

Emission Exceedance Calculation and Reporting

3-Hour Rolling Average Based on 1-Hour Blocks

Final - August 2021

Permit Language: NO_x: Monitored by continuous emission monitor continuously, based on a 3-hour rolling average based on a 1-hour block average. [N.J.A.C. 7:27-22.16(e)]

Examples: *Permit limit 50 ppm (NO_x) and assume all hours are valid hours unless otherwise noted.*

Example #1 – No violation

Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6
30 ppm	45 ppm	55 ppm	25 ppm	25 ppm	20 ppm
Hours 1-3 in compliance (43 ppm)					
	Hours 2-4 in compliance (42 ppm)				
		Hours 3-5 in compliance (35 ppm)			

In this example no Violation has occurred as no 3-hour block average is out of compliance.

Example #2 – One (1) 3-hour block average is out of compliance

Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6
40 ppm	40 ppm	60 ppm	50 ppm	45 ppm	40 ppm
Hours 1-3 in compliance (47 ppm)					
	Hours 2-4 in compliance (50 ppm)				
		Hours 3-5 out of compliance (51.7 ppm)			
			Hours 4-6 in compliance (45 ppm)		

In this case, a 3-hour block, Hour 3 through Hour 5, would be considered out of compliance and entered in the EER report as follows:

1	2	3	4	5	6		7	8*	9
Date	Emission	Permit Allowable	units	Averaging Time	Exceedance Start	Time end	Duration	Emission reading	% Deviation
5/16/2018	NOX	50	ppm	3-hour rolling	Hour 3	Hour 5	3.0 hrs	51.7 ppm	3.4

Example #3- one (1) exceedance rolls to 5 hours

Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6
30 ppm	45 ppm	90 ppm	50 ppm	40 ppm	25 ppm
Hours 1-3 out of compliance (55 ppm)					
	Hours 2-4 out of compliance (62 ppm)				
	Hours 3-5 out of compliance (60 ppm)				
			Hours 4-6 in compliance (38 ppm)		

In this case, a 5-hour block, Hour 1 through Hour 5, would be considered out of compliance and would be entered in the EER report as follows:

1	2	3	4	5	6		7	8*	9
Date	Emission	Permit Allowable	units	Averaging Time	Exceedance Start	Time end	Duration	Emission reading	% Deviation
5/16/2018	NOX	50	ppm	3 hour rolling	Hour 1	Hour 5	5.0 hrs	59.0 ppm ¹	18%

¹The value is the average of the averages – i.e. [(55+62+60)ppm]/3 = 59.0 ppm

Example #4 - Multiple hours out of compliance

Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	Hour 8	Hour 9
50 ppm	40 ppm	80 ppm	45 ppm	65 ppm	50 ppm	75 ppm	30 ppm	30 ppm
Hours 1-3 out of compliance (57ppm)								
Hours 2-4 out of compliance (55 ppm)								
Hours 3-5 out of compliance (63 ppm)								
Hours 4-6 out of compliance (55 ppm)								
Hours 5-7 out of compliance (63 ppm)								
Hours 6-8 out of compliance (52 ppm)								
Hours 7-9 in compliance (45 ppm)								

In this case an 8-hour block, hours 1 through 8, would be considered out of compliance and would be entered in the EER report as follows:

1	2	3	4	5	6		7	8*	9
Date	Emission	Permit Allowable	units	Averaging Time	Exceedance Start	Time end	Duration	Emission reading	% Deviation
5/16/2018	NOX	50	ppm	3-hour rolling	Hour 1	Hour 8	8.0 hrs	57.5 ppm ²	15%

²This value is the average of the averages – i.e. $[(57+55+55+63+63+52)\text{ppm}]/6 = 57.5\text{ppm}$

Example #5 - Multiple non-consecutive hours of non-compliance

Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	Hour 8	Hour 9
50 ppm	45 ppm	60 ppm	45 ppm	40 ppm	70 ppm	50 ppm	50 ppm	30 ppm
Hours 1-3 out of compliance (52 ppm)								
	Hours 2-4 in compliance (50 ppm)							
	Hours 3-5 in compliance (48 ppm)							
	Hours 4-6 out of compliance (52 ppm)							
	Hours 5-7 out of compliance (53 ppm)							
	Hours 6-8 out of compliance (57)							
						Hours 7-9 in compliance (40 ppm)		

In this case one 3-hour block, Hours 1 through 3, AND three 3-hour blocks, Hours 4 through 8 would be considered out of compliance and would be entered in the EER report as follows:

1	2	3	4	5	6		7	8*	9
Date	Emission	Permit Allowable	units	Averaging Time	Exceedance Start	Time end	Duration	Emission reading	% Deviation
5/16/2018	NOX	50	ppm	3-hour rolling	Hour 1	Hour 3	3 hrs	52 ppm	4.0%
5/16/2018	NOx	50	ppm	3-hour rolling	Hour 4	Hour 8	5 hrs	54 ppm ³	8.0%

³This value is the average of the averages – i.e. [(52+53+57)ppm]/3 = 54 ppm

Example #6 – Invalid data or source downtime

Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	Hour 8	Hour 9
30 ppm	50 ppm	90 ppm	Invalid hour	Invalid hour	40 ppm	30 ppm	40 ppm	40 ppm
Hours 1-3 out of compliance (57 ppm)								
Hours 2,3 and 6 out of compliance (60 ppm)								
		Hours 3,6 and 7 out of compliance (53 ppm)						

In this case a 5-hour block, Hours 1,2,3 6 & 7, would be considered out of compliance and would be entered in the EER report as follows:

1	2	3	4	5	6		7	8*	9
Date	Emission	Permit Allowable	units	Averaging Time	Exceedance Start	Time end	Duration	Emission reading	% Deviation
5/16/2018	NOX	50	ppm	3-hour rolling	Hour 1	Hour 7	5.0 hrs	56.7 ppm ⁴	13.4%

⁴This value is the average of the averages – i.e. $[(57+60+53)\text{ppm}]/3 = 56.7 \text{ ppm}$

*In all cases the emission reading is the average of each 3-hour block during the rolling period out of compliance. The existing technical manual reads as follows:

If the emission has a rolling averaging time: Enter the average emission exceedance for the duration for the incident, in decimal hours.

NOTE – for sources with Startup/Shutdown Operating Scenarios, follow guidance set forth in CEMS Multi-hour Averages document found under Technical Manuals section

7:27A-3.10(n) - Subchapter 8 & 22 Continuous Monitoring Systems included below for reference.

CONTINUOUS MONITORING SYSTEMS⁷

TABLE 1

	CONTINUOUS EMISSION MONITORS			CONTINUOUS PROCESS MONITORS		
LEVEL OF OFFENSE ¹	AIR CONTAMINANTS (% above allowable emission rate or concentration)	OPACITY	OXYGEN (MINIMUM OR MAXIMUM %)	pH	TEMPERATURE (degrees Rankine (°F+460))	OTHER MINIMUM OR MAXIMUM SPECIFICATIONS ²
LEVEL I	Greater than 0% up to and including 25%	Greater than the standard up to and including 20%	Any deviation greater than 0% up to and including 25% of the standard	pH differential of less than 2	Any deviation greater than 0% up to and including 5% of the standard	Any deviation greater than 0% up to and including 25% of the standard
LEVEL II	Greater than 25% up to and including 50%	Greater than 20% up to and including 40%	Any deviation greater than 25% up to and including 50% of the standard	pH differential of 2 through 5	Any deviation greater than 5% up to and including 15% of the standard	Any deviation greater than 25% up to and including 50% of the standard
LEVEL III	Greater than 50%	Greater than 40%	Any deviation greater than 50% of the standard	pH differential of greater than 5	Any deviation greater than 15% of the standard	Any deviation greater than 50% of the standard

CONTINUOUS MONITORING SYSTEMS⁷

TABLE 2A MAJOR SOURCE OPERATION ⁴	
LEVEL	Base Penalty
I	\$200
II	\$400
III	\$1,000

TABLE 2B MINOR SOURCE OPERATION ³	
LEVEL	Base Penalty
I	\$100
II	\$200
III	\$500

TABLE 3	
Averaging time or duration	Multiplier
≤ 30 minutes	1
> 30 min & ≤ 1 hr	2
> 1 hr & ≤ 3 hr	4
> 3 hr & ≤ 8 hr	6
> 8 hr & ≤ 24 hr	8
> 24 hr ⁸	10