

Liquid Streaming

Δ Table 5.2.2 Liquid Stream Treatment Processes

Row ^a	Line ^a	Location and Function	Fire and Explosion Hazard	Ventilation ^b	Extent of Classified Location ^c	NEC Hazardous Location Classification (All Class I, Group D) ^d	Materials of Construction ^e	Fire Protection Measures
1	a	DIVERSION AND CONTROL STRUCTURES Not preceded by Primary Treatment with Skimming	Possible ignition of flammable gases and floating flammable liquids	A	Enclosed — entire space	Division 1	NC	FE, H; CGD if enclosed in building
	B			Enclosed — entire space	Division 2	NC, LC, or LFS	FE, H; CGD if enclosed in a building	
	c			Not enclosed, open to atmosphere	Within a 3 m (10 ft) envelope around equipment and open channel	Division 2	NC, LC, or LFS	FE and H
2	a	COARSE AND FINE SCREEN FACILITIES	Possible ignition of flammable gases and floating flammable liquids	A	Enclosed — entire space	Division 1	NC	FE, H, CGD
	b	Removal of screenings from raw wastewater		B	Enclosed — entire space	Division 2	NC, LC, or LFS	FE, H, CGD
	c			Not enclosed, open to atmosphere	Within a 3 m (10 ft) envelope around equipment and open channel	Division 2	NC, LC, or LFS	FE, H
3		PUMPING STATIONS, DIVERSION STRUCTURES AND CONTROL STRUCTURES (See Table 4.2.2.)						
4	a	FLOW EQUALIZATION TANKS	Possible ignition of flammable gases and floating flammable liquids	A	Enclosed — entire space	Division 1	NC	FE, H; CGD if enclosed in a building
	b	Storage of raw or partially treated wastewater		B	Enclosed — entire space	Division 2	NC, LC, or LFS	FE, H; CGD if enclosed in a building
	c			Not enclosed, open to atmosphere	Within a 3 m (10 ft) envelope around equipment and open channel ^{4a}	Division 2	NC, LC, or LFS	FE, H
5	a	GRIT REMOVAL TANKS Separation of grit from raw wastewater	Possible ignition of flammable gases and floating flammable liquids	A	Enclosed — entire space	Division 1	NC	FE, H; CGD if enclosed in a building
	b	B		Enclosed — entire space	Division 2	NC, LC, or LFS	FE, H; CGD if enclosed in a building	
	c	Not enclosed, open to atmosphere		Within a 3 m (10 ft) envelope around equipment and open channel ^{4a}	Division 2	NC, LC, or LFS	FE, H	
6	a	PRE-AERATION TANKS	Possible ignition of flammable gases and floating flammable liquids	A	Enclosed — entire space	Division 1	NC	H; CGD if enclosed in a building
	b	Conditioning of wastewater prior to further treatment		B	Enclosed — entire space	Division 2	NC, LC, or LFS	H; CGD if enclosed in a building
	c			Not enclosed, open to atmosphere	Within a 3 m (10 ft) envelope around equipment and open channel ^{4a}	Division 2	NC, LC, or LFS	H

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Δ Table 5.2.2 Continued

Row ^a	Line ^a	Location and Function	Fire and Explosion Hazard	Ventilation ^b	Extent of Classified Location ^c	NEC Hazardous Location Classification (All Class I, Group D) ^d	Materials of Construction ^e	Fire Protection Measures
7	a	PRIMARY SEDIMENTATION TANKS	Possible ignition of flammable gases and floating flammable liquids	A	Enclosed — entire space	Division 1	NC	H; CGD if enclosed in a building
	b	Separation of floating or settleable solids from raw wastewater		B	Enclosed — entire space	Division 2	NC, LC, or LFS	H; CGD if enclosed in a building
	c			Not enclosed, open to atmosphere	Interior of the tank from the minimum operating water surface to the top of the tank wall; envelope 0.46 m (18 in.) above the top of the tank and extending 0.46 m (18 in.) beyond the exterior wall; envelope 0.46 m (18 in.) above grade extending 3 m (10 ft) horizontally from the exterior tank walls	Division 2	NC, LC, or LFS	H
8		AERATION BASIN, POND, LAGOON, OXIDATION DITCH, AEROBIC SUSPENDED GROWTH SYSTEMS, SEQUENCING BATCH REACTORS Aerobic treatment of wastewater open to the atmosphere	N/A	NR		Classified (<i>see</i> Primary Sedimentation) Unclassified if process is preceded by primary sedimentation	NR	H

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Δ Table 5.2.2 Continued

Row ^a	Line ^a	Location and Function	Fire and Explosion Hazard	Ventilation ^b	Extent of Classified Location ^c	NEC Hazardous Location Classification (All Class I, Group D) ^d	Materials of Construction ^e	Fire Protection Measures
9	a1	ENCLOSED AERATION BASIN, AEROBIC OR SUSPENDED GROWTH SYSTEMS, MEMBRANE BIOLOGICAL REACTORS Aerobic treatment not preceded by primary treatment with skimming	Possible ignition of flammable gases or floating flammable liquids	A (Interior of tank)	Entire enclosed space or tank of system	Division 1	NC	NR
	a2			A (Interior of tank)	Exterior of enclosed space or tank, installed in a building	Division 2	NC, LC, or LFS	NR
	a3			A (Interior of tank)	Exterior of enclosed space or tank, installed outdoors; envelope 0.46 m (18 in.) surrounding tank	Division 2	NC, LC, or LFS	NR
	b1			B (Interior of tank maintained at negative pressure)	Entire enclosed space or tank of system	Division 2	NC, LC, or LFS	NR
	b2			B (Interior of tank maintained at negative pressure)	Exterior of enclosed space or tank, installed in a building	Unclassified	NC, LC, or LFS	NR
	b3			B (Interior of tank maintained at negative pressure)	Exterior of enclosed space or tank, installed outdoors	Unclassified	NC, LC, or LFS	NR
	c			Not enclosed, open to atmosphere	Interior of tank from the minimum operating water surface to the top of the tank wall; envelope 0.46 m (18 in.) above the top of the tank and extending 0.46 m (18 in.) beyond exterior wall; envelope 0.46 m (18 in.) above grade and extending 3 m (10 ft) horizontally from the exterior tank walls	Division 2	NC, LC, or LFS	NR
10	a1	RESIDENTIAL ENCLOSED AERATION BASIN, AEROBIC OR SUSPENDED GROWTH SYSTEMS, MEMBRANE BIOLOGICAL REACTORS Aerobic treatment not preceded by primary treatment with skimming, serving one but not more than five dwellings	Possible ignition of flammable gases or floating flammable liquids	A (Interior of tank)	Entire enclosed space or tank of system	Division 2	NC	NR
	a2			A (Interior of tank)	Exterior of enclosed space or tank, installed in a building	Unclassified	NC, LC, or LFS	NR
	a3			A (Interior of tank)	Exterior of enclosed space or tank, installed outdoors	Unclassified	NC, LC, or LFS	NR

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Δ Table 5.2.2 *Continued*

Row ^a	Line ^a	Location and Function	Fire and Explosion Hazard	Ventilation ^b	Extent of Classified Location ^c	NEC Hazardous Location Classification (All Class I, Group D) ^d	Materials of Construction ^e	Fire Protection Measures
11		ENCLOSED AERATION BASIN, AEROBIC OR SUSPENDED GROWTH SYSTEMS, MEMBRANE BIOLOGICAL REACTORS Aerobic treatment of wastewater preceded by primary treatment with skimming	N/A	NR	Entire enclosed space	Unclassified	NC, LC, or LFS	NR
12		TRICKLING FILTER, BIO-TOWER, AEROBIC FIXED-FILM SYSTEMS Aerobic biological treatment of wastewater	Not normally a significant hazard; however, these processes might contain materials that are combustible under certain conditions	NR	N/A	Classified (See Primary sedimentation) Unclassified if unit process is preceded by primary sedimentation	NR	H
13	a	ANAEROBIC TOWERS, ANAEROBIC FIXED-FILM SYSTEM	Normally produces combustible gas as treatment process by-product	N/A	Tank interior	Division 1	NC	FE and H
	b	Anaerobic biological treatment if sealed from atmosphere		N/A	3 m (10 ft) envelope around tank	Division 2	NC, LC, or LFS	FE and H
14	a	GAS HANDLING SYSTEMS FOR LIQUID TREATMENT PROCESSES	Combustible gas, often under pressure	A	Enclosed — entire space	Division 1	NC	FE and H
	b			B	Enclosed — entire space	Division 2	NC, LC, or LFS	FE and H
	c			Not enclosed, open to atmosphere	Within a 3 m (10 ft) envelope around equipment ^f	Division 2	NC, LC, or LFS	FE and H
15		OXYGEN AERATION TANKS Tanks for aerobic treatment of wastewater using high-purity oxygen rather than air	Ignition of flammable gases and floating flammable liquids in an oxygen-enriched environment	N/A	Enclosed space	Division 2 (If unit process is not preceded by primary sedimentation, see Primary sedimentation Tanks in Table 5.2.2 for classification.)	Any equipment or material within the reactor space should be safe for exposure to volatile in an oxygen-enriched atmosphere	Special provision for LFL monitoring and automatic isolation of equipment and oxygen supply
16		INTERMEDIATE, SECONDARY, OR TERTIARY SEDIMENTATION TANKS Separate floating and settleable solids from wastewater at various treatment stages	N/A	NR	N/A	Classified (See Primary sedimentation) Unclassified if unit process is preceded by primary sedimentation	NR	H
17		FLASH MIXER OR FLOCCULATION TANKS Tanks for mixing various treatment chemicals with wastewater	N/A	NR	N/A	Classified (See Primary sedimentation) Unclassified if unit process is preceded by primary sedimentation	NR	H
18		NITRIFICATION AND DENITRIFICATION TANKS Tertiary treatment of wastewater to reduce or remove nitrogen	N/A	NR	N/A	Classified (See Primary sedimentation) Unclassified if unit process is preceded by primary sedimentation	NR	H

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△ Table 5.2.2 Continued

Row ^a	Line ^a	Location and Function	Fire and Explosion Hazard	Ventilation ^b	Extent of Classified Location ^c	NEC Hazardous Location Classification (All Class I, Group D) ^d	Materials of Construction ^e	Fire Protection Measures
19		BREAKPOINT CHLORINATION TANKS AND CHLORINE CONTACT TANKS Application of chlorine in aqueous solution to wastewater	N/A	NR	N/A	Unclassified	NR (These unit processes use corrosive chemicals that require the use of specific materials of construction. Special consideration should be given to these materials of construction.)	H
20		AMMONIA STRIPPING TOWERS	(See Trickling filter in Table 5.2.2.)	N/A	N/A	Unclassified	NR (These unit processes use corrosive chemicals. Special consideration should be given to these materials of construction.)	H
21		INTERMEDIATE OR FINAL PUMPING STATIONS AND OTHER UNIT PROCESSES AND STRUCTURES NOT SPECIFICALLY ADDRESSED IN THIS TABLE. Preceded by primary treatment with skimming	N/A	NR	N/A	Unclassified	NR	H
22		GRAVITY AND PRESSURE FILTERS Filtering of treated wastewater through sand or other media	N/A	NR	N/A	Unclassified	NR	H
23		CARBON COLUMN OR TANKS Vessels containing carbon for tertiary treatment of wastewater	Significant hazard from combustible carbon material	N/A	N/A	Unclassified	NR	H
24		ON-SITE OZONE GENERATION SYSTEM AND OZONE CONTACT TANKS Ozone generation and purification for disinfection of wastewater	Similar to oxygen generation with addition of being highly corrosive (See Table D.1.1.)	N/A	N/A	Not covered in this standard	NR	NR
25		BACKWASH WATER AND WASTE BACKWASH WATER HOLDING TANKS Tanks for temporary storage of backwash water	N/A	N/A	N/A	Unclassified	NR	H
26		ULTRAVIOLET DISINFECTION UNIT Disinfection of wastewater effluent by ultraviolet radiation	N/A	NR	N/A	Unclassified	NR	H

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Δ Table 5.2.2 Continued

Row ^a	Line ^a	Location and Function	Fire and Explosion Hazard	Ventilation ^b	Extent of Classified Location ^c	NEC Hazardous Location Classification (All Class I, Group D) ^d	Materials of Construction ^e	Fire Protection Measures
27		EFFLUENT STRUCTURES Various structures conveying treated wastewater away from treatment processes	N/A	NR	N/A	Unclassified	NR	H
28		ODOR-CONTROL AND VENTILATION SYSTEMS SERVING CLASSIFIED LOCATIONS (See Table 4.2.2)						

Note: The following codes are used in this table:

A: No ventilation or ventilated at less than 12 air changes per hour.

B: Continuously ventilated at 12 air changes per hour in accordance with Chapter 9.

C: Continuously ventilated at six air changes per hour in accordance with Chapter 9.

CGD: Combustible gas detection system.

D: No ventilation or ventilated at less than six air changes per hour.

FE: Portable fire extinguisher.

H: Hydrant protection in accordance with 7.2.4.

LC: Limited-combustible material.

LFS: Low flame spread index material.

N/A: Not applicable.

NC: Noncombustible material.

NEC: In accordance with NFPA 70.

NR: No requirement.

^aThe "Row" and "Line" columns are used to refer to specific figures in A.5.2 and specific requirements for each location and function.

^bThis column indicates the ventilation requirements for processes. Additional ventilation requirements are provided in Chapter 9. Ventilation signaling and alarm requirements are provided in Chapter 7.

^cOpen channels and open structures upstream from the unit processes are classified the same as the downstream processes they supply.

^dThese unit processes use corrosive chemicals that can have a deteriorating effect on conductors and equipment. Electrical equipment should be identified for use in the operating environment.

^eThis column indicates the materials of construction for processes. Materials of construction for buildings in which these processes are housed are in accordance with the applicable building code and construction requirements provided in Chapter 8.

^fThe area beyond the envelope is unclassified.

^gWhere liquid turbulence is not induced by aeration or other factors, the following criteria apply: (1) interior of the tank from the minimum operating water surface to the top of the tank wall; (2) envelope 0.46 m (18 in.) above the top of the tank and extending 0.46 m (18 in.) beyond the exterior wall; (3) envelope 0.46 m (18 in.) above grade extending 3 m (10 ft) horizontally from the exterior tank walls.