wash) mills" means those mills at which sulfite pulp is produced in a full cook process using an acidic cooking liquor of sulfites of calcium, magnesium, ammonia or sodium. Following the cooking operations the spent cooking liquor is washed from the pulp on vacuum or pressure drums. Also included are mills using belt extraction systems for pulp washing. The principal products at these mills are tissue papers, fine papers, newspapers and market pulp.

(11) "Fine paper mills" means those mills at which fine papers are produced from wood pulp or deinked pulp prepared at another site. The principal products at these mills include printing, business, writing and technical papers.

(12) "Tissue paper mills" means those mills at which tissue papers are produced from wood pulp or deinked pulp prepared at another site. The principal products at these mills include facial and toilet papers, glassine, paper diapers and paper towels.

(13) "Tissue FWP paper mills" means those mills at which tissue papers are produced from waste papers without deinking prepared at another site. The principal products at these mills include facial and toilet paper, glassine, paper diapers and paper towels.

(14) "Dissolving kraft mills" means those mills at which a highly bleached pulp is produced by a full cook process utilizing a highly alkaline sodium hydroxide and sodium sulfide cooking liquor. Included in the manufacturing process is a precook operation termed prehydrolysis. The principal product at these mills is a highly bleached and purified dissolving pulp used principally for the manufacture of rayon and other products requiring the virtual absence of lignin and a very high alpha cellulose content.

(15) "Bleached kraft mills" means those mills at which bleached pulp is produced by a full cook process utilizing a highly alkaline sodium hydroxide and sodium sulfide cooking liquor. The principal product at these mills is paper grade market pulp.

(16) "Dissolving sulfite mills" means those mills at which a highly bleached pulp is produced from softwoods by a full cook process utilizing strong solutions of sulfites of calcium, magnesium, ammonia or sodium. The principal products produced at the mills include viscose, nitration, cellophane or acetate grade pulps which are used principally for the manufacture of rayon and other products that require the virtual absence of lignin.

(17) "Acid sulfite cooking liquor" is sulfite cooking liquor having a pH less than 3.0.

(18) "Bisulfite cooking liquor" is sulfite cooking liquor having a pH between 3.0 and 6.0.

(19) "Full cook" means chemical pulping methods as opposed to mechanical pulping methods or semi-chemical pulping methods which employ both chemical pretreatment and mechanical energy in the pulping processes.

(20) "Integrated production" means pulp and paper manufacturing operations where all or part of the manufactured pulp is processed into paper at common or adjacent sites. Products of mills employing integrated production may include market pulp as well as paper.

(21) "Non-continuous discharger" means a person discharging pursuant to a WPDES permit which:

(a) Prohibits the discharge of pollutants during specified periods of time in excess of 24 hours in duration for purposes other than control of treatment plant upsets, and

(b) Specifies that annual average limitations are applicable to such a discharge.

(22) "Production" means annual off-the-machine production, including off-the-machine coating where applicable, divided by the number of operating days during that year, where paper production shall be measured in off-the-machine moisture content, and market pulp shall be measured in air-dry tons (10% moisture). Production shall be determined based on past production practices, present trends or committee growth.

(23) "Wet barking operations" include hydraulic barking operations and wet drum barking operations which are those drum barking operations that use substantial quantities of water in either water sprays in the barking drums or in a partial submersion of the drums in a tub of water.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

**NR 284.04 Compliance with effluent limitations and standards.** Discharge of pollutants from facilities subject to the provisions of this chapter may not exceed, as appropriate:

(1) By July 1, 1977 effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available;

(2) By July 1, 1983 effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable;

(3) Pretreatment standards for discharges to publicly owned treatment works;

(4) Standards of performance for new sources.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78; r. and recr. Register, August, 1983, No. 332, eff. 9-1-83.

**NR 284.05 Modification of effluent limitations.** (1) Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available may be modified in accordance with this section.

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(2) An individual discharger or other interested person may submit evidence to the department that factors relating to the equipment or facilities involved, the process applied, or other such factors related to such discharger are fundamentally different from the factors considered in the establishment of the effluent limitations. On the basis of such evidence or other available information the department will make a written determination that such factors are or are not fundamentally different for that facility compared to those specified in the applicable sections of the EPA development document identified in sub. (3) below. If such fundamentally different factors are found to exist, the department shall establish for the discharge effluent limitations in the WPDES permit either more or less stringent than the limitations in this chapter, to the extent dictated by such fundamentally different factors. Such limitations must be approved by EPA which may approve, disapprove, or specify other limitations.

(3) The EPA development document for effluent limitations guidelines and new source performance standards, identified by segment title, by EPA document number and by publication date, applicable in accordance with sub. (2) above is:

“Bleached Kraft, Groundwood, Sulfite, Soda, Deink and Non-Integrated Paper Mills”, EPA 440/1-76/047-b (March 1977)

(4) Copies of the development document identified in sub. (3) above are available for inspection at the office of the department of natural resources, the secretary of state's office, and the office of the revisor of statutes, and may be obtained for personal use from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20460.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

**NR 284.06 Application of effluent limitations and standards.** (1) The effluent limitations and standards set forth in this chapter shall be used in accordance with this section to establish the quantity or quality of pollutants or pollutant properties which may be discharged by a point source subject to the provisions of this chapter, except as they may be:

- (a) Modified in accordance with s. NR 284.05,
- (b) Superseded by more stringent limitations and standards necessary to achieve water quality standards,
- (c) Supplemented or superseded by standards or prohibitions for toxic pollutants or by additional limitations for other pollutants required to achieve water quality standards, or
- (d) Superseded by more stringent limitations or standards necessary to comply with other legal requirements, including discharge limitations established in permits issued pursuant to ch. 147, Stats., prior to the effective date of this chapter to point sources subject to the provisions of this chapter.

(2) The production basis for application of the limitations and standards set forth in this chapter shall be the annual production divided by the number of operating days in the year for each subcategory subject to the provisions of this chapter, except for those limitations set forth in Table 2, for which only the proportion of the mill's production subject to the activities listed in Table 2, or due to use of logs or chips subject to the

activities listed in Table 2, shall be subject to the limitations set forth in Table 2.

(3) For facilities subject to effluent limitations in more than one subcategory, the discharge limitations shall be the aggregate of limitations applicable to the total production covered by each subcategory.

(4) Only non-continuous dischargers shall be subject to annual average limitations. When annual average limitations are applied, the department shall establish daily maximum and monthly average concentration limitations for BOD, suspended solids, and zinc reflecting wastewater treatment levels representative of best practicable control technology currently available in lieu of the monthly average and daily maximum limitations set forth in Tables 1 and 2.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

**NR 284.10 Effluent limitations representing best practicable control technology currently available.** The following effluent limitations for all or specific subcategories when applied in accordance with s. NR 284.06 establish the quantity or quality of pollutants or pollutant properties which may be discharged by a facility subject to the provisions of this chapter after application to process wastes of the best practicable control technology currently available.

(1) The pH of all discharges shall be within the range of 5.0 to 9.0

(2) The base 30-day average, daily maximum and annual average limitations for BOD and suspended solids are set forth in Table 1 in lbs/ton lbs or kg/1000 kg of product. Additional 30-day average, daily maximum and annual average limitations for BOD, suspended solids and zinc are set forth in Table 2 in lbs/ton lbs or kg/1000 kg of product for specific activities within each subcategory. The limitations in Table 2 shall be in addition to those set forth in Table 1.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

**NR 284.11 Pretreatment standards.** The pretreatment standards for discharges to publicly owned treatment works from sources subject to the provisions of this chapter shall be as set forth in ch. NR 211.

History: Cr. Register, August, 1983, No. 332, eff. 9-1-83.

TABLE 1

Subcategory	BOD			TSS		
	Daily Maxi- mum	30-day Aver- age	Annual Aver- age	Daily Maxi- mum	30-day Aver- age	Annual Aver- age
(1) (a) BCT Bleached Kraft	27.3	14.2	8.0	48.0	25.8	14.2
(b) Fine Bleached Kraft	21.2	11.0	6.1	44.3	23.8	13.2
(c) Papergrade Sulfitc (Blow-Pit)	63.6	33.1	18.6	87.9	47.3	26.0
(d) Groundwood Chcmi-Mechanical	27.0	14.1	7.9	39.5	21.3	11.7
(e) Groundwood Thermo-Mechanical	21.2	11.1	6.2	31.1	16.7	9.2
(f) CMN Groundwood	14.9	7.8	4.4	25.5	13.7	7.5
(g) Fine Groundwood	13.7	7.2	4.0	23.5	12.6	6.9
(h) Soda	27.4	14.2	8.0	49.0	26.4	14.5
(i) Deink	36.2	18.8	10.6	48.1	25.9	14.2
(j) Paper Grade Sulfitc (Drum Wash)	53.4	27.8	15.6	87.9	47.3	26.0
(2) (a) Fine Paper	16.4	8.5	4.8	22.0	11.8	6.5
(b) Tissue Paper	22.8	12.5	7.0	20.5	10.0	5.7
(c) Tissue Paper (FWP)	27.4	14.2	8.0	34.1	18.4	10.1
(3) (a) Dissolving Kraft	47.2	24.5	13.8	74.6	40.1	22.1
(b) Bleached Kraft	30.9	16.1	9.0	60.8	32.8	18.0
(c) Dissolving Sulfitc	82.8	43.1	24.2	141.3	76.1	41.8

Limitations are in pounds per ton. For kg/1000 kg, divide by 2.

TABLE 2

Subcategory	Activity Process	BOD			TSS			Zinc		
		Daily Max.	30-day Ave.	Annual Ave.	Daily Max.	30-day Ave.	Annual Ave.	Daily Max.	30-day Ave.	Annual Ave.
(1) (a) BCT Bleached Kraft	1. wet barking	4.5	2.4	1.3	11.5	6.2	3.4			
	2. log, chip washing	0.5	0.3	1.0	1.3	0.7	0.4			
	3. log fluming, ponding	0.9	0.5	0.2	2.5	1.4	0.7			
(b) Fine Bleached Kraft	1. wet barking	3.9	2.0	1.1	10.6	5.7	3.1			
	2. log, chip washing	0.4	0.2	0.1	1.1	0.6	0.3			
	3. log fluming, ponding	0.7	0.4	0.2	2.3	1.2	0.6			
(c) Papergrade Sulfitc (Blow-Pit)	1. wet barking	5.4	2.9	1.6	15.0	7.9	4.4			
	2. log, chip washing	0.3	0.2	0.1	5.1	2.7	1.5			
	3. log fluming, ponding	0.7	0.4	0.2	3.4	1.8	1.0			
	4. bisulfite cooking, barometric condensing	5.8	3.0	1.7	16.5	8.9	4.9			
	5. acid sulfite cooking, surface condensing	1.0	0.5	0.3						
	6. acid sulfite cooking, barometric condensing	7.5	3.0	2.2	16.5	8.9	4.9			
(d) Groundwood Chemi-Mechanical	1. wet barking	1.8	0.9	0.5	5.2	2.9	1.6			
	2. log, chip washing	0.1	0.1	0.1	0.5	0.3	0.2			
	3. log fluming, ponding	0.3	0.1	0.1	1.1	0.6	0.3			
	4. zinc hydrosulfite bleaching							0.68	0.34	0.23
(e) Groundwood Thermo-Mechanical	1. wet barking	1.8	0.9	0.6	5.4	2.9	1.5			
	2. log, chip washing	0.1	0.1	0.1	0.6	0.3	0.1			
	3. log fluming, ponding	0.3	0.2	0.1	1.2	0.7	0.3			
	4. zinc hydrosulfite bleaching							0.52	0.26	0.17
(f) CMN Groundwood	1. wet barking	2.3	1.1	0.6	4.0	2.2	1.2			
	2. log, chip washing	0.3	0.1	0.1	0.4	0.3	0.2			
	3. log fluming, ponding	0.5	0.2	0.1	0.9	0.5	0.3			
	4. zinc hydrosulfite bleaching							0.60	0.30	0.20
(g) Fine Groundwood	1. wet barking	2.2	1.1	0.7	3.9	2.2	1.2			
	2. log, chip washing	0.3	0.1	0.1	0.4	0.3	0.2			
	3. log fluming, ponding	0.4	0.1	0.1	0.8	0.5	0.3			
	4. zinc hydrosulfite bleaching							0.55	0.27	0.18

Subcategory	Activity/Process	BOD			TSS			Zinc		
		Daily Max.	30-day Ave.	Annual Ave.	Daily Max.	30-day Ave.	Annual Ave.	Daily Max.	30-day Ave.	Annual Ave.
(h) Soda	1. wet barking	4.1	2.2	1.2	10.5	5.6	3.1			
	2. log, chip washing	0.3	0.2	0.1	1.0	0.5	0.3			
	3. log fluming, ponding	0.6	0.4	0.2	2.2	1.1	0.7			
(j) Papergrade Sulfitc (Drum Wash)	1. wet barking	6.1	3.2	1.3	15.0	7.9	4.4			
	2. log, chip washing	0.7	0.4	0.2	5.1	2.7	1.5			
	3. log fluming, ponding	1.4	0.7	0.4	3.4	1.8	1.0			
	4. bisulfite cooking, baro- metric condensing*	5.4	2.8	1.6	16.5	8.9	4.9			
	5. acid sulfite cooking, surface condensing*	6.1	3.2	1.8						
	6. acid sulfite cooking, barometric condensing*	11.6	6.0	3.4	16.5	8.9	4.9			
	7. continuous digesting	22.9	11.9	6.7	19.6	10.6	5.3			
(3) (a) Dissolving Kraft	1. wet barking	6.4	3.4	1.9	13.3	7.5	4.0			
	2. log, chip washing	0.7	0.4	0.2	1.4	0.8	0.4			
	3. log fluming, ponding	1.2	0.7	0.4	2.9	1.6	0.8			
(b) Bleached Kraft	1. wet barking	4.6	2.4	1.4	10.6	5.7	3.1			
	2. log, chip washing	0.4	0.2	0.2	1.2	0.6	0.3			
	3. log fluming, ponding	0.8	0.4	0.3	2.3	1.2	0.7			
(c) Dissolving Sulfitc	1. wet barking	1.4	0.7	0.4	0.3	0.2	0.1			
	2. log, chip washing	0.3	0.2	0.1	0.3	0.2	0.1			
	3. log fluming, ponding	0.3	0.2	0.1	0.3	0.2	0.1			
	4. viscose grade pulp making	5.8	3.0	1.7						
	5. cellophane grade pulp making	13.3	6.9	3.9						
	6. acetate grade pulp making	18.8	9.8	5.6						

\*Not applicable to facilities using continuous digesters.

Limitations are in pounds per ton. For kg/1000 kg, divide by 2.