

Chapter NR 294

SOAP AND DETERGENT MANUFACTURING

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NR 294.01 Purpose. The purpose of this chapter is to establish effluent limitations, standards of performance, and pretreatment standards for discharges of process wastes from the soap and detergent manufacturing category of point sources and subcategories thereof.

Note: The authority for promulgation of this chapter is set forth in Wis. Adm. Code chapter NR 205.

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

NR 294.02 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 the manufacture of soap and detergent products, intermediate products, and associated processing operations in the following subcategories:

(1) Soap manufacture by the batch kettle process in which neat soap is produced through saponification of animal and vegetable fats and oils by boiling;

(2) Fatty acid manufacture by hydrolysis and subsequent processing to produce a suitable feed material for manufacture of soap by fatty acid neutralization,

(a) where subsequent processing does not include hydrogenation, and

(b) where subsequent processing includes hydrogenation;

(3) Soap manufacture by neutralizing refined fatty acids with an alkaline material in approximately stoichiometric amounts;

(4) Glycerine concentration of sweet water from saponification or fat splitting to approximately 60 to 80% crude glycerine content;

(5) Glycerine distillation from crude glycerine to produce finished glycerine of various grades (e.g. UPS);

(6) Manufacture of soap flakes and powders including all operations commencing with drying of the soap to and including packaging of the finished flakes and powders;

(7) Manufacture of bar soaps including all drying, milling, plodding, stamping, and packaging operations associated with conversion of neat soap to finished bar soaps;

(8) Manufacture of liquid soaps including the blending of ingredients and the packaging of the finished products;

(9) Manufacture of sulfonic acid and sulfuric acid esters by means of sulfonation and sulfation of raw materials, including but not limited to petroleum derived alkyls, employing oleum;

(10) Manufacture of sulfonic acid and sulfuric acid esters by means of sulfonation and sulfation employing air and sulfur trioxide;

(11) Sulfonation of organic reactants by the process in which the organic reactant and sulfur trioxide are fed through a mixing nozzle into a vacuum reactor;

(12) Sulfation processes in which sulfamic acid is employed as the sulfating agent;

(13) Sulfation of alcohols, alkylphenols, and alcohol ethoxylates utilizing chlorosulfonic acid as the sulfating agent;

(14) Neutralization of sulfated and sulfonated alkylbenzenes, alcohols, and other materials to convert them to neutral salts;

(15) Manufacture of spray dried detergents, including but not limited to, assembly and storage of raw materials, crutching, spray drying, blending (including tumble spraying of additives), and packaging where there is, with or without fast turnaround operation, as defined in section NR 294.03,

(a) Normal operation of a spray drying tower, or

(b) Air quality restricted operation of a spray drying tower;

(16) Manufacture of liquid detergents commencing with the blending of ingredients to and including bottling or packaging finished products involving, as defined in section NR 294.03, either normal liquid detergent operations, or fast turnaround operations;

(17) Manufacture of detergents by dry blending ingredients, including, but not limited to, blending and subsequent packaging;

(18) Manufacture of drum dried detergents including, but not limited to, drying of formulations on heated drums or rollers, conversion of dried detergents to powders or flakes, and the packaging of finished products; and

(19) Manufacture of detergent bars and cakes including, but not limited to, drying, milling, plodding, stamping, and packaging.

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

NR 294.03 Definitions. The following special definitions are applicable to terms used in this chapter. Definitions of other terms and meanings of abbreviations are set forth in Wis. Adm. Code chapter NR 205.

(1) "Anhydrous product" means the theoretical product that would result if all water were removed from the actual product.

(2) "Neat soap" means the solution of completely saponified and purified soap containing 20-30% water which is ready for final formulation into a finished product.

(3) "Surfactant" means those methylene blue active substances amenable to measurement by the method described on page 131 of "Methods for Chemical Analysis of Water and Wastes", published 1971 by the Analytical Quality Control Laboratory of the Environmental Protection Agency. Copies of this document 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 Water Quality Office, U.S. EPA, 1014 Broadway, Cincinnati, Ohio, 45268.

(4) "Sweet water" means the solution of 8-10% crude glycerine and 90-92% water that is a by-product of saponification or fat splitting.

(5) "Normal operation" of a spray drying tower means operation utilizing formulations that present limited air quality problems from stack gases and associated need for extensive wet scrubbing, and without more than 6 turnarounds in a 30 day consecutive period, thus permitting complete recycle of waste water.

(6) "Air quality restricted operation" of a spray drying tower means an operation utilizing formulations (e.g. those with high non-ionic content) which require a very high rate of wet scrubbing to maintain desirable quality of stack gases, and thus generate much greater quantities of waste water than can be recycled to process.

(7) "Fast turnaround operation" of a spray drying tower means operation involving more than 6 changes of formulation in a 30 consecutive day period that are of such degree and type (e.g. high phosphate to no phosphate) as to require cleaning of the tower to maintain minimal product quality.

(8) "Normal liquid detergent operations" means all such operations except those defined as fast turnaround operation of automated fill lines.

(9) "Fast turnaround operation of automated fill lines" means an operation involving more than 8 changes of formulation in a 30 consecutive day period that are of such degree and type as to require thorough purging and washing of the fill line to maintain minimal product quality.

(10) "BOD," means the biochemical oxygen demand as determined by incubation at 20° C for a period of 7 days using an acclimated seed. Agitation employing a magnetic stirrer set at 200 to 500 rpm may be used.

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

NR 294.04 Compliance with effluent limitations and standards. Discharge of pollutants from facilities subject to the provisions of this chapter shall 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, 1977 pretreatment standards for existing discharges to publicly owned treatment works;

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

(4) Standards of performance for new sources; or

(5) Pretreatment standards for new sources discharging to publicly owned treatment works.

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

NR 294.05 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.

(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 Soap and Detergent Development Document, EPA 440/1-74-018-a. 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) Copies of this Development Document, "Soap and Detergent," EPA 440/1-74-018-a, published April, 1974, 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, June, 1976, No. 246, eff. 7-1-76.

NR 294.06 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 section NR 294.05.

(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.

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(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) The process waste discharge limitations for a facility subject to the provisions of this chapter shall be the sum of effluent limitations determined for the production of the facility in each of the applicable process or product subcategories.

(4) For operations in subcategories (15) and (16) which are not fast turnaround operations the effluent limitations are as set forth in the tables of sections NR 294.10, 294.11, or 294.12 as appropriate. For such operations which are fast turnaround operations, those limitations shall be increased using the appropriate factor of said tables,

(a) By addition to determine the daily maximum for either subcategory,

(b) By addition of the factor divided by 30 and multiplied by the number of turnarounds in excess of 6 in a 30 day period to determine the daily average limitation for subcategory (15) and

(c) By addition of the factor divided by 30 and multiplied by the number of turnarounds in excess of 8 in a 30 day period to determine the daily average limitation for subcategory (16).

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

NR 294.10 Effluent limitations, best practicable treatment. The following effluent limitations for all or specific subcategories when applied in accordance with sections NR 294.06(3) and (4) establish, except as provided in section NR 294.05, 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 limitations for BOD₅, suspended solids, COD, surfactants, and oil and grease are set forth in Table I in lbs/1000 lbs or kg/1000 kg of anhydrous product.

(3) The daily maximum limitations are 3 times the daily average limitation except for subcategory (9) for which they are as set forth in parenthesis below the 30 day average limitations in table 1.

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

NR 294.11 Effluent limitations, best available treatment. The following effluent limitations for all or specific subcategories when applied in accordance with sections NR 294.06(3) and (4) 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 available technology economically achievable.

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

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(2) The 30-day average limitations for BOD₅, suspended solids, COD, surfactant, and oil and grease are set forth in Table 2 in lbs/1000 lbs or kg/1000 kg of anhydrous products.

(3) Daily maximum limitations are 2 times the 30 day average limitations except for subcategory (9) for which they are 3 times the 30 day average.

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

NR 294.12 Standards of performance. The following effluent limitations for all or specific subcategories when applied in accordance with sections NR 294.06 (3) and (4) 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 limitations for BOD₅, suspended solids, COD, surfactant, and oil and grease are set forth in Table 3 in lbs/1000 lbs or kg/1000 kg of anhydrous product.

(3) The daily maximum limitations are 2 times the 30-day average values except for subcategory (9) for which they are 3 times the 30-day average.

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

NR 294.13 Pretreatment standards for new sources. The pretreatment standards for discharges to publicly owned treatment works from new sources subject to the provisions of this chapter shall be as set forth in Wis. Adm. Code chapter NR 211 except that section NR 211.30 shall apply only to discharges resulting from manufacture in subcategories (14) through (18) which shall be limited so that there is no discharge in which both the COD/BOD₅ ratio exceeds 10 and the quantity of COD, in lbs/1000 lbs or kg/1000 kg of anhydrous product, exceeds 2.4, 1.1, 0.26, or 0.20 for subcategories (15), (16), (17), or (18) respectively.

Table 1

Subcategory as defined in section NR 294.02	BPT Effluent Limitations				
	BOD	COD	TSS	Surfactants	Oil and Grease
(1)	.60	1.50	.40		.10
(2) (a)	1.20	3.30	2.20		.30
(2) (b)	1.35	3.55	2.30		.40
(3)	.01	.05	.02		.01
(4)	1.50	4.50	.20		.10
(5)	.50	1.50	.20		.10
(6)	.01	.05	.01		.01
(7)	.34	.85	.58		.04
(8)	.01	.05	.01		.01
(9)	.02	.09	.03	.03	.07
	(.09)	(.40)	(.15)	(.15)	(.25)
(10)	.30	1.35	.03	.30	.05
(11)	.30	1.35	.03	.30	.05
(12)	.30	1.35	.03	.30	.05
(13)	.30	1.35	.03	.30	.05
(14)	.01	.05	.03	.02	.01
(15) (a)	.01	.05	.01	.02	.005
(15) (b)	.08	.35	.10	.15	.03
(15) factor	.02	.09	.02	.03	.005
(16)	.20	.60	.005	.13	.005
(16) factor	.05	.15	.002	.04	.002
(17)	.01	.07	.01	.01	.005
(18)	.01	.05	.01	.01	.01
(19)	.70	3.30	.20	.50	.02

Table 2

Subcategory as defined in section NR 294.02	BAT Effluent Limitations				
	BOD	COD	TSS	Surfactants	Oil and Grease
(1)	.40	1.05	.40		.05
(2) (a)	.25	.90	.20		.15
(2) (b)	.40	1.15	.30		.25
(3)	.01	.05	.02		.01
(4)	.40	1.20	.10		.04
(5)	.30	.90	.04		.02
(6)	.01	.05	.01		.01
(7)	.20	.60	.34		.03
(8)	.01	.05	.01		.01
(9)	.02	.09	.03	.03	.07
(10)	.19	.55	.02	.18	.04
(11)	.10	.45	.01	.10	.02
(12)	.10	.45	.01	.10	.02
(13)	.15	.75	.02	.15	.03
(14)	.01	.05	.03	.02	.01
(15) (a)	.01	.04	.02	.02	.005
(15) (b)	.06	.25	.07	.10	.02
(15) factor	.02	.07	.02	.02	.005
(16)	.05	.22	.005	.05	.005
(16) factor	.02	.07	.002	.02	.002
(17)	.01	.07	.01	.01	.005
(18)	.01	.05	.01	.01	.01
(19)	.30	1.35	.10	.20	.02

Table 3

Subcategory as defined in section NR 294.02	Standards of Performance Effluent Limitations				
	BOD	COD	TSS	Surfactants	Oil and Grease
(1)	.40	1.05	.40		.05
(2) (a)	.25	.90	.20		.15
(2) (b)	.40	1.15	.30		.25
(3)	.01	.05	.02		.01
(4)	.40	1.20	.10		.04
(5)	.30	.90	.04		.02
(6)	.01	.05	.01		.01
(7)	.20	.60	.34		.03
(8)	.01	.05	.01		.01
(9)	.01	.03	.02	.01	.04
(10)	.09	.40	.02	.09	.02
(11)	.10	.45	.01	.10	.02
(12)	.10	.45	.01	.10	.02
(13)	.15	.75	.02	.15	.03
(14)	.01	.04	.03	.02	.01
(15) (a)	.01	.04	.02	.02	.005
(15) (b)	.06	.25	.07	.10	.02
(15) factor	.02	.07	.02	.02	.005
(16)	.05	.22	.005	.05	.005
(16) factor	.02	.07	.002	.02	.002
(17)	.01	.07	.01	.01	.005
(18)	.01	.05	.01	.01	.01
(19)	.30	1.35	.10	.20	.02

NR 294.14 Pretreatment standards for existing sources. The pretreatment standards for discharges to publicly owned treatment works from existing point sources subject to the provisions of this chapter shall be as set forth in Wis. Adm. Code chapter NR 211 except that section NR 211.30 shall not apply.

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