

Ceiba Crude (31.44 API, 0.398 Sul WT%)

Crude Name:	Ceiba Crude	API Gravity	API	31.44	Component	Wt %	Vol %
Crude ID:	CEIBA2015	Density @15 deg C	KG/L	0.8679	C2 Minus	0.004	0.01
Country:	Equatorial Guinea	Sulfur	WT%	0.398	C3	0.19	0.325
Region:	Africa	Reid Vapor Pressure	kPa	33.09	IC4	0.254	0.391
State:	--	Nitrogen	ppm	1500	NC4	0.535	0.795
Assay Year:	2015	Pour Point	deg C	-6	IC5	0.699	0.971
Assay Library:	COMET	Neut or TAN No.	mgKOH/g	0.7	NC5	0.703	0.967
Assay Source:	COMET	Vanadium	ppm	4.26	CycP	0.165	0.191
Sulfur Type:	Low	Nickel	ppm	8.89	IC6	0.006	0.007
Crude Type:	Medium	Viscosity @104 F (40 C)	cSt	9.5	NC6	0.648	0.848
Chemical Class:	Naphthenic	Viscosity @122 F (50 C)	cSt	8.1	Benzene	0.086	0.085

Property	Unit	WC	GAS	NAP1	NAP2	KERO	LDIST	HDIST	LVGO
Initial Boiling Pt	deg C	--	IBP	15	85	175	250	300	360
End Boiling Pt	deg C	--	15	85	175	250	300	360	450
Cut Yield (Vol%)	LV%	100	2.01	5.02	13.82	12.65	9.31	10.91	13.13
Cut Yield (Wgt%)	WT%	100	1.22	3.93	12.13	11.97	9.14	11.01	13.69
API Gravity	API	31.44	137.63	77.54	54.91	41.4	35.15	30.66	25.45
Specific Gravity (@60F)	--	0.8684	0.5258	0.6769	0.7591	0.8184	0.8491	0.8726	0.9016
Density @15 deg C	KG/L	0.8679	0.5259	0.6768	0.7588	0.818	0.8486	0.8721	0.9011
K-Factor	--	12.14 C	14.32	12.4	11.83	11.65	11.67	11.7	11.76
Molecular Weight	--	232 C	47	81	116	166	214	262	347
Hydrogen	WT%	--	19.7	15.7	14.4	13.6	13.2	12.9	12.6
Sulfur	WT%	0.398	0.012	0.036	0.069	0.122	0.179	0.244	0.355
Mercaptan Sulfur	ppm	5	0	1	1	1	2	2	3
Nitrogen	ppm	1500	0	0	0.2	5.8	23.2	63.3	557.9
Basic Nitrogen	ppm	510.4 C	0	0	0.2	4.7	15.6	34.5	238
Research Octane clear	--	--	96.8	76.8	52.4	17.1	0.1	--	--
Motor Octane clear	--	--	91.6	75	50.3	15.8	0	--	--
Flash Point (API)	deg C	--	--	--	7	66	105	128	149
Reid Vapor Pressure	kPa	33.09	541.06	51.31	0.4	0.14	0.14	--	--
Paraffins (Total) Vol	LV%	--	100	74.1	49.7	55.3	52.5	49	48.2
iso-Paraffins Vol	LV%	--	42.72	--	--	--	--	--	--
n-Paraffins Vol	LV%	--	57.24	--	--	--	--	--	--
Naphthenes Vol	LV%	--	0	24.5	37.5	25.9	24.4	20.2	16.6

Tullow Oil Crude Assay

Property	Unit	WC	GAS	NAP1	NAP2	KERO	LDIST	HDIST	LVGO
Aromatics Vol	LV%	--	0	1.4	12.8	18.8	23	30.8	35.2
N + 2A	LV%	--	0.04	27.29	63.17	63.55	70.48	81.84	86.99
Freeze Point	deg C	--	-158	-126	-97	-63	-28	-2	26
Cloud Point	deg C	--	-161	-130	-100	-66	-33	-4	22
Pour Point	deg C	-6	-161	-130	-101	-67	-33	-4	23
Naphthalenes	--	--	--	--	--	--	--	--	--
Smoke Point (ASTM)	mm	--	--	--	30.12	20.49	16.51	13.69	10.7
Aniline Point	deg C	--	14	36	51	59	67	73	81
Neut or TAN No.	mgKOH/g	0.7	0	0	0	0	0	0	0
Cetane Index	--	--	0	0.3	20.9	40.5	47.5	47.7	39.8
Cetane Index (D4737)	--	--	179.9	40.4	34.2	41.9	49.9	55.7	60.6
Cetane Index (D4737-B)	--	--	88.6	55.2	44.1	43.7	48.9	54.5	63.8
Refractive Index @ 20deg C	--	--	1.3116	1.3785	1.425	1.4579	1.4747	1.4877	1.5036
Refractive Index @ 70deg C	--	--	1.2864	1.3545	1.4021	1.4363	1.4542	1.4682	1.4854
Viscosity @ 68 F (20 C)	cSt	13.8 C	0.3	0.4	0.8	2	4.9	15.1	112.4
Viscosity @104 F (40 C)	cSt	9.5	0.3	0.4	0.6	1.5	3.1	7.6	36.1
Viscosity @122 F (50 C)	cSt	8.1	0.3	0.3	0.6	1.3	2.6	5.7	23.1
Viscosity @212 F (100 C)	cSt	4.2 C	0.3	0.3	0.4	0.8	1.3	2.1	5.1
Viscosity @275 F (135 C)	cSt	3 C	0.3	0.3	0.3	0.3	0.3	0.5	1
MCRT carbon number	WT%	3.28	0	0	0	0	0	0	0
Vanadium	ppm	4.26	0	0	0	0	0	0	0.01
Nickel	ppm	8.89	0	0	0	0	0	0	0.01
Vanadium + Nickel Total	ppm	13.15	0	0	0	0	0	0	0.02
Iron	ppm	5.4	0	0	0	0	0	0	0.01
Wax	WT%	--	0	0	0	0	0.06	7.94	13.06
Asphaltenes	WT%	< 0.5	--	--	--	--	--	--	--

Property	Unit	ARES	HVGO	VRES
Initial Boiling Pt	deg C	360	450	565
End Boiling Pt	deg C	FBP	565	FBP
Cut Yield (Vol%)	LV%	46.27	16.08	17.06
Cut Yield (Wgt%)	WT%	50.6	17.21	19.7
API Gravity	API	18.1	21.33	10.17
Specific Gravity (@60F)	--	0.9459	0.9259	0.9988
Density @15 deg C	KG/L	0.9453	0.9254	0.9982
K-Factor	--	11.75	11.97	11.99

Property	Unit	ARES	HVGO	VRES
Molecular Weight	--	525	499	881
Hydrogen	WT%	12	12.4	11.3
Sulfur	WT%	0.699	0.505	1.108
Mercaptan Sulfur	ppm	3	3	3
Nitrogen	ppm	2984.6	1479.9	5985.2
Basic Nitrogen	ppm	997.4	516.6	1945.2
Research Octane clear	--	--	--	--
Motor Octane clear	--	--	--	--
Flash Point (API)	deg C	156	166	172
Reid Vapor Pressure	kPa	--	--	--
Paraffins (Total) Vol	LV%	--	48.2	--
iso-Paraffins Vol	LV%	--	--	--
n-Paraffins Vol	LV%	--	--	--
Naphthenes Vol	LV%	11.4	13.5	5.5
Aromatics Vol	LV%	--	38.3	--
N + 2A	LV%	--	90.05	--
Freeze Point	deg C	--	--	--
Cloud Point	deg C	47	36	72
Pour Point	deg C	15	36	72
Naphthalenes	--	--	--	--
Smoke Point (ASTM)	mm	2.84	9.13	1.28
Aniline Point	deg C	94	96	101
Neut or TAN No.	mgKOH/g	0.52	0.09	1.26
Cetane Index	--	17.7	18.4	0
Cetane Index (D4737)	--	--	--	--
Cetane Index (D4737-B)	--	--	--	--
Refractive Index @ 20deg C	--	1.5284	1.5165	1.5586
Refractive Index @ 70deg C	--	1.5066	1.4988	1.5302
Viscosity @ 68 F (20 C)	cSt	1260.4	3653.2	4.72E+008
Viscosity @104 F (40 C)	cSt	287	546.2	7021057
Viscosity @122 F (50 C)	cSt	158.4	259.4	1308684.1
Viscosity @212 F (100 C)	cSt	20.6	22.2	4489.9
Viscosity @275 F (135 C)	cSt	7.7	3.6	486.3
MCRT carbon number	WT%	6.78	0.04	17.37
Vanadium	ppm	9.2	0.09	23.55
Nickel	ppm	21.92	0.09	56.23

Property	Unit	ARES	HVGO	VRES
Vanadium + Nickel Total	ppm	31.13	0.18	79.78
Iron	ppm	12.17	0.09	31.18
Wax	WT%	12.32	14.84	9.59
Asphaltenes	WT%	--	--	--

C-Calculated Value

Comments:

Hess Ceiba Crude Analytical Notes 300-400F

D2386 Freeze Point - Result is <-94F. Not entered in distillate table due to not being able to enter inequality signs. D2500 Cloud Point - Result is <-76F. Not entered in distillate table due to not being able to enter inequality signs. D97 Pour Point - Result is <-76F. Not entered in distillate table due to not being able to enter inequality signs. 650 D664 Total Acid Number - Results were balancing low to the whole crude. Recheck of the sample confirms original results. 1050 D445 Kinematic Viscosity @ 122F/50C - The sample is not applicable to the method due to the sample being a solid at specified temperature. The kinematic viscosity was ran at 275F/135C instead.

*** The GC Analysis Covers 5.7 LV% of crude up to a TBP of 72.0 deg. C.

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Crude Assay Data from H/COMET Database 1/29/2018 11:18:17 AM

