Rock Schmidt Conversion Curve Database

These conversion curves are generated from classical Schmidt hammer curves found in the literature using a conversion between the mechanical and optical rebound values based on work done by Winkler and Matthews 2014 for the N-hammer and by the Federal Institute for Materials Research and Testing (BAM) for the L-hammer. Users are encouraged to develop and share their own curves for different rock types using the custom materials functionality in the Schmidt app.

1. Rock Schmidt RS8000 Type N

UCS

Reference	Correlation	Rock Type	Validity range	Coefficients		Valid Range for R*	
			UCS (Mpa)	a	b	Min	Max
Katz et al. (2000)	$UCS = 1.177e^{(0.07R*)}$	Limestone, Sandstone, Syenite, Granite	11 to 259	1.177	0.07	24	73
Aydin Basu (2005)	$UCS = 0.4569e^{(0.07R*)}$	Granite (Grade I to IV)	5 to 188	0.4569	0.07	33	86
Sachpazis (1990)	$UCS = 4.294R*-110.46$	33 different carbonates	10 to 190	-110.46	4.294	28	70
Shorey et al. (1984)	$UCS = 0.4R*-7.6$	Coal	2 to 13	-7.6	0.4	25	50

Tangential E-modulus

Reference	Correlation	Rock Type	Validity range	Coefficients			Valid Range for R*	
			Et (GPa)	a	b	c	Min	Max
Katz et al. (2000)	$Et = 0.0289(R*)^2-1.9056R*+34.961$	Limestone, Sandstone, Syenite, Granite	1 to 83	34.961	-1.906	0.029	24	73
Sachpazis (990)	$Et = 1.94R*-53.32$	33 different carbonates	1 to 83	-53.32	1.94		28	70
Aydin Basu (2005)	$UCS = 0.4367e^{(0.05R*)}$	Granite (Grade I to IV)	2 to 33	0.437	0.05		23	76

2. Rock Schmidt RS8000 Type L

UCS

Reference	Correlation	Rock Type	Validity range UCS (Mpa)	Coefficients a	b	Valid Range for R* Min	Max
Xu et al. (1990)	UCS = 2.98e$^{(0.0459R*)}$	Mica Schist	8 to 72	2.98	0.0459	22	70
Xu et al. (1990)	UCS = 2.99e$^{(0.0459R*)}$	Prasinite	10 to 140	2.99	0.0459	21	64
Xu et al. (1990)	UCS = 2.98e$^{(0.0482R*)}$	Serpentinite	10 to 158	2.98	0.048	20	63
Xu et al. (1990)	UCS = 3.78e$^{(0.0383R*)}$	Gabro	10 to 89	3.78	0.038	20	63
Kahraman (1990)	UCS = 1.45e$^{(0.0536R*)}$	Granite	6 to 140	1.45	0.054	20	65
Yilmaz and Sendir (2002)	UCS = 2.27e$^{(0.0459R*)}$	Gypsum	13 to 32	2.27	0.046	30	44
Haramy and DeMarco (1985)	UCS = 0.758R*-0.38	Coal	7 to 46	-0.38	0.758	15	58
Ghose and Chakraborti (1986)	UCS = 0.6378R*-12.11	Coal	13 to 41	-12.11	0.638	36	70
Singh et al. (1983)	UCS = 1.5314R*	Sandstone, silstone, limestone, seatearth	12 to 73	0	1.531	8	48
O'Rourke (1989)	UCS = 3.7136R*-76.18	Sandstone, silstone, limestone, anhydride	14 to 215	-76.18	3.714	24	68

Tangential E-modulus

Reference	Correlation	Rock Type	Validity range	Coefficients		Valid Range for R*	
			Et (Gpa)	a	b	Min	Max
Xu et al. (1990)	Et = $1.77e^{(0.0536R*)}$	Mica Schist	5 to 73	1.77	0.0536	22	70
Xu et al. (1990)	Et = $2.71e^{(0.0306R*)}$	Prasinite	6 to 36	2.71	0.0306	21	64
Xu et al. (1990)	Et = $2.57e^{(0.023R*)}$	Serpentinite	4 to 17	2.57	0.023	20	63
Xu et al. (1990)	Et = $1.75e^{(0.0383R*)}$	Gabro	4 to 17	1.75	0.038	20	63
Kahraman (1990)	Et = $1.04e^{(0.0459R*)}$	Granite	3 to 52	1.04	0.046	20	65
Yilmaz and Sendir (2002)	Et = $1.04e^{(0.0459R*)}$	Gypsum	14 to 29	1.04	0.046	30	44