

Modulus of Rupture

The 10-inch long sample was supported at both ends, and a vertical downward force applied at the center until failure of the sample. The equation used was:

$$R = \frac{8WL}{\pi D^3}$$

where: R = modulus of rupture
W = force applied
L = span between supports
D = diameter of the sample

Tensile Strength

The tensile strength was determined by the standard Brazilian test. The 1-inch long sample was placed in a hydraulic compression machine and loaded along a diameter until failure occurred. The maximum force required (P) was recorded, and the tensile strength calculated as follows:

$$T = \frac{2P}{\pi L_1 D}, \text{ where } L_1 = \text{length of sample}$$

Compressive Strength

This test required a 4-inch sample length, to give a length to diameter ratio of 2 to 1. The sample ends were polished to a .004 inch tolerance with parallel ends. The samples were placed in a hydraulic compression machine and loaded on the long axis till failure. The formula for compressive strength is:

$$C = \frac{W}{A}$$

where: C = compressive strength
W = recorded force at failure
A = cross-sectional area

and the length-diameter effect is accounted for by:

$$C_e = \frac{C_p}{0.778 + 0.222 (D/H)}$$

where: C_e = compressive strength
C_p = compressive strength of a cylindrical core
D = specimen diameter
H = specimen length (height)

TABLE A-3. Physical Property Tests—Hole No. 5 South of Buhl

Sample Depth (ft)	Sonic Velocity (mps)	Young's Modulus (10 ⁶ psi)	Tensile Strength (psi)	Modulus of Rupture (psi)	Compressive Strength (psi)	Specific Gravity
581	5,355	12.88	1,590	4,900	51,500	3.10
675	3,575	6.12	1,400	.....	38,400	3.30
754	5,225	11.99	1,810	2,460	38,500	3.03
967	5,475	12.61	1,590	3,660	45,700	2.90
1026	5,300	11.45	2,010	4,050	43,600	2.81
1036	5,370	13.04	1,660	6,870	70,900	3.11
1056	4,705	9.78	1,120	2,120	73,700	3.04
1069	5,225	12.43	2,260	.....	55,800	3.14
1080	5,490	13.47	1,370	6,620	29,900	3.08
1101	5,030	11.63	2,180	4,650	33,300	3.17
1113	5,175	13.18	2,170	5,350	28,400	3.39
1155	3,945	7.40	2,060	.....	31,500	3.28
1175	5,435	14.42	1,700	3,420	60,500	3.37
1185	5,385	12.90	1,820	5,290	48,500	3.07

TABLE A-4. Physical Property Tests—Hole No. 7 South of Keewatin

Sample Depth (ft)	Sonic Velocity (mps)	Young's Modulus (10 ⁶ psi)	Tensile Strength (psi)	Modulus of Rupture (psi)	Compressive Strength (psi)	Specific Gravity
800	5,990	14.57	3,560	Unavail.	.....	2.91
849	4,155	7.85	2,090	"	31,560	3.13
890	5,000	11.32	2,740	"	59,700	3.12
927	5,275	12.96	2,380	"	30,670	3.21
1000	4,580	10.20	1,740	"	32,370	3.36
1041	5,300	13.26	2,580	"	61,520	3.26
1096	5,565	13.61	2,730	"	52,880	3.03
1105	5,725	15.04	1,810	"	30,180	3.16
1115	5,690	15.12	2,260	"	80,020	3.22
1128	4,000	7.16	2,380	"	46,670	3.09
1133	5,710	14.83	2,500	"	52,370	3.14
1145	5,730	15.03	3,280	"	70,870	3.16
1156	5,035	12.47	2,360	"	25,960	3.39
1164	4,920	12.04	2,750	"	29,330	3.43
1170	4,945	12.04	2,500	"	38,880	3.39
1180	5,365	13.61	2,820	"	55,970	3.26
1197	5,060	12.34	2,660	"	38,470	3.32
1205	5,340	14.37	2,040	"	37,990	3.47
1215	5,160	13.44	2,330	"	48,650	3.48
1233	5,615	14.42	2,700	"	44,580	3.15
1277	5,575	14.03	3,100	"	63,460	3.11
1343	5,565	17.73	.....	"	57,090	3.28
1362	5,260	13.47	3,180	"	34,750	3.36