Public Comment No. 5-NFPA 820-2022 [Section No. 4.2.2]

4.2.2

The design and construction of the components associated with the wastewater collection and transport systems shall conform to Table 4.2.2.

Table 4.2.2 Collection Systems

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b]	Extent of Classified Location	*NEC* Hazardo Locatio Classifica (All Clas Group
1	-		MATERIALS USED IN REHABILITATION, RECONSTRUCTION, OR SLIP-LINING OF SEWERS	N/A	N/A	N/A
2	-		INDUSTRIAL SEWER Sewer transporting industrial wastewater only (no sanitary wastewater)	Not included within th		
3	a	STORM SEWER Sewer transporting storm water only (no sanitary wastewater)	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Inside of sewer	Division 2
	4	b	STORM SEWER (Permitted rating for flow monitoring)	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Inside of sewer
4	Liquid side of pumping station serving only a storm sewer system	a	STORM WATER PUMPING STATION WET WELLS	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Entire roor space plus envelope 0 (3 ft) arour vents
	b	STORM WATER PUMPING STATION WET WELLS	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Entire room or space	Zone 2

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b]	Extent of Classified Location	NEC Hazardo Locatio Classifica (All Clas Group
5	a	STORM WATER PUMPING STATION DRY WELLS	Buildup of vapors from ignitible (flammable or combustible) liquids	D	Entire dry well plus envelope 0.9 m (3 ft) around vents	Division 2
	b	Dry side of a pumping station serving only a storm sewer system and physically separated from wet well		C	Entire dry well	Unclassifie
	b	STORM WATER PUMPING STATION DRY WELLS		D		Zone 2
6	a	FORCE MAIN	Buildup of vapors from ignitible (flammable or combustible) liquids	NNV	Areas within 0.9 m (3 ft) of Air Release Valve and Appurtenances	Division 2
	b	Air release valve			Areas beyond 0.9 m (3 ft) of Air Release Valve and Appurtenances	Unclassifie
7	-		BUILDING SEWER (Lateral sewer or drain) Sewer serving a house or single building (plumbing)	Not included within th		
8	-		INDIVIDUAL RESIDENTIAL SEWER Sewer serving one or more individual residences with a total flow of not more than 1500 gallons per day (gpd)	N/A	NNV	Within enclosed space
9	-		INDIVIDUAL RESIDENTIAL PUMPING UNITS Pumping units serving one or more individual residences with a total flow of not more than 1500 gallons per day (gpd) (e.g., grinder	N/A	NNV	Within enclosed space

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b]	Extent of Classified Location	NEC Hazardo Locatio Classifica (All Clas Group
			pumps, septic tank effluent pumps, ejector pumps)			
10	a	RESIDENTIAL SEWER	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Within enclosed space	Division 2
	b	Sewer transporting primarily residential wastewater		B	Within enclosed space	Unclassifie
	c	RESIDENTIAL SEWER (Permitted rating for flow studies)	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Within enclosed space	Zone 2
11		OUTFALL SEWER Final discharge pipe from a treatment plant, transporting treated wastewater	N/A	NNV	N/A	Unclassifie
12	a	SANITARY SEWER	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Inside of sewer	Division 1
	-	b		Sewer transporting domestic, commercial, and industrial wastewater	B	Inside of se
	c	SANITARY SEWER (Permitted rating for flow studies)	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Within enclosed space	Zone 1
13	a	COMBINED SEWER	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Inside of sewer	Division 1
	-	b		Sewer transporting domestic, commercial, and industrial wastewater and storm water	B	Inside of se

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b]	Extent of Classified Location	NEC Hazardo Locatio Classifica (All Clas Group
	c	COMBINED SEWER (Permitted rating for flow studies)	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Inside of sewer	Zone 1
14	a	WASTEWATER PUMPING STATION WET WELLS	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	A	Entire room or space plus envelope 0.9 m (3 ft) around vents	Division 1
	-	b	-	-		
	-	c	Liquid side of a pumping station serving a sanitary sewer or combined system	-		B
15	a	BELOWGRADE OR PARTIALLY BELOWGRADE WASTEWATER PUMPING STATION DRY WELL	Buildup of vapors from ignitible (flammable or combustible) liquids	C	Entire space or room	Unclassifie

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b]	Extent of Classified Location	NEC Hazardo Locatio Classifica (All Clas Group
	-	b		Pump room physically separated from wet well; pumping of wastewater from a sanitary or combined sewer system through closed pumps and pipes	D	Entire spac room plus envelope 0 (3 ft) aroun vents
16	-		ABOVEGRADE WASTEWATER PUMPING STATION Pump room physically separated with no personnel access to wet well; pumping of wastewater from a sanitary or combined sewer system through closed pumps and pipes	N/A	NR	N/A
17	a	ABOVEGRADE WASTEWATER PUMPING STATION	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	A	Entire space or room plus envelope 0.9 m (3 ft) around vents	Division 1
	-	b		-		A
	-	c		Pump room not physically separated from wet well; pumping of wastewater from a sanitary or	B	Entire spac room plus envelope 0 (3 ft) aroun vents

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b]	Extent of Classified Location	NEC Hazardo Locatio Classifica (All Clas Group
				combined sewer system through closed pumps and pipes		
18	a	ODOR-CONTROL AND VENTILATION SYSTEMS SERVING CLASSIFIED LOCATIONS	Leakage and ignition of flammable gases and vapors	D	Envelope 0.9 m (3 ft) around vents from Division 1 gas	Division 2
	-			b	D	Entire area enclosed p 1.5 m (5 ft) beyond ve from Divisi gas plus envelope ((3 ft) aroun vents from Division 2
	-			c	C	Areas with 0.9 m (3 ft) leakage sources su as fans, dampers, flexible connection flanges, pressurize unwelded ductwork, odor-contr vessels
	-			d	C	Areas beyo 0.9 m (3 ft)
	-			e	Not enclosed, open to the atmosphere	Areas with 0.9 m (3 ft) leakage sources su as fans, dampers, flexible connection flanges, pressurize unwelded ductwork, odor-contr vessels plu envelope (

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b]	Extent of Classified Location	NEC Hazardo Locatio Classifica (All Clas Group
						(3 ft) aroun vents from Division 2
	-			f	Not enclosed, open to the atmosphere	Areas beyo 0.9 m (3 ft)
19	a	MAINTENANCE HOLES	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Inside	Division 1
	-	b		Access to sewer for personnel entry	B	Inside
	c	MAINTENANCE HOLES (Permitted rating for flow monitoring)		NNV	Inside	Zone 1
	d			B	Inside	Zone 2
20	a	JUNCTION CHAMBERS	Buildup of vapors from ignitible (flammable or combustible) liquids	NNV	Inside	Division 1
	-	b		Structure where sewers intersect	B	Open and above grad inside and ventilated
	c	JUNCTION CHAMBERS (Permitted rating for flow monitoring)	Buildup of vapors from ignitible (flammable or combustible) liquids	NNV	Within enclosed space	Zone 1
	d			B	Open and above grade or inside and ventilated	Zone 2
21		INVERTED SIPHONS Depressed section of gravity sewer	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Interior of inlet and outlet structures	Division 1
22	-		CATCH BASINS (Curb inlet) Inlet where street water enters a storm or combined sewer	Buildup of vapors from ignitible (flammable or combustible) liquids	NNV	Enclosed space
23	a	RESIDENTIAL DIVERSION STRUCTURES	Buildup of vapors from ignitible (flammable or	NNV	Enclosed space	Division 2

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b]	Extent of Classified Location	NEC Hazardc Locatic Classifica (All Clas Group
	-	b	combustible) liquids	Enclosed structures where residential wastewater can be diverted	B	Enclosed space
24	a	RESIDENTIAL BELOWGRADE OR PARTIALLY BELOWGRADE VALVE VAULT	Possible ignition of gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Enclosed space	Division 2
	-	b		With an exposed residential wastewater surface	B	Enclosed space
25	a	RESIDENTIAL CONTROL STRUCTURES	Buildup of vapors from ignitible (flammable or combustible) liquids	A	Enclosed space	Division 2
	-	b		Enclosed structures where residential wastewater flow is regulated	B	Enclosed space
26	a	RESIDENTIAL BELOWGRADE OR PARTIALLY BELOWGRADE METERING VAULT	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Enclosed space	Division 2
	-	b		With an exposed residential wastewater surface	B	Enclosed space
27	a	DIVERSION STRUCTURES	Buildup of vapors from ignitible (flammable or combustible) liquids	NNV	Enclosed space	Division 1
	-	b		Enclosed structures where wastewater can be diverted	B	Enclosed space

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b]	Extent of Classified Location	NEC Hazardo Locatio Classifica (All Clas Group
28	-		ABOVEGRADE VALVE VAULT Physically separated from the wet well; valves in vault in closed piping system	N/A	NR	N/A
29	a	BELOWGRADE OR PARTIALLY BELOWGRADE VALVE VAULT	Buildup of vapors from ignitible (flammable or combustible) liquids	NNV	Entire room or space plus envelope 0.9 m (3 ft) around vents	Division 2
	-	b		Physically separated from the wet well and with closed piping system	C	Enclosed space
30	a	BELOWGRADE OR PARTIALLY BELOWGRADE VALVE VAULT	Possible ignition of gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Enclosed space	Division 1
	-	b		With an exposed wastewater surface	B	Enclosed space
31	a	CONTROL STRUCTURES	Buildup of vapors from ignitible (flammable or combustible) liquids	A	Enclosed space	Division 1
	-	b		Enclosed structures where wastewater or storm water flow is regulated	B	Enclosed space
	c	CONTROL STRUCTURES (Permitted rating for flow monitoring)	Buildup of vapors from ignitible (flammable or combustible) liquids	A	Enclosed space	Zone 1
	d		Buildup of vapors from ignitible (flammable or combustible) liquids	B	Enclosed space	Zone 2
32	a	WASTEWATER HOLDING BASINS	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	A or NNV	Enclosed space plus envelope 0.9 m (3 ft) around vents	Division 1

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b]	Extent of Classified Location	NEC Hazardo Locatio Classifica (All Clas Group
	-	b		-		A or NNV
	-	c		Enclosed structures temporarily holding untreated or partially treated wastewater	B	Enclosed space plus envelope 0 (3 ft) aroun vents
33	-		WASTEWATER HOLDING BASINS, LINED OR UNLINED Open structures holding storm water, combined wastewater, untreated or partially treated wastewater	NR	NR	NR
34	a	BELOWGRADE OR PARTIALLY BELOWGRADE METERING VAULT	Buildup of vapors from ignitible (flammable or combustible) liquids	NNV	Enclosed space plus envelope 0.9 m (3 ft) around vents	Division 2
	-	b		Physically separated from the wet well and with closed piping system	C	Enclosed space
35	a	BELOWGRADE OR PARTIALLY BELOWGRADE METERING VAULT	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	NNV	Enclosed space	Division 1
	-	b		With an exposed wastewater surface	B	Enclosed space
~~36~~	-	~~COARSE AND FINE SCREEN FACILITIES~~	-	-	-	-

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b]	Extent of Classified Location	*NEC* Hazardo Locatic Classifica (All Clas Group
	d	Possible ignition of flammable gases and floating Class I liquids [flash point < 100°F (37.8°C)]	B	Enclosed space	Zone 2	
36		COARSE AND FINE SCREEN FACILITIES *(See "Coarse and Fine Screen Facilities" in Table 5.2.2.)*				

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 changes per hour

C: Continuously ventilated at six air changes per hour

CGD: Combustible gas detection system

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

FAS: Fire alarm system

FE: Portable fire extinguishers installed, located, and maintained in accordance with NFPA 10

LC: Limited-combustible material

LFS: Low flame spread index material

N/A: Not applicable

NC: Noncombustible material

NEC: In accordance with *NFPA 70*

NNV: Not normally ventilated

NR: No requirement

[a]The "Row" and "Line" columns are used to refer to specific figures in A.4.2 and specific requirements for each location and function.

[b]This 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.

[C]This 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.

Additional Proposed Changes

File Name	Description	Approved
NFPA_820_Comment_Letter_from_Hach_Company_5.19.2022_.pdf	Hach Company's comment letter for revising NFPA 820.	

Statement of Problem and Substantiation for Public Comment

We suggest NFPA adopting a parallel classification of collection system metering sites under the Zone system (NEC 505) in NFPA 820 for the following reasons:

- Classifying collection systems sites solely according to Division categories results in an over-classification of many locations in which flow monitoring equipment is typically installed.
- Over-classification slows the rate of infrastructure improvements and harms the public and the environment.
- Offering alternative classifications under the Zone system will better capture the degree of actual hazard present and will allow continuation of existing best-practices for collection systems monitoring.

Please see our attached letter for more details. Thank you.

Kind regards,
James Lee

Related Item

- https://www.customheatersandresearch.com/wp-content/uploads/2019/02/CHR-Hazardous-Area-Heating-Standards-12-27-18.pdf

Submitter Information Verification

Submitter Full Name: James Lee
Organization: Hach Company
Street Address:
City:
State:
Zip:
Submittal Date: Wed May 25 03:37:45 EDT 2022
Committee: WAA-AAA

Committee Statement

Committee Action: Rejected but held

Resolution: The committee agrees with the intent of the public comment however, all tables in NFPA 820 need to be considered and how NEC 505 zone classifications apply to specific locations at wastewater treatment and collection facilities. The committee has formed a task group to evaluate the application of NEC zone classifications to NFPA 820.

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May 19, 2022

National Fire Prevention Association
1 Batterymarch Park
Quincy, MA 02169-7471

Hach's Comments regarding Notice of Modification to Text of NFPA 820

Hach Company (Hach) is writing concerning the pending update of National Fire Prevention Association's (NFPA) 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities: https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=820.

Hach is a globally-recognized supplier of water quality analysis instruments and chemical reagents headquartered in Loveland, Colorado. Some of our instruments are used to monitor flow in sewage and stormwater collection systems. For this reason, we have an interest in how NFPA 820 affects the design, use, and deployment of such systems.

Hach's Recommendations for Amendment

Hach requests the following additions to table 4.2.2 of the standard.

- Table 4.2.2, Row 3 and subsequent entries. Add additional lines with the equivalent Zone classification.

3	b	STORM SEWER (Permitted rating for flow monitoring)	Possible ignition…	NNV	Inside of Sewer	Zone 2		
4	b	STORM WATER PUMPING STATION WET WELLS	Possible ignition…	NNV	Entire room or space	Zone 2		

5	b	STORM WATER PUMPING STATION DRY WELLS	Buildup of vapors…	D	Entire dry well	Zone 2		

- Table 4.2.2, Row 10, add

10	c	RESIDENTIAL SEWER (Permitted rating for flow studies)	Possible ignition…	NNV	Within enclosed space	Zone 2		

- Table 4.2.2, Row 12, add

12	c	SANITARY SEWER (Permitted rating for flow studies)	Possible ignition…	NNV	Within enclosed space	Zone 1		

- Table 4.2.2, Row 13, add

13	c	COMBINED SEWER (Permitted rating for flow studies)	Possible ignition…	NNV	Inside of sewer	Zone 1		

- Table 4.2.2, Row 19, add

19	c			NNV	Inside	Zone 1		

	d	MAINTENANCE HOLES (Permitted rating for flow monitoring)	Possible ignition…	B	Inside	Zone 2		

- Table 4.2.2, Row 20, add

20	c	JUNCTION CHAMBERS (Permitted rating for flow monitoring)	Buildup of vapors…	NNV	Within enclosed space	Zone 1		
	d			B	Open and above grade or inside and ventilated	Zone 2		

- Table 4.2.2, Row 31, add

31	c	CONTROL STRUCTURES (Permitted rating for flow monitoring)	Buildup of vapors…	A	Enclosed space	Zone 1		
	d			B	Enclosed space	Zone 2		

- Table 4.2.2, Row 35, add

35	c	BELOW GRADE METERING VAULT With an exposed water surface	Possible ignition…	NNV	Enclosed space	Zone 1		
	d			B	Enclosed space	Zone 2		

Main Reasons for Hach's Recommendations

We suggest a parallel classification of collection system metering sites under the Zone system (NEC 505) for the following reasons:

- Classifying collection systems sites solely according to Division categories results in an over-classification of many locations in which flow monitoring equipment is typically installed.
- Over-classification slows the rate of infrastructure improvements and harms the public and the environment.
- Offering alternative classifications under the Zone system will better capture the degree of actual hazard present and will allow continuation of existing best-practices for collection systems monitoring.

The need for temporary flow monitoring

Monitoring the flow of wastewater and/or stormwater in sewage collection systems provides important benefits to the public and the environment. The US Environmental Protection Agency (EPA) estimates that there are 23,000 – 75,000 sanitary sewer overflows per year (exclusive of sewage backups into buildings)[1]. These pose a serious and ongoing risk to public health. Many of these unwanted discharges are caused by deficiencies in aging collection infrastructure.

[1] https://www.epa.gov/npdes/sanitary-sewer-overflows-ssos retrieved 3/18/2022

Open channel flow monitoring instruments (“flow meters” and “flow sensors”) are an essential tool for the study of collection systems for wastewater and/or storm water. Municipalities and treatment districts must understand how their existing infrastructure is operating to identify sewer problems and prioritize repairs and upgrades. Much of the data necessary for informed decisions are acquired through short-term flow studies. Instrumentation is typically installed for 30 to 90 days; an informative flow record is established (often in concert with rainfall logging); then the sensors and meters are removed and moved to other sites as the study continues. Because each installation is temporary, the equipment used is nearly always battery powered. Installing and removing the instrumentation is expensive: a confined space entry crew is necessary, and traffic control or re-routing may be required while the crew is on site. Some sites are remote, and others require special arrangements to access. It can take several weeks to obtain a street closure permit in a major metropolitan area. Because of the difficulty and expense, users want to avoid the need for additional site visits whenever possible. Consequently, these instruments require long battery life.

The available budget for flow monitoring (and for collection systems remediation overall) at the local government level is limited. The Bipartisan Infrastructure Law of 2021 allocated approximately $12B for improvements to wastewater and stormwater management systems, including $2B for projects to capture, treat, or reuse sewer overflows or stormwater.[2] This historic allocation represents only a down payment: EPA estimates that the total investment needed in water infrastructure over the next 20 years will be $300B.

Funds are urgently needed to address many pressing problems in sewer collection systems. To prioritize their spending, municipalities and treatment districts need to study their current systems and understand which ones are most in need of renovation and which require upgrading due to capacity concerns.

NFPA 820, as it currently stands, puts unnecessary burdens on collection system operators who seek to monitor and upgrade the systems. Specifically, NFPA 820 hazardous area guidance overclassifies the collection system locations where flow monitoring equipment is commonly installed. Although, cautious classification of sewer infrastructure is intended to protect the public welfare, the present standard as it is currently written instead harms the public by making the required flow studies more expensive and harder to conduct. The likely outcome is that fewer studies will be done, and the completed ones will be less complete. Meanwhile, ongoing harm to the public continues due to preventable sewer overflows. In 2004, the EPA estimated that the number of human illnesses caused by sewer overflows at a limited group of recreational beaches was between 3,448 and 5,576 per year[3]. This represents only a small portion of the total annual

[2] Seiger, Ryan, **The Water Quality Protection and Job Creation Act of 2021** (Fact Sheet), House Committee on Transportation and Infrastructure, 2021.

[3] US EPA. **Report to Congress: Impacts and Control of CSOs and SSOs**, Executive Summary. August 2004. Document No. EPA-833-R-04-001.

hazardous public health impact from sewer overflows in the US. Hach believes our suggested changes in NFPA 820 will help reduce this public health effect.

Discussion of the reasoning behind Hach's recommendations

I. Ordinary manholes have a risk profile which is easily distinguishable from typical Division I locations such as oil refineries and settling basins.

Storm sewers are different from typical Division I locations with the gases contained in their space. Methane (CH4) gas is a known byproduct of organic breakdown by methanogens, a microbe distinct from bacteria and eukaryotes. It occurs only under certain anoxic conditions, which typically develop during in-place decomposition. In stormwater collection systems, the organic matter present is most often leaves and other vegetative material that have been swept into storm sewers. In the absence of precipitation or runoff, this organic matter may decay in place, but it does not typically decay under their anoxic conditions because storm sewers are open to the street at multiple locations.

Similar conditions can also cause the production of hydrogen sulfide (H_2S). This gas is recognized as being extraordinarily dangerous to workers, and its corrosive nature can also damage equipment. Consequently, flow monitoring crews routinely test for its presence and avoid installing equipment in locations where the gas is found. Properly trained crews will nevertheless maintain full confined space entry protocols.

Another key distinction is the flow of the wastewater. The purpose of a municipal collection system is not to hold sewage in place, but to move it onward to the treatment plant. Sewers are commonly designed to move wastewater down-pipe at a target speed of approximately two feet per second to avoid settling of waste products and consequent clogging. (Faster speeds may occur during high load times and in combined wastewater/stormwater systems, during rainfall events.) Wastewater entering the collection system from, for instance, household drains and toilets contain dissolved oxygen and entrained air. Because of this, the small level of non-flowing water that exists in a conventionally designed manhole is continually replaced.

Even though methane and hydrogen sulfide production can occur in flowing sewer pipes and manholes and the production of these gases may not be rare, the frequency and persistence of such a situation is entirely different from a stilling basin, pumping station or an oil refinery, which are inherently more dangerous locations. The distinction is currently not recognized by a Class I Division I rating. In contrast, the Zone system distinguishes between Zone 0, where:

> “ignitable concentrations… are **present continuously or for long periods of time** under normal operating conditions”; Zone 1, where ignitable concentrations “are **likely to exist under normal operating conditions**” and “**may exist frequently** because of repair, maintenance operations, or leakage”; and Zone 2, where ignitable concentrations “are **not likely** to exist under normal operating conditions” and if they do, “**become hazardous only in case of an accident or some unusual operating condition**”. [Emphasis added]

Based on this argument, most areas in properly designed collection systems are classifiable as Zone 2 environments (and as Division 2 according to well-accepted equivalence). We are not proposing that flow monitoring instrumentation should be Zone 2 rated because a significant purpose and use of such equipment is to discover portions of a collection system that are not operating optimally. Instead, we are suggesting that NFPA 820 adopt more open-channel flow instruments rated as intrinsically safe by explicitly categorizing ordinary sanitary sewer manholes as Zone 1 locations. Outfalls and overflow sites should be separately categorized as Zone 2. Storm sewer inlets and manholes should be classified Zone 2. Combined sanitary and stormwater sewers should be treated as sanitary sewers.

II. Overclassifying typical flowmeter installation sites imposes an unnecessary burden on both instrument design and installation practice.

Overclassifying sewage collection systems is overly burdensome, which results in less monitoring and hinders infrastructure remediation. Classifying manholes and similar metering sites as either Division 1 or Zone 0 requires flow monitoring equipment be designed and certified to “ia” intrinsic safety rules better suited to more hazardous locations, such as petroleum refineries. This level of overdesign impairs its function and discourages its use. It is important to balance the potential harm of a sewer explosion against the known and ongoing harm of human exposure to untreated sewage discharged into surface waters and the built environment.

A flow measurement apparatus destined for use in Division I or Zone 0 environments is subject to very different design constraints than one destined for use in a Zone 1 location. Equipment for the first case must be designed and certified under “ia” intrinsic safety rules, whereas Zone 1 equipment can be designed and certified under “ib” rules instead. An “ia” certification requires consideration of “double fault” component failures. This makes the equipment more costly and its certification vastly more complex because it “squares” the number of fault scenarios and requires analysis of extremely unlikely failure sequences.

This over-classification reduces the power efficiency, available peak power, and the battery life of the flow meter instruments. In some situations, they are reduced by half. Please refer to the Appendix at the end of this letter for the technical reasons behind these reductions in the power efficiency, available peak power, and the battery life.

In March of 2022, Hach surveyed its customers, who conduct collection systems monitoring, to understand how they use our instruments and to identify their key concerns. These customers ranked battery life as a very high concern, second only to instrument accuracy. Their concern for battery life arises because most flow meter installation sites in short-term studies have no available source of grid power and repeated site visits solely to replace batteries are very costly.

As an example of the potential impact of reduced battery life, consider the following scenario: a battery powered open-channel flowmeter is to be installed for a six-month study period, bracketing the season of the maximum rainfall. The largest battery system available can power a Zone 1 rated flowmeter for 90 days. Consequently, three site visits are required: one for installation, one for mid-study battery replacement, and one for decommissioning.

Beside the battery pack cost and treating the instrumentation as reusable capital equipment, the cost of studying flow at such location comprises three site visits by a fully trained field crew equipped for confined-space entry and traffic control. Next, consider the same scenario with the same long-life battery pack, only using Zone 0 (or Division I) rated flowmeter. We show in the Appendix that differences in the type of protective circuitry required for Division 1 or Zone 0 can cut power efficiency by nearly 50%, compared to the Zone 1 case. Consequently, battery life is reduced to 45 days, and the following site visits are required: one for installation, three for battery pack replacement, and one for decommissioning. Based on our calculation, the need for five visits, as well as the three and four single-use battery stacks, instead of two roughly doubles the cost per site studied.

Given a fixed yearly budget for flow monitoring, following the current standard cuts the number of possibly monitored sites in half as a result of the reduced battery life. To build a complete network flow model by including data from the remaining sites, some monitoring will be delayed until the end of next year's rain season. Decisions about collection system repairs and upgrades, which depend on the data, will also be delayed by a full year. Consequently, the public and environment will bear the cost of sewer overflows that may occur in the meantime.

III. **NFPA 820, as currently written, ignores long-standing industry practice.**

Based on the current industry practice, the majority of US-based flow monitoring practitioners presently ignore the existing NFPA 820 Division I classification for manholes. Some install Zone 1 devices, and many more install unrated equipment.
Hach and its predecessors American Sigma and Marsh-McBirney have offered open channel flowmeters with Zone 1 ratings for more than two decades. However, only about half of the customers we surveyed in March of 2022 believed that an intrinsic safety rating was required

for open-channel flowmeters. Those that did expect a safety rating were about evenly split as to which kind of classification was appropriate.

While Hach supports the use of intrinsically safe equipment for collection systems monitoring, we believe explicit recognition of sanitary and combined sewers as Zone 1 environments in NFPA 820 would serve to encourage this use. Failure to implement more realistic and practical classifications will likely perpetuate a situation in which many practitioners view NFPA 820 as irrelevant and contrary to long-established industry practice. Compliance with the standard presently requires users to purchase unusual and expensive equipment which they cannot easily deploy and do not believe they need. If the standard were revised to recognize equipment which is more widely available and better suited to the discussed temporary installation, more flow monitoring companies and organizations would follow its requirements.

IV. The need to classify ordinary manholes as Division I hazardous locations in preference to Zone 1 is unsupported by the historical record.

In determining the type of equipment permissible for a particular installation site, it is appropriate to consider not only the nature of the site itself, but the resultant levels of risk and consequence. The historical record can serve as a guide in this evaluation.

Sewer explosions do occur, but it is important to understand their actual causes. Causes of the most widely-known cases are factors other than sewer gas buildup: rupture of high-pressure gas distribution lines (Guadalajara, Mexico, 1992; and Kaohsiung, Taiwan, 2014), an abandoned and improperly capped gas well (Firestone, Colorado, 2017), and illegal discharge of flammable wastes (Louisville, Kentucky, 1981; and Ottawa, Canada, 1929). What these incidents have in common is the presence of volatile gases or liquids in places where they were never intended to be. It is difficult to justify even a Zone 2 or Class II designation because of these events, considering that the same logic could be used to classify random residential basements as was the case in Firestone, Colorado.

A search for explosions specifically involving sewer gas yields several dramatic ones, but the causes generally involve some exceptional ignition factor. In many cases, ignition was caused by high tension underground power lines. A recent run of utility manhole explosions in New York City is attributed to corrosion of high-tension power terminals by seepage of brine from street deicing. A similar explosion in New Orleans from 2020 occurred because methane entered an underground electric power vault. In all these cases, the electrical voltages, currents, and power levels involved far exceed those found in flow instrumentation: by three or four orders of magnitude. One should not treat a battery-powered flow meter as if it poses comparable risk to a power substation.

In contrast to these events, there is no evidence implicating open-channel flow monitoring equipment in sewer explosions. Rather, flow monitoring equipment facilitates better sewer maintenance, which serves to prevent sedimentation and reduce the risk of their attendant environmental and human health effects.

V. There is regulatory justification and ample precedent for the classifications suggested herein.

NFPA 820 as it exists today requires compliance with NFPA 70, the National Electrical Code (NEC). Article 505 of the NEC explicitly allows use of Zone classifications in the US. Equipment certified for use in Zone 2 may already be installed in Division 2 locations under the equivalency provisions of NEC 501.5. Therefore, the additions requested here to the classifications for stormwater sewers enhance clarity. The only remaining question is how to handle flow meter installation in sewers which NFPA 820 presently treats as Division 1.

European regulators already treat such sites as Zone 1 environments. This can be confirmed by noting that European suppliers of open channel flow meters label their products as complying with "ib" intrinsic safety requirements. This level of certification would not be acceptable if the installation sites were classified as Zone 0.

VI. **Failure to allow instrument certification per harmonized standards unnecessarily restricts the instrumentation choices available to North American users.**

Multiple European vendors currently provide open channel flow meters with Intrinsic Safety ratings. US-based vendors offer similar products, primarily intended for export. In both cases, certification is generally to Zone 1 standards. The addition of Zone type classifications to NFPA 820 will permit a broader selection of flow instrumentation for use in North American flow monitoring. It will also enable local manufacturers to design instruments that can be sold worldwide. Alignment with harmonized standards for the flow meter certification benefits the public by providing greater choices of tools for this essential monitoring and the manufacturers by incentivizing broader sales and further development of applicable products.

Hach strongly supports NFPA's efforts to protect the public health and safety and appreciates this opportunity to provide input to the important standardization update process. Should you have any questions or require any additional information, please contact me at jalee@hach.com or the phone number listed above.

With kind regards,

James Lee

Appendix: Impact of various classifications on instrument battery life and function

In this Appendix, we explain why there can be a marked difference in power efficiency between “ia” equipment intended for Zone 0 or Division 1 use versus “ib” equipment intended for use in Zone 1 or Zone 2.

Open channel flowmeters’ active measurement and wireless communications power requirements tend to dominate the instruments’ energy consumption. Most flowmeters are designed to consume very little power in “standby” mode. A significant portion of the active power can be wasted in traditional passive safety barriers.

The rules governing intrinsic safety barriers are standardized in ISO 60079-11, adopted by most countries including the US and Canada. Intrinsic Safety barriers are intended to limit the maximum available voltage, current, and fault power. Allowable limits for peak voltage and short circuit current are provided in the standard; and the allowable fault power is determined according to a thermal analysis of the potential heating of downstream components. The power consumed by the protected load in normal operation is much less than that required to cause an explosion.

For the present discussion, we are particularly concerned with how much power is wasted in the safety barrier during normal operation of the flow instrumentation. Any wasted power means a loss of battery life and a reduction in the length of time during which the instrument can be deployed unattended. Furthermore, the design of the safety barrier may inadvertently limit the maximum operating power available for use by a sensor or related subsystem, making some flow monitoring features unavailable.

The key issue is an “ia” certification per the referenced standard requiring safety barriers to employ a series resistor, which limits the potential short circuit current. The alternative means of nearly obsolete “current limiting diodes” is not considered in this case because they require exorbitant overhead voltage, rendering them unsuitable in battery-operated systems.

Under “ib” certification rules, fault current may be limited by using (redundant) active devices. Commercial ICs are readily available to do this job[4]. These protection chips dissipate very little power unless an actual fault occurs. In contrast, a series limiting resistor wastes power whenever the downstream load is active.

[4] One such IC is the LT4356, made by Analog Devices. Other vendors offer similar chips, but these have not been evaluated by Hach.

The peak power available to a load in non-faulted operation depends on the barrier design and will be denoted here as $P_{load\,(\max)}$.

The power transfer efficiency of any intrinsic safety barrier under some specified load is:

$$\eta = \frac{P_{load}}{P_{load} + P_{loss}}$$

For a resistive barrier, η decreases markedly as P_{load} increases. At $P_{load\,(\max)}$, it is only 50%, as can be understood from the Maximum Power Transfer Theorem. For an active barrier, η is nearly constant once the load power surpasses the small operating current required by fault protection IC. A protection IC available from a major chip vendor is described in existing literature and analyzed for use as an intrinsic safety barrier[5]. A barrier built with this chip has a power transfer efficiency of 98% over much of its operating range[6]. The table below compares the performance of passive and active barriers under conditions representative of battery-powered flow instrumentation.

Barrier Type	$P_{load\,(\max)}$	η @ $P_{load\,(\max)}$
Resistive current limit	$V_{bat} I_{sc} / 4$	50%
Active IC current limit	$V_{bat} I_{sc} / 2$	~ 98%

The required series resistor in the passive case is assumed to be given by $R = V_{bat} / I_{sc}$. For the active case, the operating power of the load is assumed to be essentially independent of barrier output voltage. This would be true if the downstream circuitry employs switch mode voltage conversion, which is a common practice in energy-sensitive designs.

With identical current and voltage limits, an active barrier can provide twice the power to a sensor or subsystem at nearly double the efficiency.

[5] Pickard, M. "Surge Stopper IC Simplifies Design of Intrinsic Safety Barrier for Electronics Destined for Hazardous Environments", Linear Technology Magazine, September 2009.

[6] Pickard, M. Personal communication with David Rick, 2009.

Public Comment No. 2-NFPA 820-2022 [Section No. 6.2.2]

6.2.2

The design and construction of solids treatment processes associated with wastewater solids treatment shall conform to Table 6.2.2(a) and Table 6.2.2(b).

Table 6.2.2(a) Solids Treatment Processes

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b,c,d]	Extent of Classified Location	*NEC* Hazardou Locatior Classificat (All Class Group D)
1	-		COARSE AND FINE SCREENINGS- HANDLING BUILDINGS Storage, conveying, or dewatering of screenings (no exposed flow of wastewater through building or area)	N/A	NR	N/A
2	-		GRIT-HANDLING BUILDING Storage, conveying, and dewatering of heavy small screenings and grit (no exposed flow of wastewater through building or area)	N/A	NR	N/A
3	a	SCUM-HANDLING BUILDING OR AREA	Possible grease or Class I liquids [flash point < 100°F (37.8°C)] carryover	A	Enclosed space	Division 2
	b	Holding, dewatering, or storage		B	Enclosed space	Unclassified
	c	-			Not enclosed, open to atmosphere	N/A
4	a	SCUM PITS	Buildup of vapors from ignitible (flammable or combustible) liquids	A	Enclosed — entire space	Division 1
	b			B	Enclosed — entire space	Division 2

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b,c,d]	Extent of Classified Location	*NEC* Hazardou Locatior Classificat (All Class Group D)
	c			Not enclosed, open to atmosphere	Within a 3 m (10 ft) envelope around equipment and open channel[c]	Division 2
	-	d	-	-		
5	a	SCUM-PUMPING AREAS	Buildup of vapors from ignitible (flammable or combustible) liquids	A	Enclosed — entire space	Division 1
	b	Pumping of scum, wet side of pumping station		B	Enclosed — entire space	Division 2
	c	-			Not enclosed, open to atmosphere	Within a 3 m (10 ft) envelope around equipment a open chann
6	a	SCUM-PUMPING AREAS	Buildup of vapors from ignitible (flammable and combustible) liquids	D	Enclosed space	Division 2
	b	Pumping of scum, dry side of pumping station		C	Enclosed space	Unclassified
	c	-			Not enclosed, open to atmosphere	N/A
7	-		SCUM INCINERATORS[e,f] Elimination of scum through burning	Firebox explosion from possible carryover of flammable scum	NR	Incinerator area if separated fr scum storag
8	a	SLUDGE THICKENER	Possible generation of methane from sludge; carryover of floating Class I liquids [flash point < 100°F (37.8°C)]	A	Enclosed — entire space	Division 1
	b	Sludge concentration and removal, gravity, or dissolved air flotation		B	Enclosed — entire space	Division 2

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b,c,d]	Extent of Classified Location	*NEC* Hazardou Locatior Classificat (All Class Group D)
	c			C	Enclosed — entire space	Unclassified process doe not contain a primary sluc
	d			Not enclosed, open to atmosphere	Interior of the tank from the minimum operating sludge 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[c]	Division 2
9	a	SLUDGE PUMPING STATION DRY WELLS	Buildup of methane gas or flammable vapors	D	Entire dry well when physically separated from a wet well or separate structures	Division 2
	b	Dry side of a sludge pumping station		C	Entire dry well when physically separated from a wet well or separate structures	Unclassified
10	a	SLUDGE STORAGE WET WELLS, PITS, AND HOLDING TANKS	Possible generation of methane gas in explosive concentrations; carryover of floating Class I liquids [flash point < 100°F (37.8°C)]	A	Enclosed — entire space	Division 1
	b	Retaining of sludge		B	Enclosed — entire space	Division 2

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b,c,d]	Extent of Classified Location	NEC Hazardou Locatior Classificat (All Class Group D)
	c	-			Not enclosed, open to atmosphere	Interior of th tank from th minimum operating sludge surfa to the top of the tank wal envelope 0.4 m (18 in) above the tc of the tank a extending 0. m (18 in) beyond the exterior wall envelope 0.4 m (18 in) above grade extending 3 (10 ft) horizontally from the exterior tank walls[c]
11	a	SLUDGE-BLENDING TANKS AND HOLDING WELLS	Possible generation of methane gas in explosive concentrations; carryover of floating Class I liquids [flash point < 100°F (37.8°C)]	A	Enclosed — entire space	Division 1
	b	Retaining of sludge with some agitation		B	Enclosed — entire space	Division 2
	c	-			Not enclosed, open to atmosphere	Interior of th tank from th minimum operating sludge surfa to the top of the tank wal envelope 0.4 m (18 in) above the tc of the tank a extending 0. m (18 in) beyond the exterior wall envelope 0.4 m (18 in) above grade extending 3

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b,c,d]	Extent of Classified Location	NEC Hazardou Locatior Classificat (All Class Group D)
						(10 ft) horizontally from the exterior tank walls[c]
12	a	DEWATERING BUILDINGS CONTAINING CENTRIFUGES, GRAVITY BELT THICKENERS, BELT AND VACUUM FILTERS, AND FILTER PRESSES	Accumulation of methane gas	C	Entire room	Unclassified
	b	Removal of water from sludge and the conveyance of sludge cake		D	Entire room	Division 2
13	a	ENCLOSED SLUDGE CAKE STORAGE	Accumulation of methane gas	C	Entire room	Unclassified
	b	Storage of dewatered sludge cake and conveyance of sludge cake		D	Entire room	Division 2
14	-		INCINERATORS[f] AND INCINERATOR BUILDINGS Conveying and burning of sludge cake	Firebox explosion	NR	N/A
15	-		HEAT TREATMENT UNITS, LOW- OR HIGH-PRESSURE OXIDATION UNITS Closed oxidation of sludge	None, other than in high-pressure systems	NR	N/A
16	a	ANAEROBIC DIGESTERS, BOTH FIXED ROOF AND FLOATING COVER Generation of	Leakage of gas from cover, piping, emergency relief valves, and appurtenances	Not enclosed, open to atmosphere	Tank interior; areas above and around digester cover; envelope 3 m (10 ft) above the highest	Division 1

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b,c,d]	Extent of Classified Location	NEC Hazardou Locatior Classificat (All Class Group D)
		sludge gas from digesting sludge			point of cover, when cover is at its maximum elevation, and 1.5 m (5 ft) from any wall	
	b			Not enclosed, open to atmosphere	Envelope 4.6 m (15 ft) above Division 1 area over cover and 1.5 m (5 ft) beyond Division 1 area around tank walls	Division 2
	c			A	For digester tanks enclosed in a building: tank interior; entire area inside building	Division 1
	d			B	For digester tanks enclosed in a building: tank interior; areas above and around digester cover; envelope 3 m (10 ft) above highest point of cover, when cover is at its maximum elevation, and 1.5 m (5 ft) from any wall of digester tank	Division 1
	e			B	Remaining space in enclosed area	Division 2
17	a	ANAEROBIC DIGESTER CONTROL BUILDING	Leaking and ignition of sludge gas	A	Entire building Envelope 1.5 m (5 ft) from any vent or opening to the outside atmosphere	Division 1

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b,c,d]	Extent of Classified Location	NEC Hazardou Location Classificat (All Class Group D)
	b	Conveyance and/or handling, of sludge gas		A	Envelope 1.5 m (5 ft) beyond Division 1 area openings	Division 2
	c	-			B	Enclosed ar that contain gas-handlin equipment Envelope 3 (10 ft) from a vent or oper to the outsic atmosphere
	d	-			C	Physically separated fr gas-handlin equipment
18	a	DIGESTER GAS-PROCESSING AREAS	Sludge gas ignition	A	Entire room	Division 1
	b	Gas compression, handling, and processing		B	Within 1.5 m (5 ft) of equipment	Division 1
	c	-			B	Remaining space in roo
	-	d	-	-		
19	-		ANAEROBIC DIGESTER GAS STORAGE Storage of sludge gas	Gas storage piping and handling	NNV	Within a 3 m (10 ft) envelope of tanks, valve and appurtenanc
20	a	WASTE GAS BURNERS Combusting excess gas	Gas piping and appurtenances	N/A	Within 3 m (10 ft) envelope of all fixtures, appurtenances, and housing	Division 1
	-	b	-	-	-	

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b,c,d]	Extent of Classified Location	NEC Hazardou Locatior Classificat (All Class Group D)
	-	c	-	-	-	
21	-		CHLORINE OXIDATION UNITS Chlorine reaction with sludge	Chlorine is a very strong oxidizing agent	NR	N/A
22	a	UNDERGROUND (PIPING) TUNNELS CONTAINING NATURAL GAS PIPING OR SLUDGE GAS PIPING	Ignition of natural gas or sludge gases	D	Within 3 m (10 ft) of valves and appurtenances	Division 1
	b	Transmission of gas, sludge, water, air, and steam via piping; also might contain power cable and conduit		D	Entire tunnel	Division 2
	c	-			C	Areas withir 3 m (10 ft) o valves, mete gas check valves, condensate traps, and other piping appurtenanc
	d	-			C	Areas beyor 3 m (10 ft)

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b,c,d]	Extent of Classified Location	*NEC* Hazardou Locatior Classificat (All Class Group D)
23	-		UNDERGROUND (PIPING) TUNNELS NOT CONTAINING NATURAL GAS PIPING OR SLUDGE GAS PIPING Transmission of sludge, water, air, and steam piping; also might contain power cable and conduit	N/A	NR	N/A
24	a	COMPOSTING PILES	Liberation of ammonia and toxic gas (composting materials can self-ignite)	D	Enclosed area	Division 2
	b	Aerobic sludge reduction		C	Enclosed area	Unclassified
25	a	IN-VESSEL COMPOSTING Aerobic sludge reduction	Liberation of ammonia and toxic gas (composting materials can self-ignite)	As required by process	If enclosed, interior of reactor vessel plus a 3 m (10 ft) envelope around reactor vessel	Division 2
	b	-			As required by process	Areas beyor 3 m (10 ft)
26	-		ODOR-CONTROL AND VENTILATION SYSTEMS SERVING CLASSIFIED LOCATIONS *(See Table 4.2.2)*	-	-	-
	-	-			-	-
	-	-			-	-
27	-		PUMPING OF DRAINAGE FROM DIGESTED SLUDGE-DEWATERING PROCESSES Pumping of centrate, filtrate, leachate, drying beds, and so forth -	N/A	NR	N/A

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

FAS: Fire alarm system

FDS: Fire Detection System

FE: Portable fire extinguishers installed, located, and maintained in accordance with NFPA 10

FSS: Fire suppression system (e.g., automatic sprinkler, water spray, foam, gaseous, or dry chemical)

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*

NNV: Not normally ventilated

NR: No requirement

[a]The "Row" and "Line" columns are used to refer to specific figures in A.6.2 and specific requirements for each location and function.

[b]This 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.

[c]The area beyond the envelope is unclassified.

[d]These 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.

[e]This 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.

[f]See NFPA 54, NFPA 82, and NFPA 85.

Table 6.2.2(b) Solids Treatment Processes — Sludge Drying

Row	Line	Location and Function	Fire and Explosion Hazard	Ventilation[a,b]	Extent of Classified Location	*NEC* Hazardous Location Classification (All Class II, Group G)[c]	Materials of Construction
1	a	SLUDGE-DRYING PROCESSES[e]	Potential for ignition of dust	NR	If exposed to combustible particulate solids,	Division 1	NC (Construction i accordance wi NFPA 30, NFPA 68, NFPA 69,

Row	Line	Location and Function	Fire and Explosion Hazard	Ventilation[a,b]	Extent of Classified Location	*NEC* Hazardous Location Classification (All Class II, Group G)[c]	Materials of Construction
					entire room[f]		NFPA 499, and NFPA 654)
	-			b	NR	Areas within equipment processing combustible particulate solids	Division 1
	-			c	NR	Areas within 3 m (10 ft) of equipment processing combustible particulate solids	Division 2
	-			d	NR	Areas beyond 3 m (10 ft) of equipment processing combustible particulate solids	Unclassified
2	a	DRIED SLUDGE STORAGE AREAS, IF ENCLOSED	Potential for ignition of dust	NR	If exposed to dried sludge, entire room[e]	Division 1	NC (Construction in accordance with NFPA 68 and NFPA 69, NFPA 499, and NFPA 654)
	-			b	NR	Areas within tanks storing dried sludge	Division 1

Row	Line	Location and Function	Fire and Explosion Hazard	Ventilation[a,b]	Extent of Classified Location	NEC Hazardous Location Classification (All Class II, Group G)[c]	Materials of Construction
	-			c	NR	Areas within 3 m (10 ft) of tanks storing dried sludge	Division 2
	-			d	NR	Areas beyond 3 m (10 ft) of tanks storing dried sludge	Unclassified

Note: The following codes are used in this table:

FAS: Fire alarm system

FSS: Fire suppression system (e.g., automatic sprinkler, water spray, foam, gaseous, or dry chemical)

H: Hydrant protection in accordance with 7.2.4

NC: Noncombustible material

NEC: In accordance with *NFPA 70*

NR: No requirement

[a]This 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.

[b]For sludge-drying processes that use ignitible (flammable or combustible) liquids, ventilate in accordance with NFPA 30.

[c]Or if acceptable to the authority having jurisdiction with classification in NFPA 499.

[d]This 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.

[e]See NFPA 54, NFPA 85, NFPA 499, and NFPA 654. For sludge-drying processes that use ignitible (flammable or combustible) liquids, see NFPA 30.

[f]The area beyond the envelope is unclassified.

Statement of Problem and Substantiation for Public Comment

FDS is used within Rows 22 and 23, however it is not defined.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 3-NFPA 820-2022 [New Section after 7.4]	

Related Item

-

Submitter Information Verification

Submitter Full Name:	Aaron Jones
Organization:	GHD Inc.
Street Address:	
City:	
State:	
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Submittal Date:	Wed Apr 27 13:13:55 EDT 2022
Committee:	WAA-AAA

Committee Statement

Committee Action:	Rejected
Resolution:	The submitter did not provide any proposed revisions. The committee in previous editions intended to remove all references to fire detection systems with First Revision No. 19-NFPA 820-2017 [Global Input]. Rows 22 and 23 were revised to reflect the committee revisions in previous editions that removed all references to fire detection systems.

Public Comment No. 3-NFPA 820-2022 [New Section after 7.4]

7.4 Fire Detection Systems.

7.4.1 Fire Detection Systems shall be provided in all spaces as identified in Chapters 4, 5, and 6.

7.4.2 Fire Detection Systems shall include automatic initiating devices.

7.4.3 Fire detectors shall be listed and labeled for the intended application and shall be listed for the atmosphere in which it is installed.

7.4.4 Detectors and signaling systems shall be provided with an auxiliary power supply to ensure continuous operation during any failure of normal power supply.

7.4.5 The installation, calibration, maintenance, and testing of fire detectors shall be in accordance with their listing requirements and the manufacturers' instructions.

7.4.6 Fire Detectors Systems required as fire protection measures in chapters 4, 5, and 6 shall be connected to alarm signaling systems that comply with the requirements of Section 7.7.

Statement of Problem and Substantiation for Public Comment

FDS is referenced within table 6.2.2, however there are no requirements for an FDS within the standard.

Related Item

-

Submitter Information Verification

Submitter Full Name:	Aaron Jones
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City:	
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Submittal Date:	Wed Apr 27 13:16:18 EDT 2022
Committee:	WAA-AAA

Committee Statement

Committee Action:	Rejected
Resolution:	The committee in previous editions intended to remove all references to fire detection systems with First Revision No. 19-NFPA 820-2017 [Global Input], therefore this section is not necessary in the document. The intent of the committee is that all fire alarm systems be installed in accordance with NFPA 72.