EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
BRIGHTON, CO
80601

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201312093	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 19, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 18, 2013
PRODUCER :		CYLINDER NO. :	6018
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	TREATER @ 13:40		EMPACT
	BOB WHITE 2-36-8-62		
FIELD DATA		SAMPLE TEMP. :	142
SAMPLE PRES. :	31	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.0077	0.0020	0.0018
CARBON DIOXIDE	0.0239	0.0096	0.0087
METHANE	0.2640	0.0385	0.0956
ETHANE	0.3430	0.0937	0.1958
PROPANE	0.9319	0.3735	0.5483
I-BUTANE	0.2680	0.1415	0.1871
N-BUTANE	1.3827	0.7303	0.9307
I-PENTANE	0.6934	0.4546	0.5416
N-PENTANE	1.2115	0.7943	0.9367
HEXANES PLUS	94.8739	97.3620	96.5537
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.4670	1.0413
TOLUENE	3.2525	2.7234
ETHYLBENZENE	0.5324	0.5137
XYLENE	2.4101	2.3253
TOTAL BTEX	7.6620	6.6037

(CALC: GPA STD 2145-94 & TP-17 @14.696 & 60 F)

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7448	0.7512	60/60
API Gravity =	58.48	56.87	60/60
Molecular Weight =	110.04	113.462	
Absolute Density =	6.21	6.26	LBS/GAL
Heating Value Liq. Idl Gas=	126487	127419	BTU/GAL
Vapor/Liquid =	21.47	21.00	CUFT/GAL
Vapor Pressure =	20.57	1.70	PSIA @100 F

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993) ; ASTM D6730*

EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
BRIGHTON, CO
80601

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201312093	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 19, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 18, 2013
PRODUCER :		CYLINDER NO. :	6018
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	TREATER @ 13:40		EMPACT
	BOB WHITE 2-36-8-62		
FIELD DATA		SAMPLE TEMP. :	142
SAMPLE PRES. :	31	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0239		0.0096		0.0087	
NITROGEN (AIR)	0.0077		0.0020		0.0018	
METHANE	0.2640		0.0385		0.0956	
ETHANE	0.3430		0.0937		0.1958	
PROPANE	0.9319		0.3735		0.5483	
I-BUTANE	0.2680		0.1415		0.1871	
N-BUTANE	1.3827		0.7303		0.9307	
I-PENTANE	0.6934		0.4546		0.5416	
N-PENTANE	1.2115		0.7943		0.9367	
CYCLOPENTANE (N-C5)	1.1707		0.7461		0.7305	
N-HEXANE	6.5809		5.1532		5.7790	
CYCLOHEXANE (OTHER C6)	2.9161		2.2302		2.1186	
OTHER HEXANES	10.0670		7.8031		8.3079	
OTHER HEPTANES	14.4169		13.0333		13.6226	
METHYLCYCLOHEXANE (OTHER C7)	4.4684		3.9872		3.8305	
2,2,4 TRIMETHYLPENTANE	0.8554		0.7633		0.7540	
BENZENE	1.4670		1.0413		0.8778	
TOLUENE	3.2525		2.7234		2.3185	
ETHYLBENZENE	0.5324		0.5137		0.4373	
XYLENES	2.4101		2.3253		1.9835	
OTHER OCTANES	12.3154		12.7783		12.7598	
OCTANES PLUS	----	50.5344	----	60.6442	----	58.9683
NONANES	12.5415		14.4593		14.2701	
DECANES PLUS	21.8796		29.8043		28.7636	
SUB TOTAL	100.0000		100.0000		100.0000	
TOTAL	100.0000		100.0000		100.0000	

API Gravity =	**58.48**	60/60
Vapor Pressure =	**20.57**	PSIA & 100 F
Average Molecular Weight of Decanes plus =	**149.90**	
Average Specific Gravity of Decanes plus =	**0.7700**	

EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
BRIGHTON, CO
80601

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201312093	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 19, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 18, 2013
PRODUCER :		CYLINDER NO. :	6018
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	TREATER @ 13:40		EMPACT
	BOB WHITE 2-36-8-62		
FIELD DATA		SAMPLE TEMP. :	142
SAMPLE PRES. :	31	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
NITROGEN		0.0077	0.0020	0.0018
CARBON DIOXIDE		0.0239	0.0096	0.0087
	C1	0.2640	0.0385	0.0956
	C2	0.3430	0.0937	0.1958
	C3	0.9319	0.3735	0.5483
	C4	1.6507	0.8718	1.1178
	C5	3.0756	1.9950	2.2088
	C6	21.0310	16.2278	17.0833
	C7	22.1378	19.7439	19.7716
	C8	16.1133	16.3806	15.9346
	C9	12.5415	14.4593	14.2701
	C10	11.1547	13.9702	13.5722
	C11	5.2404	7.1561	6.8079
	C12	2.5905	3.7426	3.5850
	C13	1.7795	2.9261	2.8393
	C14	1.1145	2.0093	1.9592
	C15	0.0000	0.0000	0.0000
	C16	0.0000	0.0000	0.0000
	C17	0.0000	0.0000	0.0000
	C18	0.0000	0.0000	0.0000
	C19	0.0000	0.0000	0.0000
	C20	0.0000	0.0000	0.0000
	C21	0.0000	0.0000	0.0000
	C22	0.0000	0.0000	0.0000
	C23	0.0000	0.0000	0.0000
	C24	0.0000	0.0000	0.0000
	C25	0.0000	0.0000	0.0000
	C26	0.0000	0.0000	0.0000
	C27	0.0000	0.0000	0.0000
	C28	0.0000	0.0000	0.0000
	C29	0.0000	0.0000	0.0000
	C30+	0.0000	0.0000	0.0000
	Total	100.0000	100.0000	100.0000

EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
BRIGHTON, CO
80601

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201312093	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 19, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 18, 2013
PRODUCER :		CYLINDER NO. :	6018
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	TREATER @ 13:40 BOB WHITE 2-36-8-62		EMPACT
FIELD DATA		SAMPLE TEMP. :	142
SAMPLE PRES. :	31	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0077	0.0020	0.0018
Carbon Dioxide	NHC	0.0239	0.0096	0.0087
Methane	P1	0.2640	0.0385	0.0956
Ethane	P2	0.3430	0.0937	0.1958
Propane	P3	0.9319	0.3735	0.5483
i-Butane	I4	0.2680	0.1415	0.1871
n-Butane	P4	1.3827	0.7303	0.9307
i-Pentane	I5	0.6934	0.4546	0.5416
n-Pentane	P5	1.2115	0.7943	0.9367
2,2-Dimethylbutane	I6	0.0232	0.0182	0.0207
Cyclopentane	N5	1.1707	0.7461	0.7305
2,3-Dimethylbutane	I6	0.3558	0.2787	0.3110
2-Methylpentane	I6	3.2947	2.5803	2.9196
3-Methylpentane	I6	1.9730	1.5452	1.7193
n-Hexane	P6	6.5809	5.1532	5.7790
2,2-Dimethylpentane	I7	0.0073	0.0066	0.0072
Methylcyclopentane	N6	4.4203	3.3807	3.3373
2,4-Dimethylpentane	I7	0.3666	0.3338	0.3673
2,2,3-Trimethylbutane	I7	0.0752	0.0685	0.0733
Benzene	A6	1.4670	1.0413	0.8778
3,3-Dimethylpentane	I7	0.0182	0.0166	0.0177
Cyclohexane	N6	2.9161	2.2302	2.1186
2-Methylhexane	I7	0.9081	0.8269	0.9019
2,3-Dimethylpentane	I7	0.8553	0.7788	0.8252
1,1-Dimethylcyclopentane	N7	0.5851	0.5221	0.5118
3-Methylhexane	I7	1.7750	1.6163	1.7364
1c,3-Dimethylcyclopentane	N7	0.9392	0.8381	0.8322
1t,3-Dimethylcyclopentane	N7	0.8554	0.7633	0.7540
3-Ethylpentane	I7	0.0791	0.0720	0.0761
1t,2-Dimethylcyclopentane	N7	1.9603	1.7492	1.7218
2,2,4-Trimethylpentane	I8	0.1517	0.1575	0.1677
n-Heptane	P7	5.1652	4.7033	5.0863
1c,2-Dimethylcyclopentane	N7	0.1149	0.1025	0.0982
Methylcyclohexane	N7	4.4684	3.9872	3.8305
2,2-Dimethylhexane	I8	0.7662	0.7954	0.8456

Ethylcyclopentane	N7	0.7120	0.6353	0.6132
2,5-Dimethylhexane	I8	0.1172	0.1217	0.1297
2,2,3-Trimethylpentane	I8	0.0353	0.0366	0.0378
2,4-Dimethylhexane	I8	0.2840	0.2948	0.3127
1c,2t,4-Trimethylcyclopentane	N8	0.4070	0.4150	0.4022
3,3-Dimethylhexane	I8	0.0948	0.0984	0.1026
2,3,4-Trimethylpentane	I8	0.0973	0.1010	0.1038
2,3,3-Trimethylpentane	I8	0.0273	0.0283	0.0288
Toluene	A7	3.2525	2.7234	2.3185
2,3-Dimethylhexane	I8	0.1307	0.1357	0.1410
2-Methyl-3-ethylpentane	I8	0.1815	0.1884	0.1937
1,1,2-Trimethylcyclopentane	N8	0.0751	0.0766	0.0734
2-Methylheptane	I8	1.2022	1.2480	1.3202
4-Methylheptane	I8	0.5769	0.5989	0.6183
3-Methyl-3-ethylpentane	I8	0.1040	0.1080	0.1099
3,4-Dimethylhexane	I8	0.1249	0.1297	0.1333
1c,2c,4-Trimethylcyclopentane	N8	0.0687	0.0701	0.0672
1c,3-Dimethylcyclohexane	N8	0.0510	0.0520	0.0502
3-Methylheptane	I8	0.1638	0.1700	0.1783
1c,2t,3-Trimethylcyclopentane	N8	0.7961	0.8118	0.7797
3-Ethylhexane	I8	0.5887	0.6111	0.6341
1t,4-Dimethylcyclohexane	N8	0.9105	0.9284	0.9008
1,1-Dimethylcyclohexane	N8	0.1506	0.1536	0.1456
3t-Ethylmethylcyclopentane	N8	0.2145	0.2187	0.2111
2t-Ethylmethylcyclopentane	N8	0.1469	0.1498	0.1442
1,1-Methylethylcyclopentane	N8	0.7056	0.7195	0.6818
2,2,4-Trimethylhexane	I9	0.0873	0.1018	0.1053
1t,2-Dimethylcyclohexane	N8	0.7063	0.7202	0.6870
1t,3-Dimethylcyclohexane	N8	0.0040	0.0041	0.0039
n-Octane	P8	1.3392	1.3902	1.4636
1c,4-Dimethylcyclohexane	N8	1.7564	1.7910	1.6931
i-Propylcyclopentane	I8	0.0516	0.0526	0.0501
2,4,4-Trimethylhexane	I9	0.0217	0.0253	0.0259
2,2,3,4-Tetramethylpentane	I9	0.0754	0.0879	0.0904
2,3,4-Trimethylhexane	I9	0.0219	0.0255	0.0261
1c,2-Dimethylcyclohexane	N8	0.1711	0.1745	0.1622
2,3,5-Trimethylhexane	I9	0.0742	0.0865	0.0887
2,2-Dimethylheptane	I9	0.0263	0.0307	0.0320
1,1,4-Trimethylcyclohexane	N9	1.0298	1.1814	1.1327
2,2,3-Trimethylhexane	I9	0.3931	0.4582	0.4649
2,4-Dimethylheptane	I9	0.1399	0.1631	0.1687
4,4-Dimethylheptane	I9	0.1713	0.1997	0.2065
Ethylcyclohexane	N8	0.7027	0.7166	0.6733
n-Propylcyclopentane	N8	0.2051	0.2091	0.1992
1c,3c,5-Trimethylcyclohexane	N9	0.0425	0.0488	0.0468
2,5-Dimethylheptane	I9	0.1228	0.1431	0.1477
3,3-Dimethylheptane	I9	0.1185	0.1381	0.1426
3,5-Dimethylheptane	I9	0.0938	0.1093	0.1128
2,6-Dimethylheptane	I9	0.0581	0.0677	0.0707
1,1,3-Trimethylcyclohexane	N9	0.0641	0.0735	0.0705
Ethylbenzene	A8	0.5324	0.5137	0.4373
1c,2t,4t-Trimethylcyclohexane	N9	0.5153	0.5912	0.5560
2,3-Dimethylheptane	I9	0.0030	0.0035	0.0036
1,3-Dimethylbenzene (m-Xylene)	A8	0.7171	0.6919	0.5924
1,4-Dimethylbenzene (p-Xylene)	A8	1.0032	0.9679	0.8313
3,4-Dimethylheptane	I9	0.2427	0.2829	0.2862
3,4-Dimethylheptane (2)	I9	0.3024	0.3525	0.3567
4-Ethylheptane	I9	0.0971	0.1132	0.1171
4-Methyloctane	I9	0.2428	0.2830	0.2906
2-Methyloctane	I9	0.2934	0.3420	0.3546
1c,2t,4c-Trimethylcyclohexane	I9	0.0910	0.1061	0.1082
3-Ethylheptane	I9	0.0819	0.0955	0.0973
3-Methyloctane	I9	0.2633	0.3069	0.3151
3,3-Diethylpentane	I9	0.0789	0.0920	0.0902
1c,2t,3-Trimethylcyclohexane	N9	0.2052	0.2354	0.2214
1,1,2-Trimethylcyclohexane	N9	0.0781	0.0896	0.0843
1,2-Dimethylbenzene (o-Xylene)	A8	0.6898	0.6655	0.5598

i-Butylcyclopentane	N9	0.2387	0.2738	0.2595
UnknownC8s	U8	0.0619	0.0643	0.0677
n-Nonane	P9	1.0336	1.2047	1.2422
1,1-Methylethylcyclohexane	N9	1.1866	1.3830	1.4303
i-Propylbenzene	A9	0.2939	0.3210	0.2751
i-Propylcyclohexane	N9	0.1120	0.1285	0.1186
2,2-Dimethyloctane	I10	0.1000	0.1293	0.1294
2,4-Dimethyloctane	I10	0.0758	0.0980	0.0981
2,6-Dimethyloctane	I10	0.0120	0.0155	0.0160
2,5-Dimethyloctane	I10	0.0505	0.0653	0.0654
n-Butylcyclopentane	N9	0.1990	0.2537	0.2350
3,3-Dimethyloctane	I10	0.1030	0.1332	0.1334
n-Propylbenzene	A9	0.2692	0.2940	0.2520
3,6-Dimethyloctane	I10	0.2456	0.3176	0.3179
3-Methyl-5-ethylheptane	I10	0.5230	0.6096	0.6216
1,3-Methylethylbenzene	A9	0.2805	0.3064	0.2605
1,4-Methylethylbenzene	A9	0.3438	0.3755	0.3192
1,3,5-Trimethylbenzene	A9	0.0692	0.0756	0.0647
2,3-Dimethyloctane	I10	0.0636	0.0822	0.0823
5-Methylnonane	I10	0.0979	0.1266	0.1279
1,2-Methylethylbenzene	A9	0.2999	0.3276	0.2770
2-Methylnonane	I10	0.1090	0.1409	0.1435
3-Ethyloctane	I10	0.1210	0.1565	0.1566
3-Methylnonane	I10	0.2067	0.2673	0.2697
1,2,4-Trimethylbenzene	A9	0.0572	0.0625	0.0528
t-Butylbenzene	A10	0.1727	0.2106	0.1800
i-Butylcyclohexane	N10	0.2550	0.3251	0.2965
1t-Methyl-2-n-propylcyclohexane	I10	0.1095	0.1276	0.1301
i-Butylbenzene	A10	0.0697	0.0850	0.0738
sec-Butylbenzene	A10	0.1199	0.1462	0.1256
UnknownC9s	U9	2.8441	3.3150	3.4181
n-Decane	P10	1.2143	1.5701	1.5917
1,2,3-Trimethylbenzene	A9	0.2780	0.3036	0.2515
1,3-Methyl-i-propylbenzene	A10	0.1386	0.1514	0.1280
1,4-Methyl-i-propylbenzene	A10	0.0891	0.0973	0.0823
Sec-Butylcyclohexane	N10	0.2640	0.3365	0.3065
1,2-Methyl-i-propylbenzene	A10	0.1936	0.2361	0.1995
3-Ethylnonane	I10	0.0555	0.0718	0.0731
1,3-Diethylbenzene	A10	0.1309	0.1597	0.1369
1,3-Methyl-n-propylbenzene	A10	0.0362	0.0442	0.0380
1,4-Diethylbenzene	A10	0.1606	0.1959	0.1683
1,4-Methyl-n-propylbenzene	A10	0.0897	0.1094	0.0944
n-Butylbenzene	A10	0.0674	0.0822	0.0706
1,3-Dimethyl-5-ethylbenzene	A10	0.1680	0.2049	0.1754
1,2-Diethylbenzene	A10	0.0986	0.1203	0.1013
1,2-Methyl-n-propylbenzene	A10	0.0729	0.0889	0.0754
1,4-Dimethyl-2-ethylbenzene	A10	0.0983	0.1199	0.1012
1,3-Dimethyl-4-ethylbenzene	A10	0.1442	0.1759	0.1486
1,2-Dimethyl-4-ethylbenzene	A10	0.1772	0.2161	0.1830
1,3-Dimethyl-2-ethylbenzene	A10	0.0694	0.0847	0.0705
1t,2c,4-Trimethylcyclopentane	A10	0.5242	0.5345	0.5291
1,2-Dimethyl-3-ethylbenzene	A10	0.1340	0.1634	0.1356
1,2-Ethyl-i-propylbenzene	A10	0.0731	0.0892	0.0754
1,4-Methyl-t-butylbenzene	A11	0.0640	0.0781	0.0660
UnknownC10s	U10	4.4954	5.8123	5.8923
n-Undecane	P11	0.7957	1.1303	1.1300
1,4-Ethyl-i-propylbenzene	A11	0.2658	0.3242	0.2739
1,2,4,5-Tetramethylbenzene	A11	0.1215	0.1482	0.1239
1,2-Methyl-n-butylbenzene	A11	0.0250	0.0305	0.0258
1,2,3,5-Tetramethylbenzene	A11	0.1431	0.1745	0.1452
1,2-Methyl-t-butylbenzene	A11	0.0456	0.0556	0.0470
5-Methylindan	A11	0.0131	0.0203	0.0201
4-Methylindan	A11	0.0242	0.0375	0.0371
1,2-Ethyl-n-propylbenzene	A11	0.1736	0.2117	0.1788
2-Methylindan	A11	0.0630	0.0975	0.0964
1,3-Methyl-n-butylbenzene	A11	0.0330	0.0402	0.0340
1,3-Di-i-propylbenzene	A11	0.0167	0.0204	0.0172

sec-Pentylbenzene	A11	0.0726	0.0885	0.0748
n-Pentylbenzene	A11	0.0624	0.0841	0.0725
1t-M-2-(4MP)cyclopentane	P12	0.0131	0.0203	0.0201
1,2-Di-n-propylbenzene	A11	0.1328	0.1620	0.1369
1,4-Di-i-propylbenzene	A11	0.1038	0.1266	0.1070
Tetrahydronaphthalene	A10	0.0301	0.0367	0.0310
t-Decahydronaphthalene	A10	0.1047	0.1277	0.1079
Naphthalene	A10	0.0898	0.1046	0.0884
1-t-Butyl-3,5-dimethylbenzene	A12	0.0273	0.0333	0.0281
1,4-Ethyl-t-butylbenzene	A11	0.0718	0.0876	0.0740
UnknownC11s	U11	2.6915	3.8232	3.8221
n-Dodecane	P12	0.6326	0.9792	0.9682
1,3-Di-n-propylbenzene	A12	0.1080	0.1317	0.1113
1,3,5-Triethylbenzene	A12	0.1146	0.1252	0.1071
1,2,4-Triethylbenzene	A12	0.3097	0.3383	0.2859
1,4-Methyl-n-pentylbenzene	A12	0.0743	0.0906	0.0765
n-Hexylbenzene	A12	0.0724	0.1068	0.0922
1,2,3,4,5-Pentamethylbenzene	A13	0.1213	0.1480	0.1250
2-Methylnaphthalene	A11	0.1550	0.2003	0.1692
1-Methylnaphthalene	A11	0.1662	0.2148	0.1560
UnknownC12s	U12	1.2385	1.9172	1.8956
n-Tridecane	P13	0.5407	0.9059	0.8851
UnknownC13s	U13	1.1175	1.8722	1.8292
UnknownC14s	U14	1.1145	2.0093	1.9592
TOTAL		100.0000	100.0000	100.0000

EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
BRIGHTON, CO
80601

303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201312093	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 20, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 18, 2013
PRODUCER :		CYLINDER NO. :	0591
LEASE NO. :		SAMPLED BY :	JOHN MOSER-EMPACT
NAME/DESCRIP :	SALES GAS @13:50 BOB WHITE 2-36-8-62		
FIELD DATA		SAMPLE TEMP. :	65
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; PULLED FROM SALES LINE TO FLARE LENGTH OF H2S STAIN @ 7PPM @ 13:55		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0021	0.0032		
HELIUM	0.01	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	0.88	1.04	---	---
CARBON DIOXIDE	2.71	5.03	---	---
METHANE	70.65020	47.84650	---	---
ETHANE	11.8235	15.0084	3.1575	3.1747
PROPANE	8.2857	15.4239	2.2795	2.2919
I-BUTANE	0.8479	2.0805	0.2773	0.2788
N-BUTANE	2.7559	6.7621	0.8679	0.8727
I-PENTANE	0.5857	1.7787	0.2102	0.2114
N-PENTANE	0.6786	2.0669	0.2453	0.2466
HEXANES PLUS	0.7504	2.9498	0.2991	0.3006
TOTALS	100.00000	100.00000	7.3368	7.3767

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0261	0.0861
TOLUENE	0.0171	0.0665
ETHYLBENZENE	0.0017	0.0076
XYLENES	0.0062	0.0278
TOTAL BTEX	0.0511	0.1880

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1215.7 **/scf**	1222.4 **/scf**
	NET WET REAL :	1194.4 **/scf**	1201.1 **/scf**
HIGH	GROSS DRY REAL :	1337.0 **/scf**	1344.3 **/scf**
	GROSS WET REAL :	1313.6 **/scf**	1320.9 **/scf**
	NET DRY REAL :	19507.3 **/lb**	19613.9 **/lb**
	GROSS DRY REAL :	21451.4 **/lb**	21568.5 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8162
	COMPRESSIBILITY FACTOR :		0.99578

(CALC: GPA STD 2145 & TP-17 @14.696 & 60 F)

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993) ; ASTM D6730*

EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
BRIGHTON, CO
80601

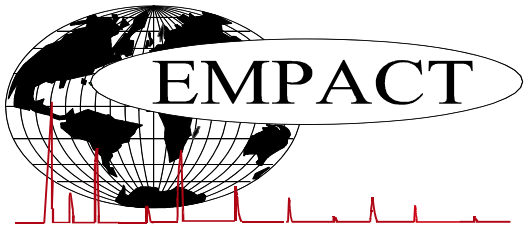
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201312093	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 20, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 18, 2013
PRODUCER :		CYLINDER NO. :	0591
LEASE NO. :		SAMPLED BY :	JOHN MOSER-EMPACT
NAME/DESCRIP :	SALES GAS @13:50 BOB WHITE 2-36-8-62		
FIELD DATA		SAMPLE TEMP. :	65
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; PULLED FROM SALES LINE TO FLARE LENGTH OF H2S STAIN @ 7PPM @ 13:55		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	2.71	5.03
Nitrogen	0.88	1.04
Methane	70.65020	47.84650
Ethane	11.8235	15.0084
Propane	8.2857	15.4239
Isobutane	0.8479	2.0805
n-Butane	2.7559	6.7621
Isopentane	0.5247	1.5981
n-Pentane	0.6786	2.0669
Cyclopentane	0.0610	0.1806
n-Hexane	0.1463	0.5322
Cyclohexane	0.0400	0.1421
Other Hexanes	0.2633	0.9503
Heptanes	0.1286	0.5400
Methycyclohexane	0.0316	0.1310
2,2,4 Trimethylpentane	0.0001	0.0005
Benzene	0.0261	0.0861
Toluene	0.0171	0.0665
Ethylbenzene	0.0017	0.0076
Xylenes	0.0062	0.0278
C8+ Heavies	0.0894	0.4657
Subtotal	99.98790	99.98680
Oxygen/Argon	0.01	0.01
Alcohols	0.0021	0.0032
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201312093	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 20, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 18, 2013
PRODUCER :		CYLINDER NO. :	0591
LEASE NO. :		SAMPLED BY :	JOHN MOSER-EMPACT
NAME/DESCRIP :	SALES GAS @13:50 BOB WHITE 2-36-8-62		
FIELD DATA		SAMPLE TEMP. :	65
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; PULLED FROM SALES LINE TO FLARE LENGTH OF H2S STAIN @ 7PPM @ 13:55		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	0.88	1.04	---	---
Carbon Dioxide	---	2.71	5.03	---	---
Methane	P1	70.65020	47.84650	---	---
Ethane	P2	11.8235	15.0084	3.158	3.175
Propane	P3	8.2857	15.4239	2.280	2.292
i-Butane	I4	0.8479	2.0805	0.277	0.279
Methanol	X1	0.0019	0.0026	0.000	0.000
n-Butane	P4	2.7558	6.7618	0.868	0.873
2,2-Dimethylpropane	I5	0.0023	0.0070	0.001	0.001
i-Pentane	I5	0.5224	1.5911	0.191	0.192
Acetone	X3	0.0001	0.0003	0.000	0.000
UnknownC4s	U4	0.0001	0.0003	0.000	0.000
n-Pentane	P5	0.6786	2.0669	0.245	0.247
t-Butanol	X4	0.0001	0.0003	0.000	0.000
2,2-Dimethylbutane	I6	0.0016	0.0058	0.001	0.001
Cyclopentane	N5	0.0610	0.1806	0.018	0.018
2,3-Dimethylbutane	I6	0.0100	0.0364	0.004	0.004
2-Methylpentane	I6	0.1080	0.3929	0.045	0.045
3-Methylpentane	I6	0.0554	0.2015	0.023	0.023
n-Hexane	P6	0.1463	0.5322	0.060	0.060
2,2-Dimethylpentane	I7	0.0006	0.0025	0.000	0.000
Methylcyclopentane	N6	0.0883	0.3137	0.031	0.031
2,4-Dimethylpentane	I7	0.0035	0.0148	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0261	0.0861	0.007	0.007
3,3-Dimethylpentane	I7	0.0003	0.0013	0.000	0.000
Cyclohexane	N6	0.0400	0.1421	0.014	0.014
2-Methylhexane	I7	0.0153	0.0647	0.007	0.007
2,3-Dimethylpentane	I7	0.0070	0.0296	0.003	0.003
1,1-Dimethylcyclopentane	N7	0.0040	0.0166	0.002	0.002
3-Methylhexane	I7	0.0175	0.0740	0.008	0.008
1c,3-Dimethylcyclopentane	N7	0.0099	0.0410	0.005	0.005
1t,3-Dimethylcyclopentane	N7	0.0089	0.0369	0.004	0.004

EMPACT Analytical Systems, Inc 365 S. Main Street, Brighton, CO 80601 303-637-0150

3-Ethylpentane	I7	0.0014	0.0059	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0178	0.0738	0.008	0.008
2,2,4-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
n-Heptane	P7	0.0366	0.1548	0.017	0.017
1c,2-Dimethylcyclopentane	N7	0.0012	0.0050	0.001	0.001
Methylcyclohexane	N7	0.0316	0.1310	0.013	0.013
2,2-Dimethylhexane	I8	0.0023	0.0111	0.001	0.001
Ethylcyclopentane	N7	0.0045	0.0187	0.002	0.002
2,5-Dimethylhexane	I8	0.0008	0.0038	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
2,4-Dimethylhexane	I8	0.0013	0.0063	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0026	0.0123	0.001	0.001
3,3-Dimethylhexane	I8	0.0002	0.0010	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0029	0.0137	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0005	0.0024	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
Toluene	A7	0.0171	0.0665	0.006	0.006
2,3-Dimethylhexane	I8	0.0011	0.0053	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0007	0.0034	0.000	0.000
2-Methylheptane	I8	0.0062	0.0299	0.003	0.003
4-Methylheptane	I8	0.0017	0.0082	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0010	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0010	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0005	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0005	0.000	0.000
3-Methylheptane	I8	0.0029	0.0140	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0043	0.0204	0.002	0.002
3-Ethylhexane	I8	0.0004	0.0019	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0015	0.0071	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0006	0.0028	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0009	0.0043	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0008	0.0038	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0025	0.0119	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0023	0.0109	0.001	0.001
n-Octane	P8	0.0098	0.0472	0.005	0.005
1c,4-Dimethylcyclohexane	N8	0.0008	0.0038	0.000	0.000
i-Propylcyclopentane	I8	0.0002	0.0009	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0006	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0006	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0006	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0001	0.0006	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0008	0.0038	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0032	0.0171	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0010	0.0054	0.001	0.001
2,4-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
Ethylcyclohexane	N8	0.0016	0.0076	0.001	0.001
n-Propylcyclopentane	N8	0.0006	0.0028	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0006	0.000	0.000
2,5-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
3,5-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
2,6-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0005	0.0027	0.000	0.000
Ethylbenzene	I8	0.0017	0.0076	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0008	0.0043	0.000	0.000
2,3-Dimethylheptane	I9	0.0004	0.0022	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0037	0.0166	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0008	0.0036	0.000	0.000

3,4-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0004	0.0022	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0006	0.000	0.000
4-Methyloctane	I9	0.0007	0.0038	0.000	0.000
2-Methyloctane	I9	0.0008	0.0044	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0002	0.0011	0.000	0.000
3-Ethylheptane	I9	0.0002	0.0011	0.000	0.000
3-Methyloctane	I9	0.0010	0.0054	0.001	0.001
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0006	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0006	0.000	0.000
3,3-Diethylpentane	I9	0.0002	0.0011	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0017	0.0076	0.001	0.001
i-Butylcyclopentane	N9	0.0006	0.0032	0.000	0.000
UnknownC8s	U8	0.0001	0.0005	0.000	0.000
n-Nonane	P9	0.0032	0.0173	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0005	0.0027	0.000	0.000
i-Propylbenzene	A9	0.0006	0.0030	0.000	0.000
i-Propylcyclohexane	N9	0.0002	0.0011	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Butylcyclopentane	N9	0.0007	0.0037	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Propylbenzene	A9	0.0007	0.0036	0.000	0.000
3,6-Dimethyloctane	I10	0.0005	0.0030	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0007	0.0042	0.000	0.000
1,3-Methylethylbenzene	A9	0.0006	0.0030	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0010	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0002	0.0010	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
5-Methylnonane	I10	0.0004	0.0024	0.000	0.000
2-Methylnonane	I10	0.0007	0.0042	0.000	0.000
3-Ethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methylnonane	I10	0.0003	0.0018	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
t-Butylbenzene	A10	0.0007	0.0040	0.000	0.000
i-Butylcyclohexane	N10	0.0003	0.0018	0.000	0.000
1t-Methyl-2-n-propylcyclohexane	I10	0.0001	0.0006	0.000	0.000
i-Butylbenzene	A10	0.0001	0.0006	0.000	0.000
sec-Butylbenzene	A10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0025	0.0136	0.001	0.001
n-Decane	P10	0.0015	0.0090	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0004	0.0020	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0006	0.000	0.000
1,4-Methyl-i-propylbenzene	A10	0.0001	0.0006	0.000	0.000
Sec-Butylcyclohexane	A10	0.0004	0.0024	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0002	0.0011	0.000	0.000
3-Ethylnonane	I10	0.0001	0.0007	0.000	0.000
1,3-Diethylbenzene	A10	0.0002	0.0011	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0001	0.0006	0.000	0.000
1,4-Diethylbenzene	A10	0.0003	0.0017	0.000	0.000
1,4-Methyl-n-propylbenzene	A10	0.0001	0.0006	0.000	0.000
n-Butylbenzene	A10	0.0001	0.0006	0.000	0.000
1,3-Dimethyl-5-ethylbenzene	A10	0.0001	0.0006	0.000	0.000
1,2-Diethylbenzene	A10	0.0002	0.0011	0.000	0.000
t-Decahydronaphthalene	A9	0.0001	0.0006	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0006	0.000	0.000
1,4-Dimethyl-2-ethylbenzene	A10	0.0001	0.0006	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0002	0.0011	0.000	0.000
1,3-Dimethyl-2-ethylbenzene	A10	0.0001	0.0006	0.000	0.000

1,2-Dimethyl-3-ethylbenzene	A10	0.0001	0.0006	0.000	0.000
1,2-Ethyl-i-propylbenzene	A10	0.0001	0.0006	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0002	0.0013	0.000	0.000
UnknownC10s	U10	0.0030	0.0180	0.002	0.002
n-Undecane	P11	0.0008	0.0053	0.001	0.001
1,2,4,5-Tetramethylbenzene	A11	0.0001	0.0006	0.000	0.000
1,2-Methyl-n-butylbenzene	A11	0.0001	0.0006	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0002	0.0011	0.000	0.000
1,2-Methyl-t-butylbenzene	A11	0.0001	0.0006	0.000	0.000
1,2-Ethyl-n-propylbenzene	A11	0.0001	0.0006	0.000	0.000
2-Methylindan	A11	0.0001	0.0006	0.000	0.000
1,3-Methyl-n-butylbenzene	A11	0.0001	0.0006	0.000	0.000
1,3-Di-i-propylbenzene	A11	0.0001	0.0007	0.000	0.000
n-Pentylbenzene	A11	0.0001	0.0006	0.000	0.000
Naphthalene	A10	0.0001	0.0006	0.000	0.000
1,3-Di-n-propylbenzene	A12	0.0001	0.0007	0.000	0.000
UnknownC11s	U11	0.0005	0.0033	0.000	0.000
n-Dodecane	P12	0.0003	0.0022	0.000	0.000
1,2,4-Triethylbenzene	A12	0.0001	0.0007	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0001	0.0006	0.000	0.000
UnknownC12s	U12	0.0001	0.0007	0.000	0.000
n-Tridecane	P13	0.0001	0.0008	0.000	0.000
n-Tetradecane	P14	0.0001	0.0008	0.000	0.000
n-Pentadecane	P15	0.0003	0.0027	0.000	0.000
n-Hexadecane	P16	0.0003	0.0029	0.000	0.000
n-Heptadecane	P17	0.0001	0.0010	0.000	0.000
n-Octadecane	P18	0.0001	0.0011	0.000	0.000
UnknownC18s	U18	0.0001	0.0011	0.000	0.000
TOTAL		100.00000	100.00000	7.3368	7.3767

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0261	0.0861
TOLUENE	0.0171	0.0665
ETHYLBENZENE	0.0017	0.0076
XYLENES	0.0062	0.0278
TOTAL BTEX	0.0511	0.1880

	BTU @	14.650		14.730	
LOW	NET DRY REAL :	1215.7	**/scf**	1222.4	**/scf**
	NET WET REAL :	1194.4	**/scf**	1201.1	**/scf**
HIGH	GROSS DRY REAL :	1337.0	**/scf**	1344.3	**/scf**
	GROSS WET REAL :	1313.6	**/scf**	1320.9	**/scf**
	NET DRY REAL :	19507.3	**/lb**	19613.9	**/lb**
	GROSS DRY REAL :	21451.4	**/lb**	21568.5	**/lb**
	RELATIVE DENSITY (AIR=1):			0.8162	
	COMPRESSIBILITY FACTOR :			0.99578	

(CALC: GPA STD 2145 & TP-17 @14.696 & 60 F)

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993) ; ASTM D6730*

THIS DATA HAS BEEN ACQUIRED THROUGH APPLICATION OF CURRENT STATE-OF-THE-ART ANALYTICAL TECHNIQUES. THE USE OF THIS INFORMATION IS THE RESPONSIBLITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, ASSUMES NO RESPONSIBLITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF IT'S APPLICATION.

EMPACT Analytical Systems, Inc 365 S. Main Street, Brighton, CO 80601 303-637-0150

CRUDE OIL ASSAY

PROJECT NO. :	201312093	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 19, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 18, 2013
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUCTION TANK @ 14:10 BOB WHITE 2-36-8-62		EMPACT
FIELD DATA		SAMPLE TEMP. :	64
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

SPECIFICATION		TEST METHOD	UNITS	RESULTS
API GRAVITY			API 60/60	35.6
RVP @100 DEG F		D323	PSIG	6.4
TOTAL SULFUR		D2622	WT %	N/A
TOTAL CHLORIDE		D4929	ug/g	N/A
ORGANIC CHLORIDE		D4929	ug/g	N/A
FLASH POINT		D93	° F	N/A
HEATING VALUE		D4809	BTU/ LB	N/A
VISUAL APPEARANCE				DARK REDDISH/BROWN
BS&W		D96		
Crude Oil			VOL %	N/A
Water			VOL %	N/A
Emulsion			VOL %	N/A
Sediment			VOL %	N/A
DISTILLATION:		D86		
INITIAL POINT			DEG F	N/A
50%			DEG F	N/A
90%			DEG F	N/A
END POINT			DEG F	N/A
DISTILLATION:	@TEMP	D445		
Average Centipoise	20°C			N/A
Average Centipoise	30°C			N/A
Average Centipoise	80°C			N/A
Kinetic Viscosity	20°C		cSt (mm2/s)	N/A
Kinetic Viscosity	30°C		cSt (mm2/s)	N/A
Kinetic Viscosity	80°C		cSt (mm2/s)	N/A

ND: NOT DETECTED

N/A: NO TEST PREFORMED FOR THIS PARAMETER