

Data Comparison of Selected Crude Oils

COUNTRY	Brazil
STATE	
CRUDE	Frade Blk RJ363-A (CVX) '02
REFERENCE	FRADE180-A
SAMPLE DATE	2002
ANALYSIS QUALITY	GOOD

WHOLE CRUDE INSPECTIONS

Gravity, °API	18
Specific Gravity	0.9465
Sulfur, wt %	0.713
Mercaptan Sulfur, ppm	85
Dissolved H ₂ S, ppm	0.00378
Nitrogen, ppm	4410
Pour Point °F	-38.5
Pour Point °C	-39.2
Acid Number, mg KOH/g	0.47
Back-Blended Acid, mg KOH/g	0.271
Viscosity @ 40 °C (104 °F), cSt	129
Viscosity @ 50 °C (122 °F), cSt	75.3
Asphaltenes, C7, %	2.8
Nickel, ppm	11.5
Vanadium, ppm	22
Characterization Factor, K	11.59
MCR, wt%	6.2

TBP YIELDS, VOL %

Butanes and Lighter	0.001
Light Gasoline (55-175 °F)	0.029
Light Naphtha (175-300 °F)	2.192
Heavy Naphtha (300-400 °F)	4.213
Kerosene (400-500 °F)	7.21
Atm. Gas Oil (500-650 °F)	16.031
Lt Vacuum Gas Oil (650-800 °F)	17.978
Hvy Vacuum Gas Oil (800-1050 °F)	26.768
Vacuum Residuuum (1050 °F+)	25.578

LIGHT GASOLINE (55-175 °F)

Gravity, °API	73.9
Specific Gravity	0.6888
Mercaptan Sulfur, ppm	103
Octane Number, Research, Clear	80.8

LIGHT NAPHTHA (175-300 °F)

Gravity, °API	49.5
Specific Gravity	0.7818
Mercaptan Sulfur, ppm	102
Naphthenes, vol %	42.49
Aromatics, vol %	8.56
Octane Number, Research, Clear	65.4

HEAVY NAPHTHA (300-400 °F)

Gravity, °API	40
Specific Gravity	0.8248
Sulfur, wt %	0.128
Mercaptan Sulfur, ppm	34.5
Naphthenes, vol %	47.91
Aromatics, vol %	15.76
Smoke Point, mm (ASTM)	21.5

KEROSENE (400-500 °F)

Gravity, °API	32.7
Specific Gravity	0.8619
Sulfur, wt %	0.319
Mercaptan Sulfur, ppm	28.4
Naphthenes, vol %	55.48
Aromatics, vol %	29.76
Freezing Point, °F	-122.6
Freezing Point, °C	-85.9
Smoke Point, mm (ASTM)	14.9
Acid Number, mg KOH/g	0.301
Viscosity @ 50 °C (122 °F), cSt	1.69

ATM. GAS OIL (500-650 °F)

Gravity, °API	26.3
Specific Gravity	0.8967
Sulfur, wt %	0.579
Nitrogen, ppm	319
Acid Number, mg KOH/g	0.635

Pour Point °F	-96.2
Pour Point °C	-71.2
Viscosity @ 50 °C (122 °F), cSt	4.08
Cetane Index	39.3
Characterization Factor, K	11.29

ATM. RESIDUUM (650 °F+)

Yield, vol%	70.324
Gravity, °API	13.4
Specific Gravity	0.9767
Sulfur, wt %	0.823
Nitrogen, ppm	6000
MCR, wt%	8.53
Asphaltenes, C7, %	3.86
Nickel, ppm	15.9
Vanadium, ppm	30.2
Pour Point °F	37.9
Pour Point °C	3.3
Viscosity @ 50 °C (122 °F), cSt	1390
Viscosity @ 100 °C (212 °F), cSt	74
Characterization Factor, K	11.66

LT VAC. GAS OIL (650-800 °F)

Gravity, °API	19.1
Specific Gravity	0.9395
Sulfur, wt %	0.749
Nitrogen, ppm	2150
Naphthenes, vol %	46.47
Paraffins, vol%	4.97
Pour Point °F	-36.3
Pour Point °C	-37.9
Acid Number, mg KOH/g	0.638
Aniline Point, °F	144.3
Aniline Point, °C	62.4
Hydrogen, wt%	11.74
Viscosity @ 50 °C (122 °F), cSt	27
Viscosity @ 100 °C (212 °F), cSt	5.29
Characterization Factor, K	11.27

HVY VAC. GAS OIL (800-1050 °F)

Gravity, °API	16.2
Specific Gravity	0.9577

Sulfur, wt %	0.755
Nitrogen, ppm	4060
MCR, wt%	1.28
Nickel, ppm	0.979
Vanadium, ppm	2.53
Pour Point °F	32.6
Pour Point °C	0.3
Acid Number, mg KOH/g	0.133
Aniline Point, °F	167.3
Aniline Point, °C	75.1
Hydrogen, wt%	11.47
Viscosity @ 50 °C (122 °F), cSt	425
Viscosity @ 100 °C (212 °F), cSt	28.1
Characterization Factor, K	11.62

VACUUM RESIDUUM (1050
°F+)

Yield, vol%	25.578
Gravity, °API	6.9
Specific Gravity	1.0227
Sulfur, wt %	0.938
Nitrogen, ppm	10400
Hydrogen, wt%	10.98
MCR, wt%	21.1
Asphaltenes, C7, %	10.1
Nickel, ppm	40.7
Vanadium, ppm	76.9
Pour Point °F	196.1
Pour Point °C	91.2
Viscosity @ 50 °C (122 °F), cSt	5130000
Viscosity @ 100 °C (212 °F), cSt	13000
Viscosity @ 135 °C (275 °F), cSt	1080
Cutter, vol% in Fuel Oil	38.9
Fuel Oil Yield, vol%	41.8
Characterization Factor, K	11.8