

Basic Petroleum Rock and Fluid Properties Handbook

Rock Type / Mineral	Key Components	Density	Photoelectric	Gamma Ray	Hydrogen Index	Neutron Porosity @ $\phi_e = 0$	Neutron Capture	SONI p-wave
		RHOB	PeF	GR	HI	NPHI		Vp
		g/cc	barn	GAPI			c.u.	km/s

Rock Types

Shale / Mudstone / Claystone / Argillite	Silt < Clay	1.36 – 2.88		80 – 140				1.0 – 2
Siltstone	Silt > Clay	1.54 – 2.85						1.0 – 2
Limestone Calcite	CaCO ₃	2.71	4.8 – 5.08	5 – 10	0	0	7.08 – 7.30	5.8 – 6
Limestone Aragonite	CaCO ₃	2.99	4.8 – 5.08	5 – 10	0	0	7.08 – 7.30	5.8 – 6
Dolomite	CaMg(CO ₃) ₂	2.85 – 2.87	3.00	10 – 20	0	0.02	4.70 – 4.80	6.4 – 7
Sandstone (consolidated)	Quartz > Feldspar, Clay	2.65	1.80	10 – 20				5.8
Sandstone (unconsolidated)	Quartz > Feldspar							4.6 – 5
Sand	Quartz	1.6 – 2.0			0			
Anhydrite	CaSO ₄	2.977	5.05		0	-0.02	13.0	6.1
Coal	C	1.2 – 1.8	0.16 – 0.20	0	0		9 – 14	
Halite (Rock Salt)	NaCl	2.03 – 2.16	4.6	0	0		770	
Sylvite	KCl	1.99	8.51	500	0		580	
Granite								5.8 – 6

Rock Forming Minerals

Quartz	SiO ₂	2.59 – 2.654	5.09			-0.02	4.26	
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Feldspar	$\text{KAlSi}_3\text{O}_8 - \text{NaAlSi}_3\text{O}_8 - \text{CaAl}_2\text{Si}_2\text{O}_8$	2.55 – 2.76	2.86 – 3.13				15 – 16	
Silt	Quartz + Feldspar	1.38						
Clay 1 Chlorite	$\text{Mg,Fe}_3(\text{Si,Al})_4\text{O}_{10}(\text{OH})_2 \cdot (\text{Mg,Fe})_3(\text{OH})_6$	2.8	6.30	180 – 250	0.32		10 – 40	
Clay 2 Glauconite	$(\text{K,Na})(\text{Fe}^{3+},\text{Al,Mg})_2(\text{Si,Al})_4\text{O}_{10}(\text{OH})_2$	2.3	6.37			0.38	20 – 30	
Clay 3 Kaolinite	$\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$	2.59	1.83	80 – 130	0.37	-0.37	14.12	
Clay 4 Illite	$(\text{K,H}_3\text{O})(\text{Al,Mg,Fe})_2(\text{Si,Al})_4\text{O}_{10}[(\text{OH})_2,(\text{H}_2\text{O})]$	2.66	3.45	250 – 300	0.09	-0.3	32 – 42	
Clay 5 Montmorillonite / Smectite	$(\text{Na,Ca})_{0.33}(\text{Al,Mg})_2(\text{Si}_4\text{O}_{10})(\text{OH})_2 \cdot n\text{H}_2\text{O}$	2.1 – 2.6	2.04	150 – 200			14.12	
Mica	$\{\text{K, Na, Ca, Al, Mg, Fe, Si}\} \text{O}_{20}(\text{OH, F})_4$	3.0 – 3.05	6.27	270 – 275			33 – 36	
Gypsum	$\text{CaSO}_4(2\text{H}_2\text{O})$	2.32			0.4855		19.0	

Fluids

Water @ NTP	H_2O	1.0	1.82		1.0	1.0		1.4 – 1
Water @ 90°C, 14 MPa	H_2O				1.0			1.4 – 1
Brine (200 ppk NaCl) @ 90°C, 14 MPa	$\text{H}_2\text{O} + \text{Salt}$	1.2			1.0	0.92		1.4 – 1
Seawater @ NTP	$\text{H}_2\text{O} + \text{NaCl}$	1.027			1.0			1.4 – 1
Gas (methane) @ NTP	CH_4				0.002	0.002		

Gas (methane) @ 90°C, 48 MPa	CH ₄				0.49	0.54		
Oil (octane) @ NTP	C ₈ H ₁₆				1.0	0.9		
Oil (octane) @ 90°C, 14 MPa	C ₈ H ₁₆				0.96			
Air	O ₂ N ₂ CO ₂	0.0012						0.33

See Also

[Petroleum Industry / Upstream / Subsurface E&P Disciplines / Petrophysics](#)

[[Petrophysical Rock Properties](#)]

[[Petroleum Unit Conversion](#)]

References