

## Ammonia TNT830 QA/QC



	Sample	True value	Actual reading	% Recovery for LFB (std)	LFM (Spike) %Recovery $\pm 20\%$	RPD $\leq 20\%$	ICV or CCV % Recovery $\pm 10\%$
1	<b>Blank</b> ( $<$ detection limit)		0.0				
2	<b>ICV</b> - 1.0 mg/L NH <sub>3</sub> -N	1.0	0.98				$\frac{0.98}{1.0} * 100 = 98\%$
3	<b>LFB</b> - 0.5 mg/L NH <sub>3</sub> -N	0.5	0.51	$\frac{0.51}{0.50} * 100 = 102\%$			
4	Influent, Composite – 25 x dilution		0.96 (x 25 = 24.00)				
5	<b>LFM</b> Influent, Composite – 25 x dilution *1.0 mg/L NH <sub>3</sub> -N		1.95		$\frac{1.95-0.96}{1.0} * 100 = 99\%$	$\frac{1.98-1.95}{2} * 100 = 1.5\%$	
6	<b>LFMD</b> - Influent, Composite – 25 x dilution *1.0 mg/L NH <sub>3</sub> -N		1.98		= 102%		
7	Sample, mg/L		0.05				
8	<b>LFM</b> - Sample Spike *1.0 mg/L NH <sub>3</sub> -N added to Samples		1.13		= 108%	= 7.7%	
9	<b>LFMD</b> - Sample Spike Dup * 1.0 mg/L NH <sub>3</sub> -N added to Samples		1.22		= 117%		
10	<b>CCV</b> - 1.0 mg/L NH <sub>3</sub> -N	1.0	0.99				$\frac{0.99}{1.0} * 100 = 99\%$

\* For spike – Put 1.0 mL of 100 mg/L standard in 100 mL of sample (A or B). Use 100 mL volumetric flask. That will give you 101 mL of sample and spike. Then, take 5 mL of this to run test. This should raise the sample + spike value by 1.0 mg/L (ppm). Spike volume should be  $<1\%$  of total volume.

$$\frac{(\text{unspiked sample conc.} * \text{unspiked sample vol.}) + (\text{std conc for spike} * \text{vol of spike})}{(\text{total sample vol.} + \text{spike vol})} = \frac{(? \text{ sample conc} * 100 \text{ mL}) + (100 \text{ mg/L} * 1.0 \text{ mL})}{(100 \text{ mL} + 1.0 \text{ mL})} = \text{mg/L}$$

**Calculations**

- % Recovery for LFB
  - =  $\frac{\text{LFB Result}}{\text{Expected Concentration}} \times 100\%$
- RPD – relative percent differences for duplicates and LFM/LFMD
  - =  $\frac{\text{Difference between sample and duplicate}}{\text{Average of the sample and duplicate}} \times 100\%$
- % Recovery for LFM – when using less than or equal to 1% spike volume compared to sample volume
  - =  $\frac{\text{LFM Result} - \text{Sample Result}}{\text{Actual Concentration of spike}} \times 100\%$

**Calculations**

**Examples:**

Blanks < MDL (example 0.004 mg/L)

LFB 100% ± 10%       $\frac{0.51}{0.5} * 100\% = 102\%$

ICV or CCV 100% ± 10%       $\frac{0.99}{1.00} * 100 = 99\%$

LFM/LFMD ± 10% Recovery  
 1.22 - 0.051 = 1.17/1 mg/L = 1.17 \* 100 = 117%  
 1.13 - 0.051 = 1.08/1 mg/L = 1.08 \* 100 = 108%

Reporting Limit = MDL

RPD < 20% (for LFM/LFMD) =  $\frac{1.22 - 1.13}{\frac{(1.22 + 1.13)}{2}} = 0.09/1.175 = 0.0766 * 100 = 7.7\%$

**Method Detection Limit**

The MDL must be greater than 1/10 the concentration of each spike.

Example: if the spike was 0.05, the MDL cannot be lower than 0.005 (0.05 divided by 10)

Date	Analyst	Number	True Value	Value Read	% Recovery (50-150%)
6/22/2015	SEP	1	0.05	0.066	132.00
6/22/2015	SEP	2	0.05	0.080	160.00
6/23/2015	SEP	3	0.05	0.056	112.00
6/23/2015	SEP	4	0.05	0.055	110.00
6/23/2015	SEP	5	0.05	0.054	108.00
6/24/2015	SEP	6	0.05	0.056	112.00
6/24/2015	SEP	7	0.05	0.056	112.00
Standard Deviation				0.009519404	
Average				0.06	
<b>Relative Standard Deviation (RSD)</b>				<b>15.75315</b>	(Needs to be ≤ 20%)
<b>MDL</b>				<b>0.0298909</b>	

\*\*This information is found in 22nd Edition of Standard Methods on page 1-8.\*\*

## Calibration Curve

- \* The appropriate linear correlation coefficient for standard concentration-to-instrument response should be greater than or equal to 0.995.

2015

**Wastewater Treatment Plant**

**DR3900 Calibration Verification**  
**Ammonia TNT**

---

Instrument Serial/Number: 1553848  
Working Standard: 1 mL of 1000 mg/L into 100 mL = 10 mg/L

Date: 7/22/15 Time: 0934

Sample	True Value	Prepared By:	Analyzed Value	R <sup>2</sup> =
1	2.00	2 mL of 10 mg/L into 10 mL	2.08	
2	1.00	1 mL of 10 mg/L into 10 mL	1.03	
3	0.50	½ mL of 10 mg/L into 10 mL	0.53	
4	0.10	1 mL of 1.00 mg/L into 10 mL	0.108	
5	0.05	1 mL of 0.50 mg/L into 10 mL	0.069	

Instrument Serial/Number: 1553848  
Working Standard: 1 mL of 1000 mg/L into 100 mL = 10 mg/L

Low Range Calibration						
S/N: 1553848						
Time: 0934						
Date	Subject	true value (x)	value read (y)	(x)(y)	X <sup>2</sup>	y <sup>2</sup>
22-Jul-2015	1	2.00	2.080	4.1600	4.0000	4.3264
22-Jul-2015	2	1.00	1.030	1.0300	1.0000	1.0609
22-Jul-2015	3	0.50	0.530	0.2650	0.2500	0.2809
22-Jul-2015	4	0.10	0.108	0.0108	0.0100	0.0117
22-Jul-2015	5	0.05	0.069	0.0035	0.0025	0.0048
	Sum (Σ)	3.65	3.817	5.4693	5.2625	5.6846
22-Jul-2015	R <sup>2</sup> =	0.999900144				