

NOMENCLATURE

ζ = FRICTION FACTOR
 d = DIAMETER OF AVERAGE GRAIN
 Δp = PRESSURE DROP
 L = LENGTH OF CORE
 γ = FLUID DENSITY
 V = VELOCITY
 $=$ RATE OF FLOW
 A = CROSS-SECTIONAL AREA
 μ = ABSOLUTE VISCOSITY

SYMBOLS

$\square$ OIL
 $\circ$ WATER
 $\times$ AIR
 $\square$ OIL, W.F. CLOUD
 $+$ GAS, U.S. BUREAU OF MINES

PRESENT
 DATA

SAMPLE NO.	SAND	POROSITY %
CONSOLIDATED		
1	BRADFORD	12.5
2	BRADFORD	12.3
3	3rd VENANGO	16.9
4	CERAMIC A	37.0
5	ROBINSON	20.3
6	CERAMIC B	37.8
7	WOODBINE	19.7
8	WILCOX	15.9
9	3rd VENANGO	11.9
10	ROBINSON	19.5
11	ROBINSON	18.4
12	3rd VENANGO	22.3
13	WILCOX	16.3
14	WARREN	19.2
15	3rd VENANGO	21.4
16	ROBINSON	20.6
17	CERAMIC C	33.2
18	3rd VENANGO	21.9
19	WOODBINE	23.8
20	"	26.9
21	"	27.7
22	"	22.1
23	"	28.8
UNCONSOLIDATED		
24	FLINT	39.5
25	OTTAWA	30.9
26	20-30 OTTAWA	34.5
27	LEAD SHOT	34.5

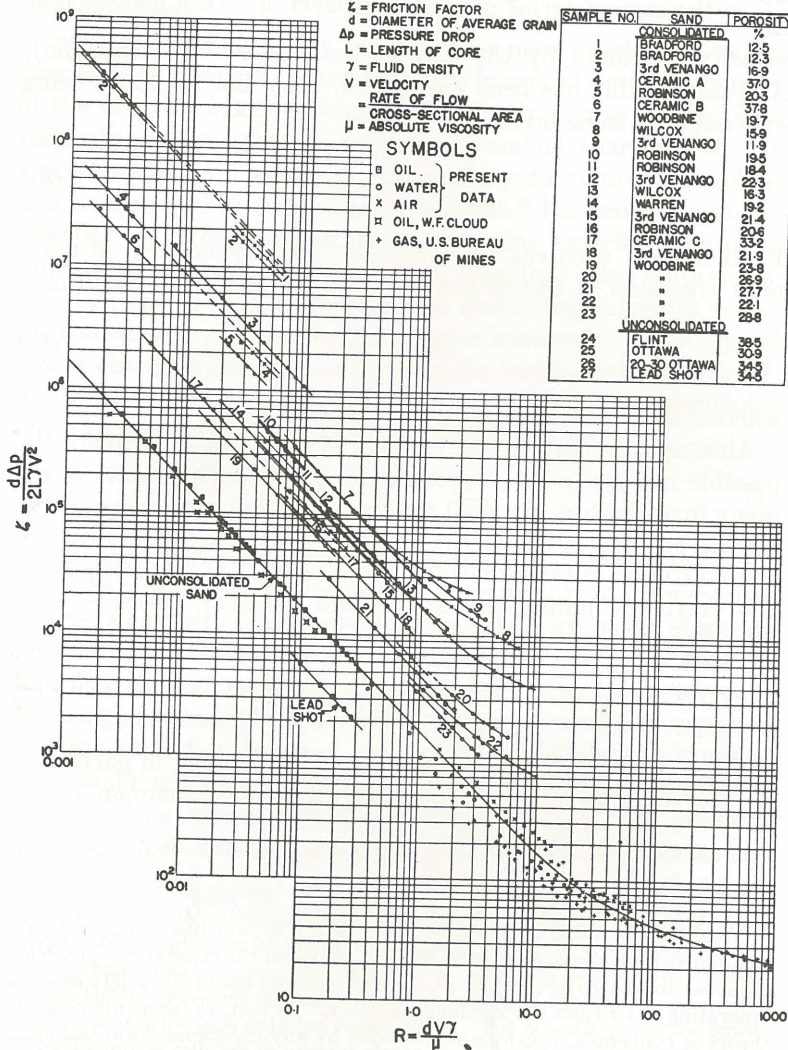


FIG. 8.—Friction-factor chart for the flow of fluids through sands. (After Fancher, Lewis, and Barnes, Bull. Pa. State Expt. Sta.)