

# Characteristics of Crude Petroleum

Petroleum type	API Gravity <sup>1</sup>	Viscosity ( $\mu$ ) (centipoise) <sup>2</sup>	Volume Factor ( $\beta$ ) <sup>3</sup>	Gas-oil ratio* <sup>4</sup>	Benchmark crude	% sulfur <sup>5</sup>
Bitumen <sup>6</sup>	4 - 10	5000 - 10 <sup>6</sup>	1	0		
Tar / Heavy Oil <sup>7</sup>	10 - 20	100 - 5000	1.0 - 1.1	< 50		
Low-shrinkage oils ("Black Oils")	20 - ~33	2 - 100	1.1 - 1.5	5 - 500		
	31				Dubai	2
	39.6				West Texas Intermediate	0.24
	38.1				Brent	0.37
High-shrinkage oils ("Volatile Oils")	~33 - ~53	0.25 - 3	1.5 - 3.5	500 - 6000		
(Retrograde) Condensate gas	~54 - 70	~0.25	—	2000 - 15,000		
Wet Gas	> 60	~ 0.25	—	2000 - 15,000		
Dry Gas	—	—	—	—		

More economically desirable petroleum

1 API Gravity =  $(141.5 \div \text{Specific gravity}) - 131.5$ . Thus water (SG = 1.0) is 10 °API; petroleum lighter than water °API > 10.

2 For comparison, the viscosity of water at 20°C is 1 centipoise.

3 Volume factor is the ratio of volume in surface storage tanks to volume in the producing formation.

4 GOR = cubic feet of gas per barrel of stock-tank oil. The ratios shown conflate R and R<sub>s</sub>.

5 Sweet crudes have S < 0.5%; sour crudes have S > 0.5 %. Sweeter crudes have greater economic value.

6 "Bitumen" is used in its narrower sense here; sometimes "bitumen" is used to denote all petroleum.

7 Langenkamp (1984, 1985) puts the boundary between heavy and light oils at 20 °API; Miles (1989) puts it at 25 °API.

Sources: C.F. Conaway (1999) *The Petroleum Industry: A Non-technical Guide* (pp. 69-73) and Wikipedia pages on benchmark crudes.