



Certificate of Analysis

Number: 2500-16060005-003A

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

Amanda Graves
Sandridge
123 Robert Skerr Ave.
Oklahoma City, OK 73102

June 20, 2016

Station Name: Hebron
Station Number: 0780 3-18H
Sample Point: Flowback Separator
Cylinder No: 1030-03047
Analyzed: 06/17/2016 11:08:42 by AH

Sampled By: Bob Burns
Sample Of: Gas Spot
Sample Date: 06/15/2016
Sample Conditions: 58 psig, @ 98 °F
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia		
Nitrogen	1.297	1.421		GPM TOTAL C2+	8.248
Carbon Dioxide	1.958	3.370		GPM TOTAL C3+	5.381
Methane	66.710	41.846		GPM TOTAL iC5+	0.663
Ethane	10.688	12.567	2.867		
Propane	10.856	18.718	2.999		
Iso-butane	1.301	2.957	0.427		
n-Butane	4.087	9.289	1.292		
Iso-pentane	0.868	2.449	0.318		
n-Pentane	0.948	2.675	0.345		
Hexanes Plus	1.287	4.708	NIL		
	100.000	100.000	8.248		

Calculated Physical Properties	Total	C6+
Relative Density Real Gas	0.8871	3.2001
Calculated Molecular Weight	25.57	92.68
Compressibility Factor	0.9946	

GPA 2172-09 Calculation:

Calculated Gross BTU per ft³ @ 14.696 psia & 60°F

Real Gas Dry BTU	1457	5008
Water Sat. Gas Base BTU	1431	4920

Comments: H₂O Mol% : 1.744 ; Wt% : 1.235
H₂S 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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Components	Mol. %	Wt. %	GPM at 14.696 psia		
Nitrogen	1.297	1.421		GPM TOTAL C2+	8.470
Carbon Dioxide	1.958	3.370		GPM TOTAL C3+	5.603
Methane	66.710	41.846		GPM TOTAL iC5+	0.885
Ethane	10.688	12.567	2.867		
Propane	10.856	18.718	2.999		
Iso-Butane	1.301	2.957	0.427		
n-Butane	4.087	9.289	1.292		
Iso-Pentane	0.868	2.449	0.318		
n-Pentane	0.948	2.675	0.345		
Hexanes	0.555	1.823	0.222		
Heptanes Plus	0.732	2.885	NIL		
	100.000	100.000	8.470		

Calculated Physical Properties	Total	C7+
Relative Density Real Gas	0.8871	3.4038
Calculated Molecular Weight	25.57	98.58
Compressibility Factor	0.9946	

GPA 2172-09 Calculation:

Calculated Gross BTU per ft³ @ 14.696 psia & 60°F

Real Gas Dry BTU	1457	5263
Water Sat. Gas Base BTU	1431	5171

Comments: H₂O Mol% : 1.744 ; Wt% : 1.236
H₂S 0 ppm

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Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia
Nitrogen	1.297	1.421	
Carbon Dioxide	1.958	3.370	
Methane	66.710	41.846	
Ethane	10.688	12.567	2.867
Propane	10.856	18.718	2.999
Iso-Butane	1.301	2.957	0.427
n-Butane	4.087	9.289	1.292
Iso-Pentane	0.868	2.449	0.318
n-Pentane	0.948	2.675	0.345
i-Hexanes	0.348	1.131	0.137
n-Hexane	0.207	0.692	0.085
Benzene	0.018	0.056	0.005
Cyclohexane	0.059	0.194	0.020
i-Heptanes	0.328	1.165	0.129
n-Heptane	0.060	0.237	0.028
Toluene	0.019	0.067	0.006
i-Octanes	0.156	0.650	0.070
n-Octane	0.023	0.101	0.012
Ethylbenzene	0.005	0.019	0.002
Xylenes	0.010	0.037	0.004
i-Nonanes	0.034	0.193	0.018
n-Nonane	0.006	0.031	0.003
Decane Plus	0.014	0.135	NIL
	100.000	100.000	8.767

Calculated Physical Properties	Total	C10+
Calculated Molecular Weight	25.57	139.08
GPA 2172-09 Calculation:		
Calculated Gross BTU per ft³ @ 14.696 psia & 60°F		
Real Gas Dry BTU	1456.8	7264.1
Water Sat. Gas Base BTU	1431.4	7137.4
Relative Density Real Gas	0.8871	4.8036
Compressibility Factor	0.9946	

Comments: H2S 0 ppm

Hydrocarbon Laboratory Manager

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