

Chapter NR 240

DAIRY PRODUCTS PROCESSING

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NR 240.01 Purpose. The purpose of this chapter is to establish effluent limitations, standards of performance, and pretreatment standards for discharges of process wastes from the dairy products processing industry category of point sources and subcategories thereof.

Note: The authority for promulgation of this chapter is set forth in ch. NR 205.
History: Cr. Register, June, 1976, No. 246, eff. 7–1–76.

NR 240.02 Applicability. The effluent limitations, standards of performance, pretreatment standards, and other provisions in this chapter are applicable to pollutants or pollutant properties in discharges of process waste resulting from operations or manufacture in any or a combination of the following subcategories.

(1) RECEIVING STATIONS. Facilities in this subcategory are those engaged in the assembly and reshipment of bulk milk for the use of manufacturing or processing plants;

(a) Class A facilities are those receiving more than 15,600 pounds per day BOD input (150,000 pounds milk equivalent), and
(b) Class B facilities are those receiving less than class A.

(2) FLUID PRODUCTS. Facilities in this subcategory are those manufacturing market milk (ranging from 3.5% fat content to fat free), flavored milk (chocolate and others), and cream (of various fat contents, plain or whipped);

(a) Class A facilities are those receiving more than 25,900 pounds per day BOD input (250,000 pounds milk equivalent), and
(b) Class B facilities are those receiving less than class A.

(3) CULTURED PRODUCTS. Facilities in this subcategory are those manufacturing cultured products, including cultured skim milk, cultured buttermilk, yogurt, sour cream, and dips of various types;

(a) Class A facilities are those receiving more than 6,200 pounds per day BOD input (60,000 pounds milk equivalent), and
(b) Class B facilities are those receiving less than class A.

(4) BUTTER. Facilities in this subcategory are those manufacturing butter either by churning or a continuous process;

(a) Class A facilities are those processing more than 18,180 pounds per day BOD input (175,000 pounds milk equivalent), and
(b) Class B facilities are those processing less than class A.

(5) COTTAGE AND CREAM CHEESE. Facilities in this subcategory are those manufacturing cottage cheese and cultured cream cheese;

(a) Class A facilities are those processing more than 2,600 pounds per day BOD input (25,000 pounds milk equivalent), and
(b) Class B facilities are those processing less than class A.

(6) NATURAL AND PROCESSED CHEESE. Facilities in this subcategory are those manufacturing natural cheese (hard curd) and processed cheese;

(a) Class A facilities are those processing more than 10,390 pounds per day BOD input (100,000 pounds milk equivalent), and
(b) Class B facilities are those processing less than class A.

(7) FLUID MIX FOR FROZEN PRODUCTS. Facilities in this subcategory are those manufacturing fluid mixes for ice cream and other frozen desserts (for later freezing in other plants);

(a) Class A facilities are those having a dairy products input of more than 8,830 pounds per day BOD input (85,000 pounds milk equivalent), and

(b) Class B facilities are those having a dairy products input less than class A.

(8) ICE CREAM AND FROZEN PRODUCTS. Facilities in this subcategory are those manufacturing ice cream, ice milk, sherbert, water ices, stick confections, frozen novelty products, frozen desserts, mellorine, pudding, and other dairy product base desserts;

(a) Class A facilities are those having a dairy products input of more than 8,830 pounds per day BOD input (85,000 pounds milk equivalent), and

(b) Class B facilities are those having a dairy products input of less than class A.

(9) CONDENSED MILK. Facilities in this subcategory are those manufacturing condensed whole milk, condensed skim milk, sweetened condensed milk, and condensed buttermilk;

(a) Class A facilities are those condensing more than 10,390 pounds per day BOD input (100,000 pounds milk equivalent), and

(b) Class B facilities are those condensing less than class A.

(10) DRY MILK. Facilities in this subcategory are those manufacturing dry whole milk, dry skim milk, and dry buttermilk;

(a) Class A facilities are those with an input equivalent to more than 15,070 pounds per day BOD input (145,000 pounds milk equivalent), and

(b) Class B facilities are those with an input less than class A.

(11) CONDENSED WHEY. Facilities in this subcategory are those manufacturing condensed sweet whey and condensed acid whey;

(a) Class A facilities are those with more than 14,160 pounds per day BOD input (300,000 pounds of raw fluid whey containing 20,700 pounds solids), and

(b) Class B facilities are those with an input less than class A.

(12) DRY WHEY. Facilities in this subcategory are those manufacturing sweet or acid dry whey;

(a) Class A facilities are those with more than 15,620 pounds per day BOD input (57,000 pounds of 40% solids whey containing 22,800 pounds of solids), and

(b) Class B facilities are those with an input less than class A.

History: Cr. Register, June, 1976, No. 246, eff. 7–1–76.

NR 240.03 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) “BOD input” means the 5 day biochemical oxygen demand of the materials entered into process. It can be calculated by multiplying the amounts of fats, proteins, and carbohydrates by factors of 0.890, 1.031, and 0.691, respectively. Organic acids, e.g. lactic acid, should be included as carbohydrates. The composition of input materials may be based on either,

- (a) Direct analysis, or
- (b) Generally accepted published values such as specifically those in s. NR 240.07.

(2) "Milk equivalent" means the quantity of 3.7% fat content whole milk necessary to supply one pound of fluid raw material to a process.

History: Cr. Register, June, 1976, No. 246, eff. 7-1-76.

NR 240.04 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, June, 1976, No. 246, eff. 7-1-76; r. and recr. Register, August, 1983, No. 332, eff. 9-1-83.

NR 240.06 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:

(a) They may be modified in accordance with subch. IV of ch. NR 220,

(b) They may be superseded by more stringent limitations and standards necessary to achieve water quality standards or meet other legal requirements, or

(c) They may be supplemented or superseded by standards or prohibitions for toxic pollutants or by additional limitations for other pollutants required to achieve water quality.

(2) The production basis for application of the limitations and standards set forth in this chapter shall be the daily average for a maximum month for the facility in each subcategory subject to the provisions of this chapter.

(3) For a facility which manufactures one or more final products in only one of the subcategories of s. NR 240.02 using a process or processes involving the production of intermediate products in any other subcategories the total discharge limitation shall be the total of the amounts calculated from the BOD input in the final product subcategory and each of such other subcategories involved, except that,

(a) Such other subcategories shall not include receiving stations, subcategory (1), and

(b) If the facility is in subcategory (8) the total discharge limitation shall not include any amounts calculated for fluid mixes it prepares and shall be reduced by the amounts calculated for any fluid mixes it receives from other facilities.

(4) For a facility which manufactures final products in more than one of the subcategories of s. NR 240.02 the total discharge limitation shall be the total of the amounts calculated in accordance with sub. (3) for each final product subcategory involved.

Note: For example, a facility receives daily 300,000 pounds of 3.7% fat content whole milk, sells 100,000 pounds, makes cheese from 200,000 pounds, and produces dry whey, from the 180,000 pounds of fluid whey containing 12,480 pounds of solids produced in the cheese process. Dry whey production involves the intermediate production of condensed whey. The facility has final products in subcategory (1) (class B), (6) (class A), and (12) (class B) and an intermediate product in subcategory (11) (class B). Discharge limitations for the facility are calculated using s. NR 240.07 data to determine BOD input, and average effluent limitations in s. NR 240.10 to determine discharge limitations to be achieved by best practicable treatment, as shown in the table with data in pounds except that the BOD factor is in pounds for 100 pounds of raw materials and the effluent limitation in pounds per 1000 pounds of BOD input.

Product (column)	Material Used 1	BOD Factor 2	BOD Input 3	Effluent Limitations		Discharge Limitations	
				4	5	6	7
				BOD	TSS	BOD	TSS
raw milk	100,000 milk	10.39	10,390	0.31	0.47	3.2	4.9
cheese	200,000 milk	10.39	20,780	0.29	0.44	6.0	9.1
cond. whey	180,000 whey	4.72	8,596	0.65	0.98	5.5	8.3
dry whey	180,000 whey	4.72	8,596	0.65	0.98	5.5	8.3
TOTAL						20.2	30.6

(for column 3 divide column 1 by 100 and multiply by column 2; for columns 6 and 7 divide column 3 by 1000 and multiply by columns 4 and 5 respectively)

History: Cr. Register, June, 1976, No. 246, eff. 7-1-76; correction in (1) (a) made under s. 13.92 (4) (b) 7, Stats., Register April 2018 No. 748.

NR 240.07 BOD of dairy product materials. The data in table 1 taken from the development document incorporated by reference in subch. IV of ch. NR 220, are generally accepted published values for the protein, fat, and carbohydrate content and

BOD equivalent of common dairy products process materials and may be used to determine the BOD input of such materials in facilities subject to the provisions of this chapter.

Table 1

BOD of Dairy Product Materials				
Material	% Protein	% Fat	% Carbohydrate	BOD ₅ kg/100kg (lb/100lb)
Almonds (dried)	18.6	54.2	19.5	80.89
Blackberries (canned, light syrup)	0.8	0.6	17.3	13.30
Buttermilk				
Fluid (cultured skim milk)	3.6	0.1	5.1	7.22
Dried	34.6	5.3	50.0	74.63
Chocolate (semisweet)	4.2	35.7	57.0	65.49
Cheese				
Brick	22.2	30.5	1.9	51.35
Cheddar	25.0	32.2	2.1	55.89
Cottage (uncreamed)	17.0	0.3	2.7	19.66
Cherries (sweet, light syrup)	0.9	0.2	16.5	12.51
Cocoa (dry powder, low-medium fat)	19.2	12.7	53.8	68.17
Cream (fluid)				
Half-and-Half	3.2	11.7	4.6	16.89
Light (coffee or table)	3.0	20.6	4.3	24.39
Light whipping	2.5	31.3	3.6	32.93
Heavy whipping	2.2	37.6	3.1	37.87
40 Percent	2.1	40.0	2.9	39.77
Milk (fluid)				
Whole, 3.7% Fat	3.5	3.7	4.9	10.39
Whole, 3.5% Fat	3.5	3.5	4.9	10.23
Skim	3.6	0.1	5.1	7.44
Milk (canned)				
Evaporated (unsweetened)	7.0	7.9	9.7	21.74
Condensed (sweetened)	8.1	8.7	54.3	53.76
Milk (dried)				
Whole	26.4	27.5	38.2	78.85
Skim	35.9	0.8	52.3	75.01
Orange juice				
All commercial varieties	0.7	0.2	10.4	7.85
Peaches, canned				
Water pack	0.4	0.1	8.1	6.11
Juice pack	0.6	0.1	11.6	8.75
Pecans	9.2	71.2	14.6	83.17
Strawberries				
Canned, water pack	0.4	0.1	5.6	4.40
Frozen, sweetened	0.4	0.2	23.5	17.06
Sugar	0.0	0.0	99.5	68.75
Walnuts, black	20.5	59.3	14.8	85.15
Whey				
Fluid	0.9	0.3	5.1	4.72
Dried	12.9	1.1	73.5	65.07
40 Percent Solids	5.5	0.5	30.1	26.71

History: Cr. Register, June, 1976, No. 246, eff. 7-1-76; correction made under s. 13.92 (4) (b) 7, Stats., Register April 2018 No. 748.

NR 240.10 Effluent limitations, best practicable treatment. The following effluent limitations for all or specific subcategories when applied in accordance with s. NR 240.06 establish, except as provided in subch. IV of ch. NR 220, 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 6.0 to 9.0.

(2) The 30-day average and daily maximum limitations for BOD₅ and suspended solids are set forth in table 2 in lbs/1000lbs or kg/1000kg of BOD₅ input.

Table 2

Subcategory	BPT Effluent Limitations				
	Class	BOD ₅		TSS Suspended Solids	
		Average	Maximum	Average	Maximum
Receiving stations	(A)	0.19	0.48	0.29	0.71
	(B)	0.31	0.63	0.47	0.94
Fluid products	(A)	1.35	3.38	2.03	5.51
	(B)	2.25	4.50	3.38	6.75
Cultured products	(A)	1.35	3.38	2.03	5.06
	(B)	2.25	4.50	3.38	6.75
Butter	(A)	0.55	1.38	0.83	2.06
	(B)	0.91	1.83	1.37	2.74
Cottage and cream cheese	(A)	2.68	6.70	4.02	10.05
	(B)	4.46	8.93	6.69	13.39
Natural and processed cheese	(A)	0.29	0.73	0.44	1.09
	(B)	0.49	0.98	0.73	1.46
Fluid mixes for frozen products	(A)	0.88	2.20	1.32	3.30
	(B)	1.46	2.93	2.19	4.39
Ice cream and frozen products	(A)	1.84	4.60	2.76	6.90
	(B)	3.06	6.13	4.59	9.19
Condensed milk	(A)	1.38	3.45	2.07	5.18
	(B)*	2.30	4.60	3.45	6.90
Dry milk	(A)	0.65	1.63	0.98	2.44
	(B)	1.09	2.18	1.64	3.28
Condensed whey	(A)	0.40	1.00	0.60	1.50
	(B)*	0.65	1.30	0.98	1.95
Dry whey	(A)	0.40	1.00	0.60	1.50
	(B)	0.65	1.30	0.98	1.95

*These limitations are exclusive of barometric condenser discharges which shall be permitted with net concentration limits for BOD₅ of 10 mg/l 30 day average and 15 mg/l daily maximum.

History: Cr. Register, June, 1976, No. 246, eff. 7-1-76; correction in (intro.) made under s. 13.92 (4) (b) 7, Stats., Register April 2018 No. 748.

NR 240.11 Effluent limitations, best available treatment. The following effluent limitations for all or specific subcategories when applied in accordance with s. NR 240.06 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 avail-

able technology economically achievable.

(1) The pH of all discharges shall be within the range of 6.0 to 9.0.

(2) The 30-day average and daily maximum limitations for BOD₅ and suspended solids are set forth in table 3 in lbs/1000lbs or kg/1000kg of BOD₅ input.

Table 3

Subcategory	Class	BOD ₅		TSS Suspended Solids	
		Average	Maximum	Average	Maximum
Receiving stations	(A)	0.05	0.10	0.06	0.13
	(B)	0.08	0.15	0.09	0.19
Fluid products	(A)	0.37	0.74	0.46	0.93
	(B)	0.55	1.10	0.69	1.38
Cultured products	(A)	0.37	0.74	0.46	0.93
	(B)	0.55	1.10	0.69	1.38
Butter	(A)	0.08	0.16	0.10	0.20
	(B)	0.13	0.25	0.16	0.31
Cottage cheese and cream cheese	(A)	0.74	1.48	0.93	1.85
	(B)	1.11	2.23	1.39	2.78
Natural and processed cheese	(A)	0.08	0.16	0.10	0.20
	(B)	0.13	0.25	0.16	0.31
Fluid mixes for frozen products	(A)	0.24	0.48	0.30	0.60
	(B)	0.36	0.73	0.45	0.91
Ice cream and frozen products	(A)	0.47	0.94	0.59	1.18
	(B)	0.70	1.40	0.88	1.75
Condensed milk	(A)	0.38	0.76	0.48	0.95
	(B)	0.58	1.15	0.72	1.44
Dry milk	(A)	0.28	0.36	0.23	0.45
	(B)	0.28	0.55	0.34	0.69
Condensed whey	(A)	0.11	0.22	0.14	0.28
	(B)	0.16	0.33	0.20	0.41
Dry whey	(A)	0.11	0.22	0.14	0.28
	(B)	0.16	0.33	0.20	0.41

History: Cr. Register, June, 1976, No. 246, eff. 7-1-76.

NR 240.12 Standards of performance. The following effluent limitations for all or specific subcategories when applied in accordance with s. NR 240.06 establish the quantity or quality of pollutants or pollutant properties which may be discharged by a facility which is a new source subject to the provisions of this chapter.

(1) The pH of all discharges shall be within the range of 6.0 to 9.0.

(2) The 30-day average and daily maximum limitations for BOD₅ and suspended solids are set forth in table 4 in lbs/1000lbs or kg/1000kg of BOD₅ input.

Table 4

Subcategory	Standards of Performance Effluent Limitations			
	BOD ₅		TSS Suspended Solids	
	Average	Maximum	Average	Maximum
Receiving stations	0.05	0.10	0.06	0.13
Fluid products	0.37	0.74	0.46	0.93
Cultured products	0.37	0.74	0.46	0.93
Butter	0.08	0.16	0.10	0.20
Cottage and cream cheese	0.74	1.48	0.93	1.85
Natural and processed cheese	0.08	0.16	0.10	0.20
Fluid mixes for frozen products	0.24	0.48	0.30	0.60
Ice cream and frozen products	0.47	0.94	0.59	1.18
Condensed milk	0.38	0.76	0.48	0.95
Dry milk	0.18	0.36	0.23	0.45
Condensed whey	0.11	0.22	0.14	0.28
Dry whey	0.11	0.22	0.14	0.28

History: Cr. Register, June, 1976, No. 246, eff. 7-1-76.

NR 240.13 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, June, 1976, No. 246, eff. 7-1-76; r. and recr. Register, August, 1983, No. 332, eff. 9-1-83.