



# Certificate of Analysis

Number: 2500-18040034-003A

**Windsor Laboratory**  
208 Main Street – Unit A  
Windsor, CO 80550

Kristy Johnson  
Sandridge  
123 Robert Skerr Ave.  
Oklahoma City, OK 73102

Apr. 12, 2018

Station Name: Peterson Ridge 0780 1-20H  
Sample Point: Separator  
Meter Number: CO111R0013  
Cylinder No: 2500-00003  
Analyzed: 04/10/2018 17:03:00 by James Lowe

Sampled By: MK  
Sample Of: Gas Spot  
Sample Date: 04/06/2018 11:18  
Sample Conditions: 18 psig, @ 58 °F  
Method: GPA 2286

## Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia		
Nitrogen	1.306	1.442		GPM TOTAL C2+	7.637
Carbon Dioxide	2.978	5.167		GPM TOTAL C3+	5.741
Methane	70.287	44.456		GPM TOTAL iC5+	1.489
Ethane	7.057	8.366	1.896		
Propane	8.969	15.593	2.483		
Iso-butane	1.242	2.846	0.408		
n-Butane	4.296	9.844	1.361		
Iso-pentane	1.089	3.098	0.400		
n-Pentane	1.161	3.303	0.423		
Hexanes Plus	1.615	5.885	0.666		
	100.000	100.000	7.637		

Calculated Physical Properties	Total	C6+
Relative Density Real Gas	0.8799	3.1867
Calculated Molecular Weight	25.36	92.30
Compressibility Factor	0.9948	
<b>GPA 2172-09 Calculation:</b>		
<b>Calculated Gross BTU per ft<sup>3</sup> @ 14.73 psia &amp; 60°F</b>		
Real Gas Dry BTU	1422	5006
Water Sat. Gas Base BTU	1398	4919
VOC Weight Fraction	0.4057	

**Comments:** H<sub>2</sub>O Mol% : 1.741 ; Wt% : 0.345  
H<sub>2</sub>S 0 ppm

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.



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Station Name: Peterson Ridge 0780 1-20H  
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Components	Mol. %	Wt. %	GPM at 14.73 psia		
Nitrogen	1.306	1.442		GPM TOTAL C2+	7.637
Carbon Dioxide	2.978	5.167		GPM TOTAL C3+	5.741
Methane	70.287	44.456		GPM TOTAL iC5+	1.489
Ethane	7.057	8.366	1.896		
Propane	8.969	15.593	2.483		
Iso-Butane	1.242	2.846	0.408		
n-Butane	4.296	9.844	1.361		
Iso-Pentane	1.089	3.098	0.400		
n-Pentane	1.161	3.303	0.423		
Hexanes	0.776	2.607	0.314		
Heptanes Plus	0.839	3.278	0.352		
	100.000	100.000	7.637		

Calculated Physical Properties	Total	C7+
Relative Density Real Gas	0.8799	3.4368
Calculated Molecular Weight	25.36	99.54
Compressibility Factor	0.9948	

### GPA 2172-09 Calculation:

#### Calculated Gross BTU per ft<sup>3</sup> @ 14.73 psia & 60°F

Real Gas Dry BTU	1422	5328
Water Sat. Gas Base BTU	1398	5235
VOC Weight Fraction	0.4057	

**Comments:** H<sub>2</sub>O Mol% : 1.741 ; Wt% : 1.242  
H<sub>2</sub>S 0 ppm

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## Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia	
Nitrogen	1.306	1.442		
Methane	70.287	44.456		
Carbon Dioxide	2.978	5.167		
Hydrogen Sulfide	NIL	NIL		
Ethane	7.057	8.366	1.896	
Propane	8.969	15.593	2.483	
Iso-Butane	1.242	2.846	0.408	
n-Butane	4.296	9.844	1.361	
Iso-Pentane	1.089	3.098	0.400	
n-Pentane	1.161	3.303	0.423	
i-Hexanes	0.514	1.710	0.205	
n-Hexane	0.262	0.897	0.109	
Benzene	0.018	0.056	0.005	
Cyclohexane	0.060	0.199	0.020	
2,2,4-Trimethylpentane	0.005	0.018	0.002	
i-Heptanes	0.377	1.358	0.149	
n-Heptane	0.054	0.215	0.025	
Toluene	0.015	0.056	0.005	
i-Octanes	0.166	0.693	0.075	
n-Octane	0.018	0.082	0.009	
Ethylbenzene	0.006	0.022	0.002	
Xylenes	0.015	0.058	0.006	
i-Nonanes	0.061	0.281	0.030	
n-Nonane	0.010	0.051	0.006	
i-Decanes	0.029	0.155	0.015	
n-Decane	0.003	0.016	0.002	
Undecanes	0.002	0.015	0.001	
Dodecanes	NIL	0.001	NIL	
Tridecanes	NIL	0.001	NIL	
Tetradecanes Plus	NIL	0.001	NIL	
	100.000	100.000	7.637	

GPM TOTAL C2+ 7.637



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Calculated Physical Properties	Total	C14+
Calculated Molecular Weight	25.364	198.413
<b>GPA 2172-09 Calculation:</b>		
<b>Calculated Gross BTU per ft<sup>3</sup> @ 14.73 psia &amp; 60°F</b>		
Real Gas Dry BTU	1422.4	10754.4
Water Sat. Gas Base BTU	1397.6	10567.3
Relative Density Real Gas	0.8799	6.8498
Compressibility Factor	0.9948	
<b>Comments:</b> H2S 0 ppm		

Hydrocarbon Laboratory Manager

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