

Figure 1
H-Coal PDU reactor

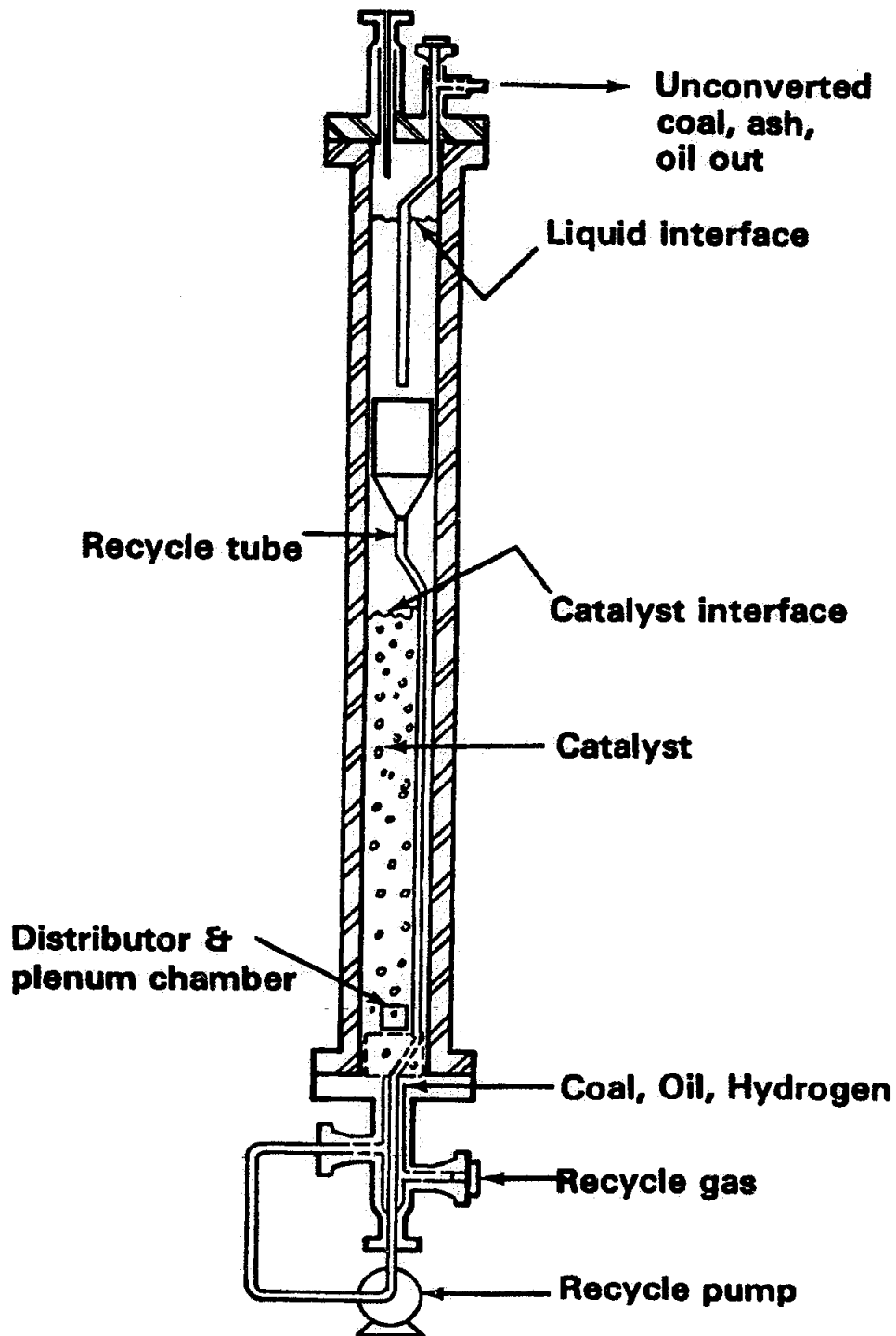


Figure 2
Drift flux vs. gas holdup: Darton and Harrison (5)
(Gas/liquid/solid fluidization)

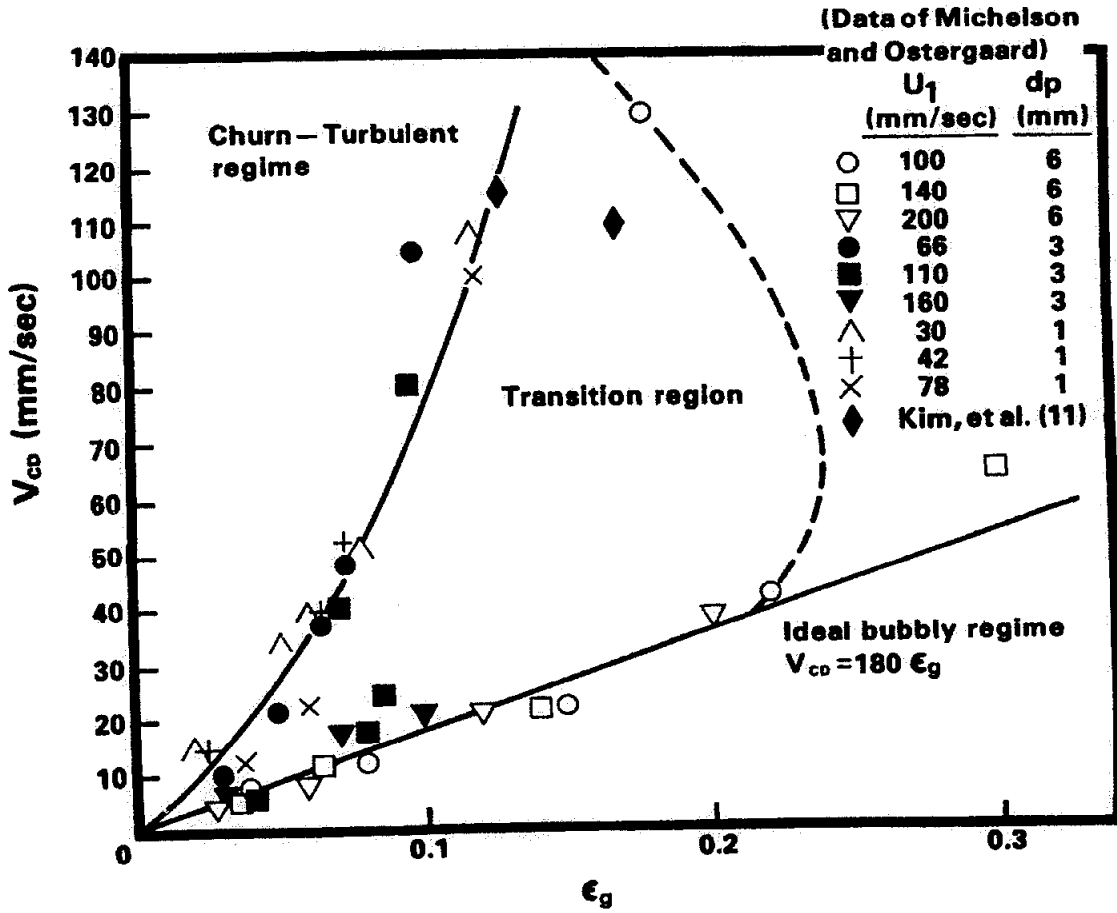


Figure 3
Schematic diagram of the fluid dynamics unit

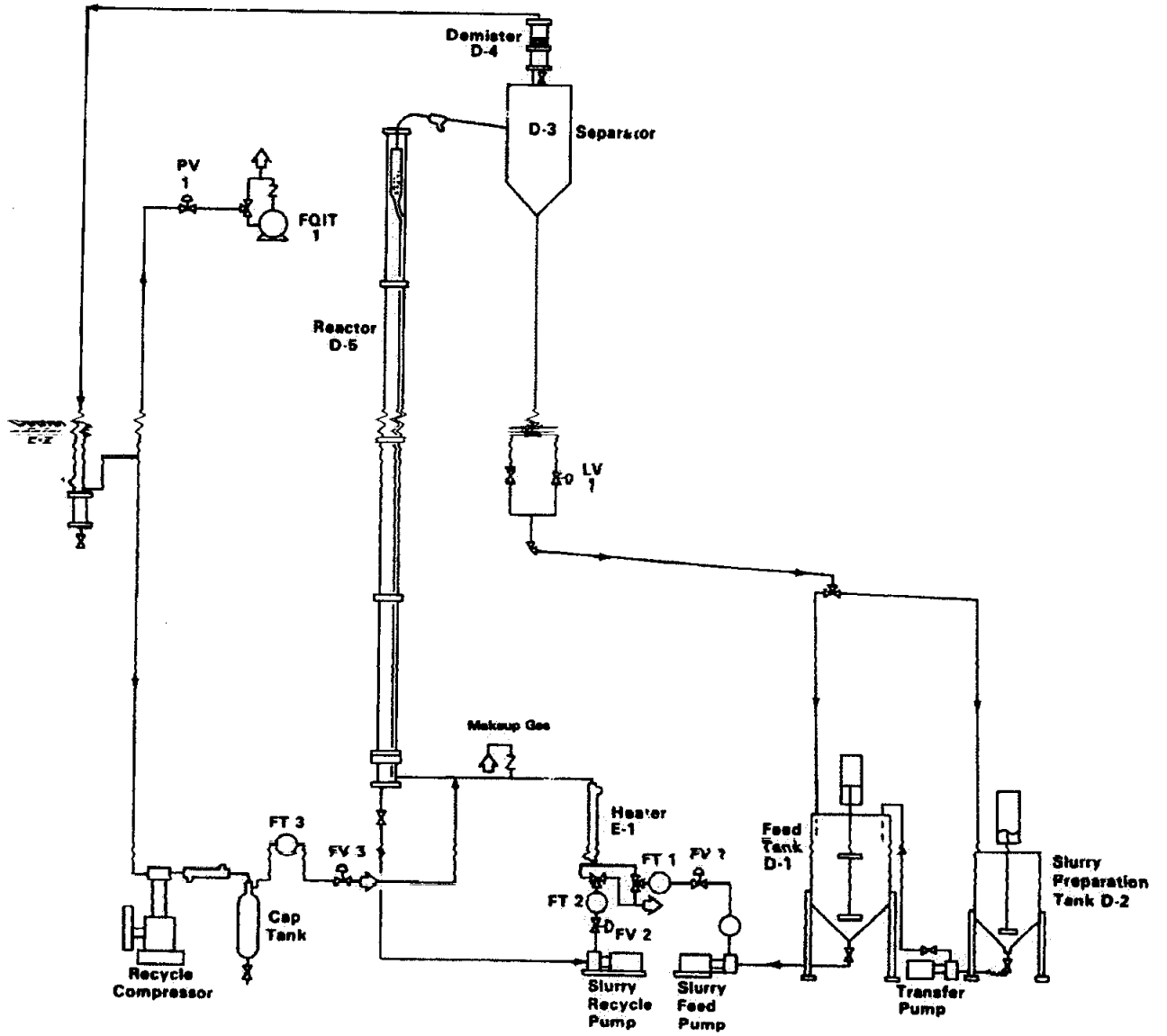


Figure 4
Schematic diagram of experimental
for viscosity measurement

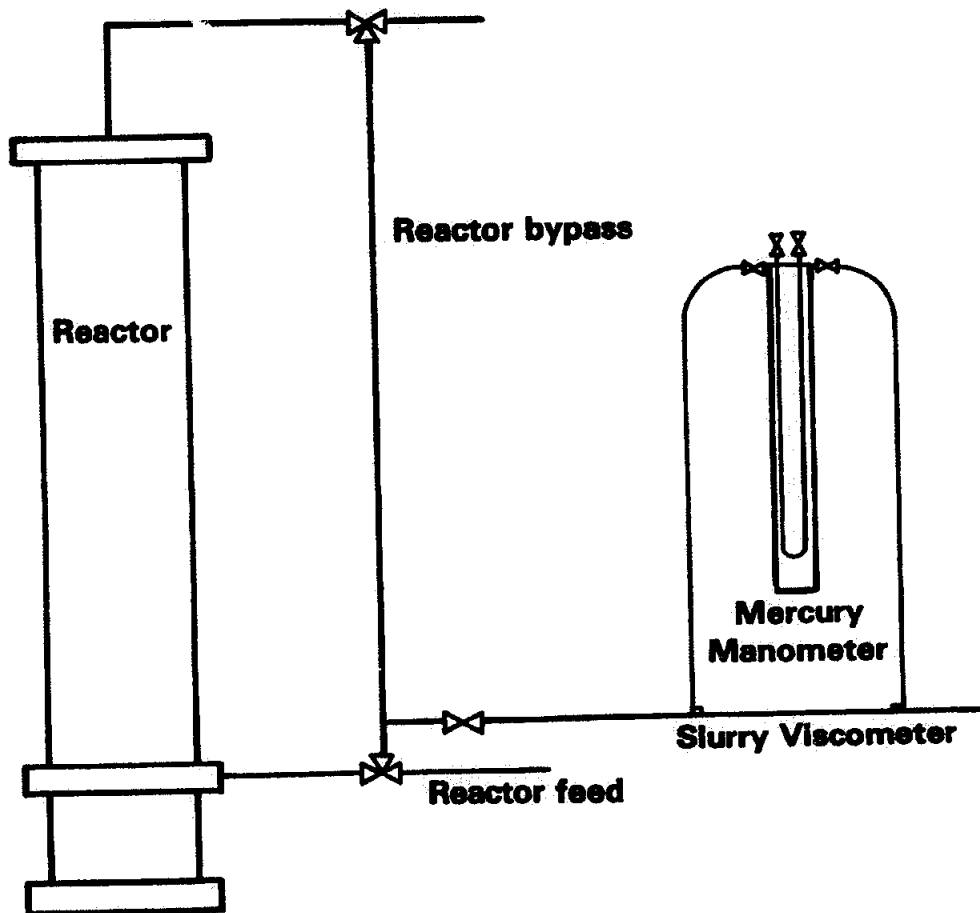
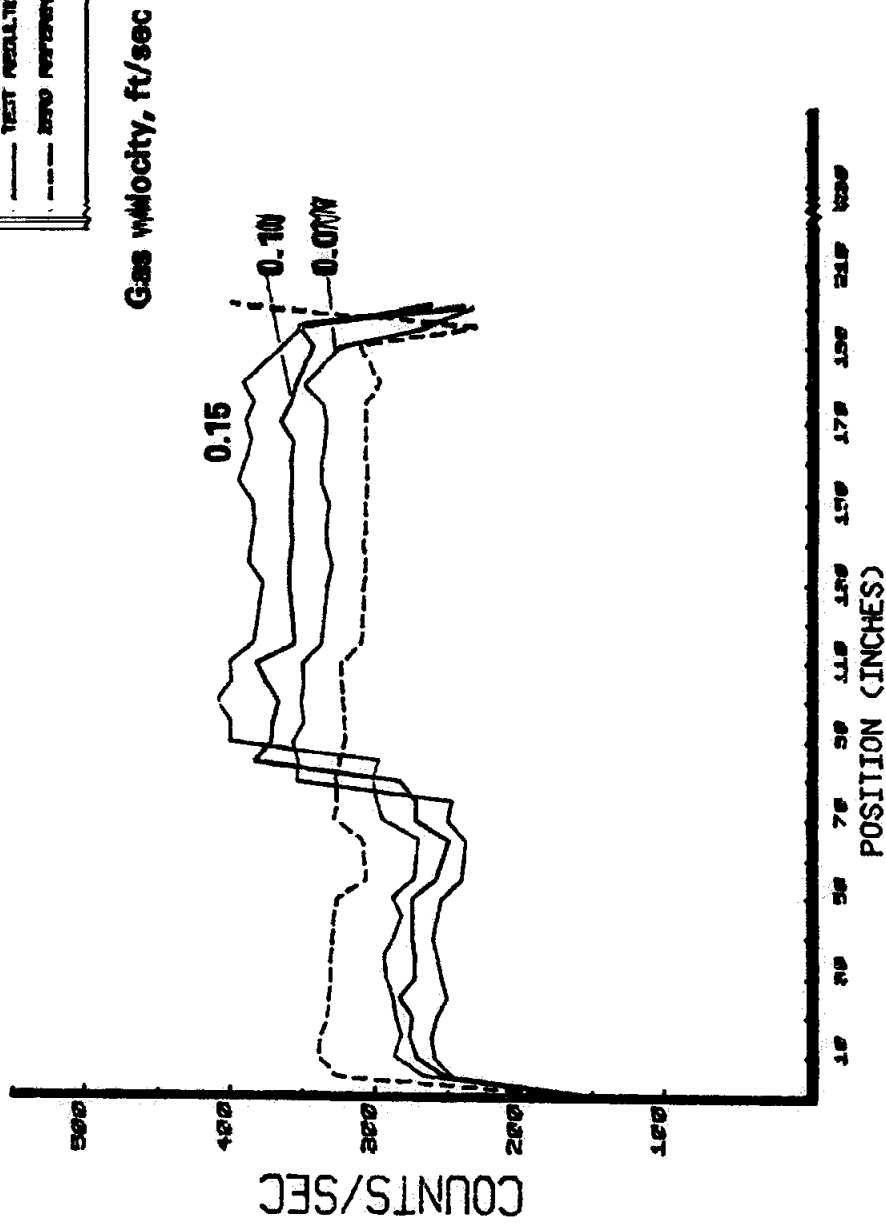


Figure 5

**Gamma ray scans
liquid velocity 0.07 ft/sec**

LEGEND
—— TEST RESULTS
- - - - ZERO REFERENCE



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Figure 6

Radiotracer detector location

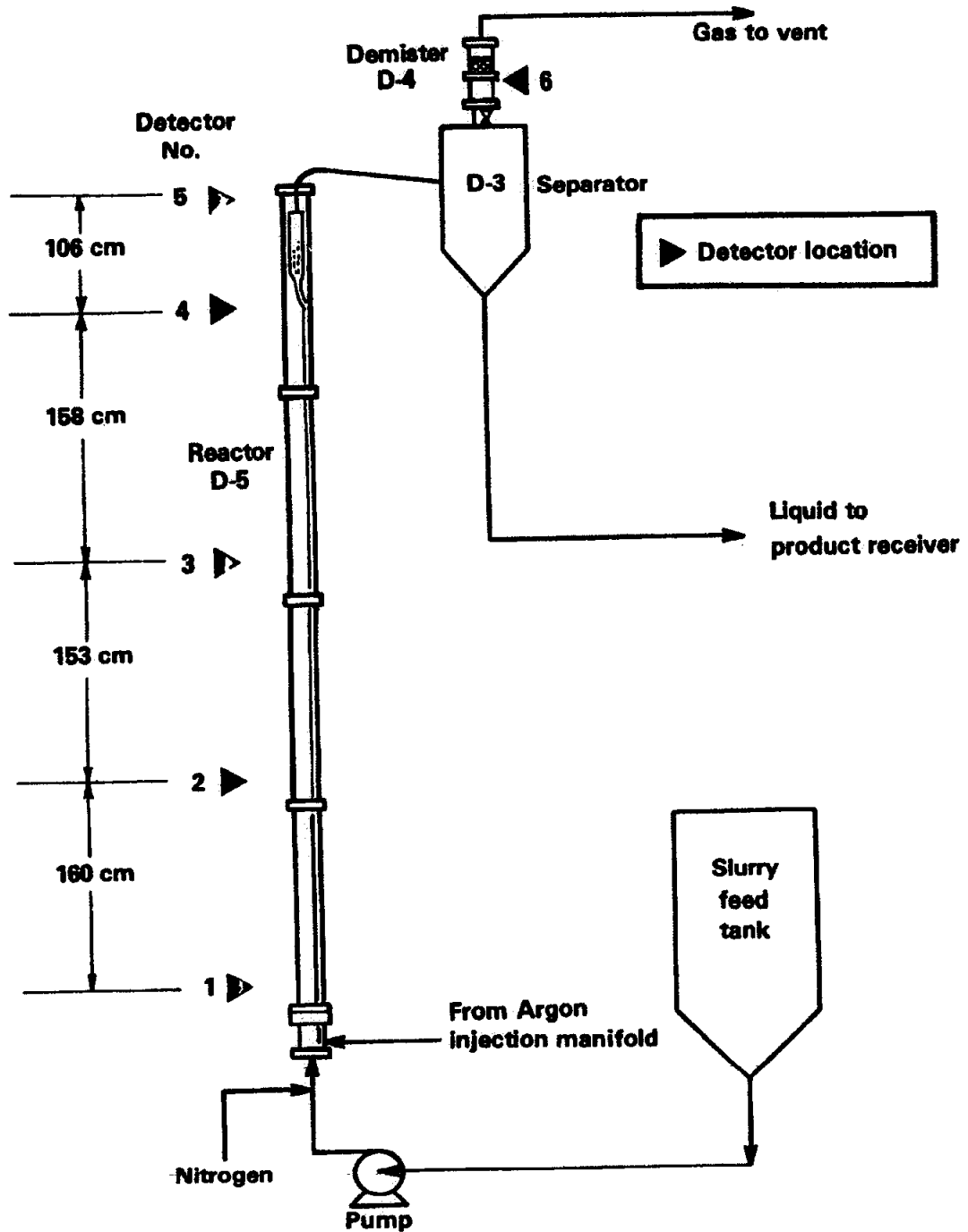


Figure 7
Coal fines settling rate

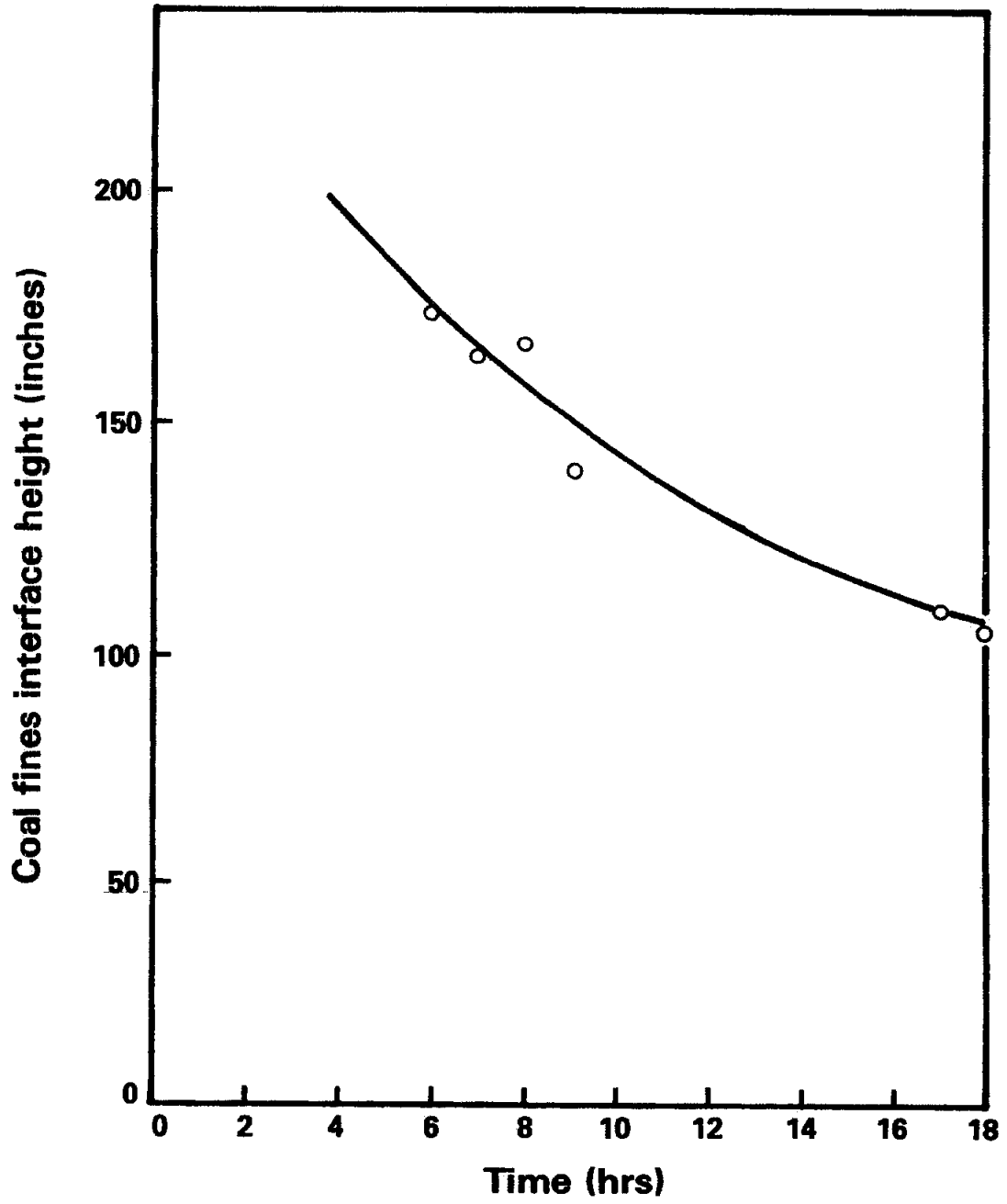
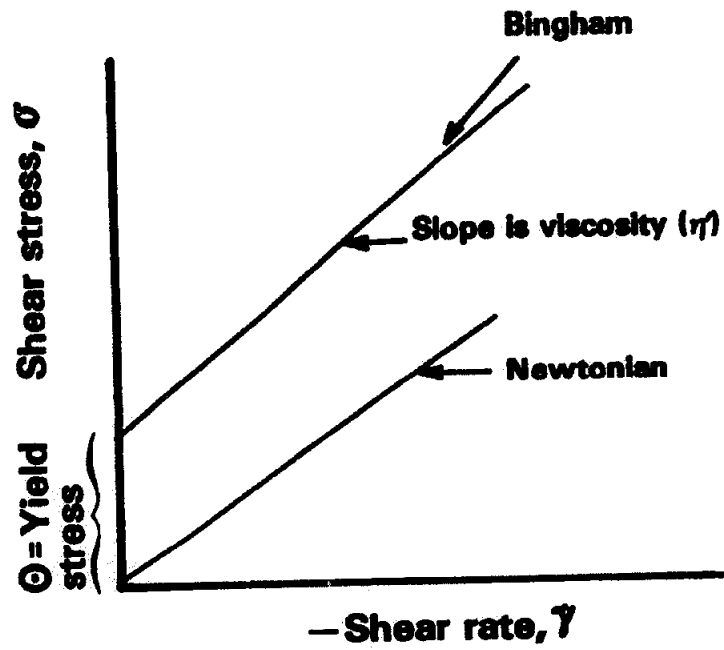


Figure 8
Definition of Bingham fluid



$$\sigma = \theta + \eta' \dot{\gamma}$$

IF $\sigma < \theta$, no flow ($\dot{\gamma} = 0$)

Figure 9
Effect of temperature on viscosity of
H-coal sample, 2500 psi

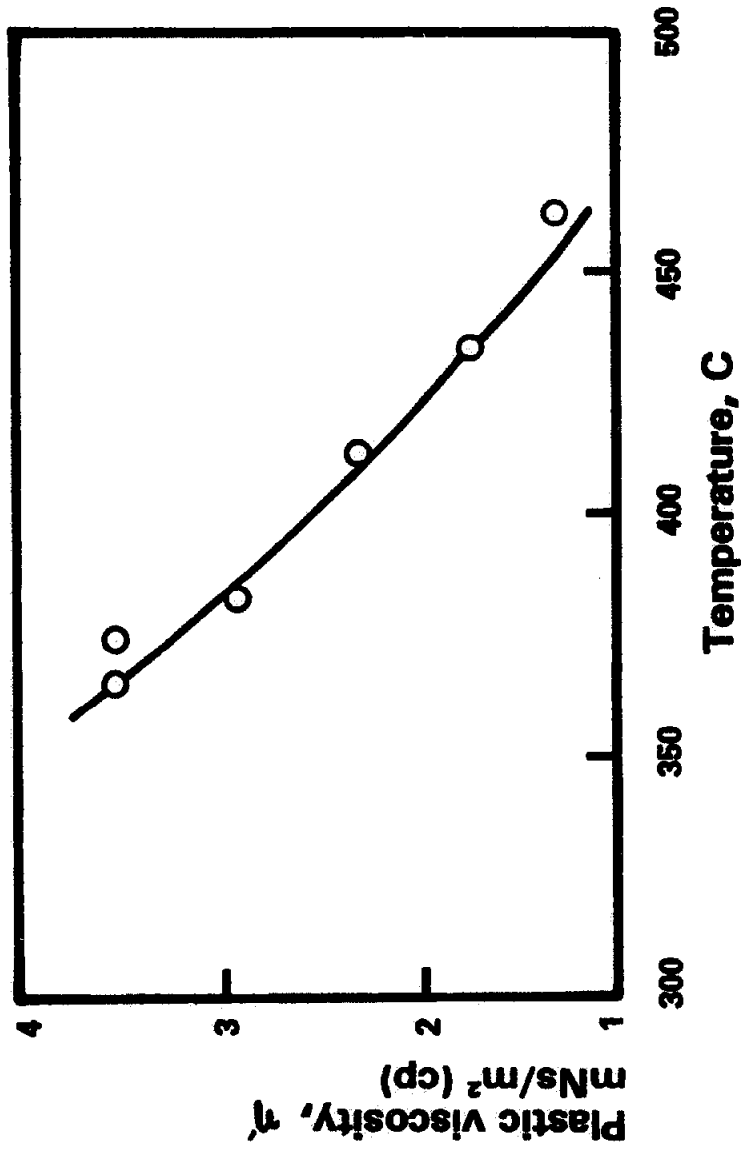


Figure 10

Variation in bed expansion with temperature and coal fines concentration

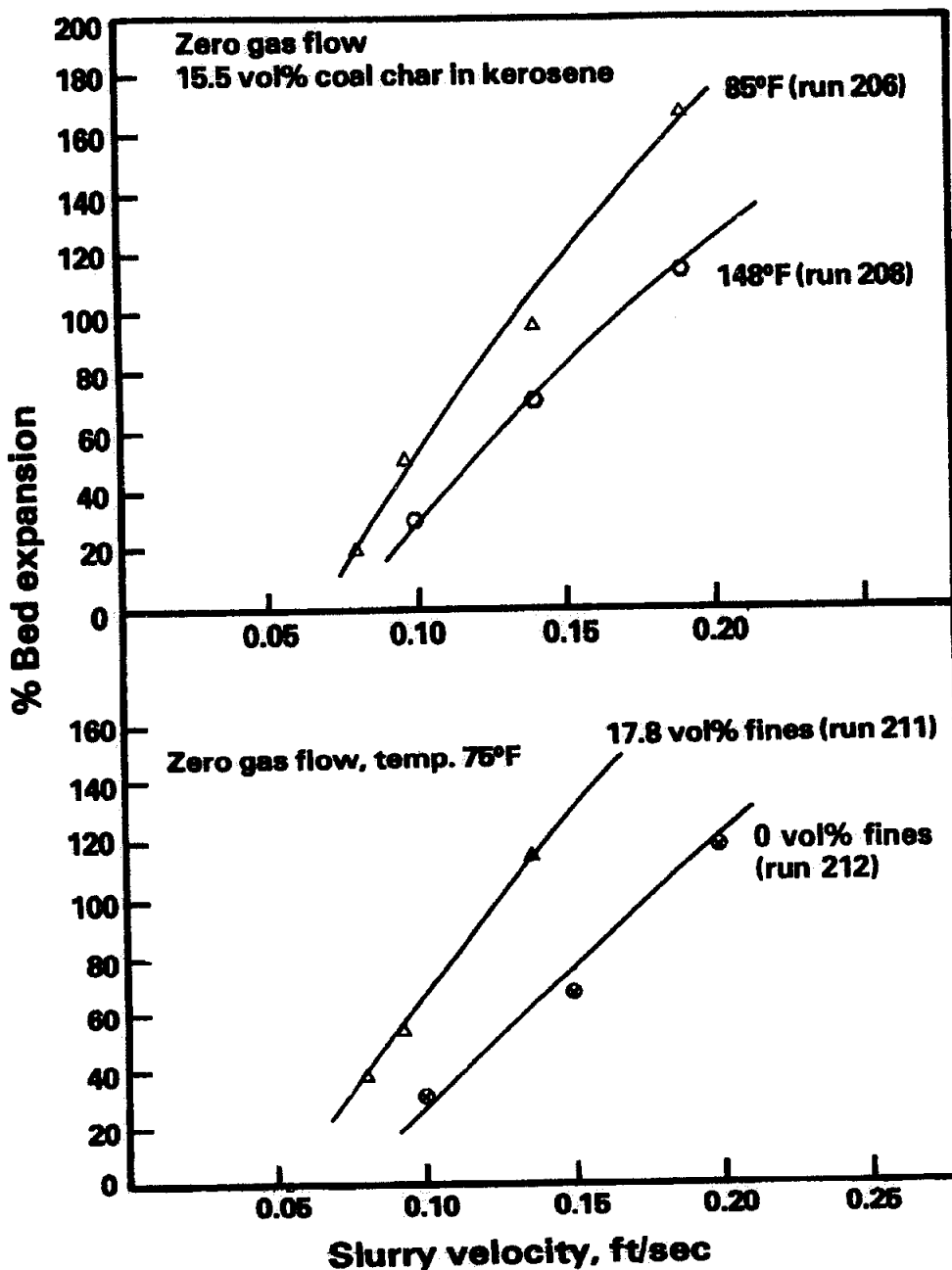
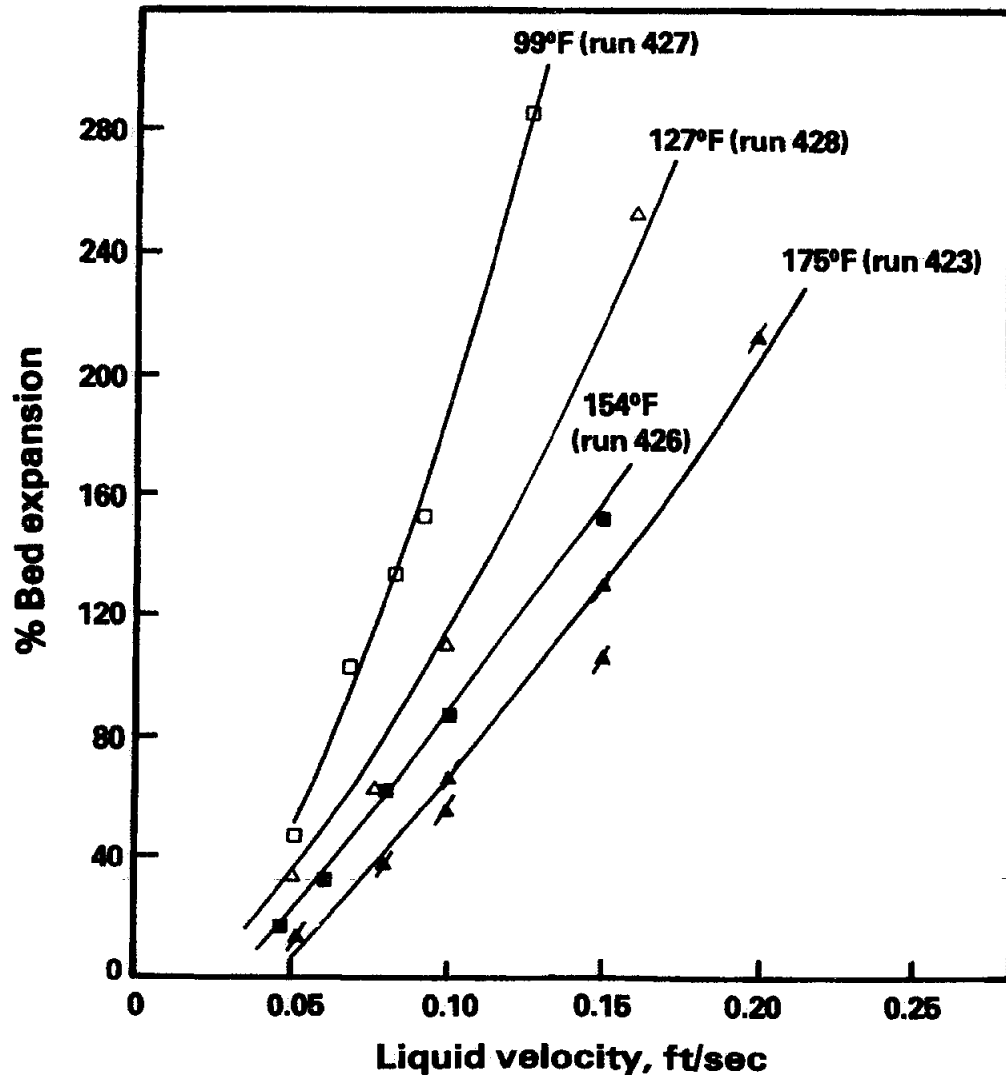


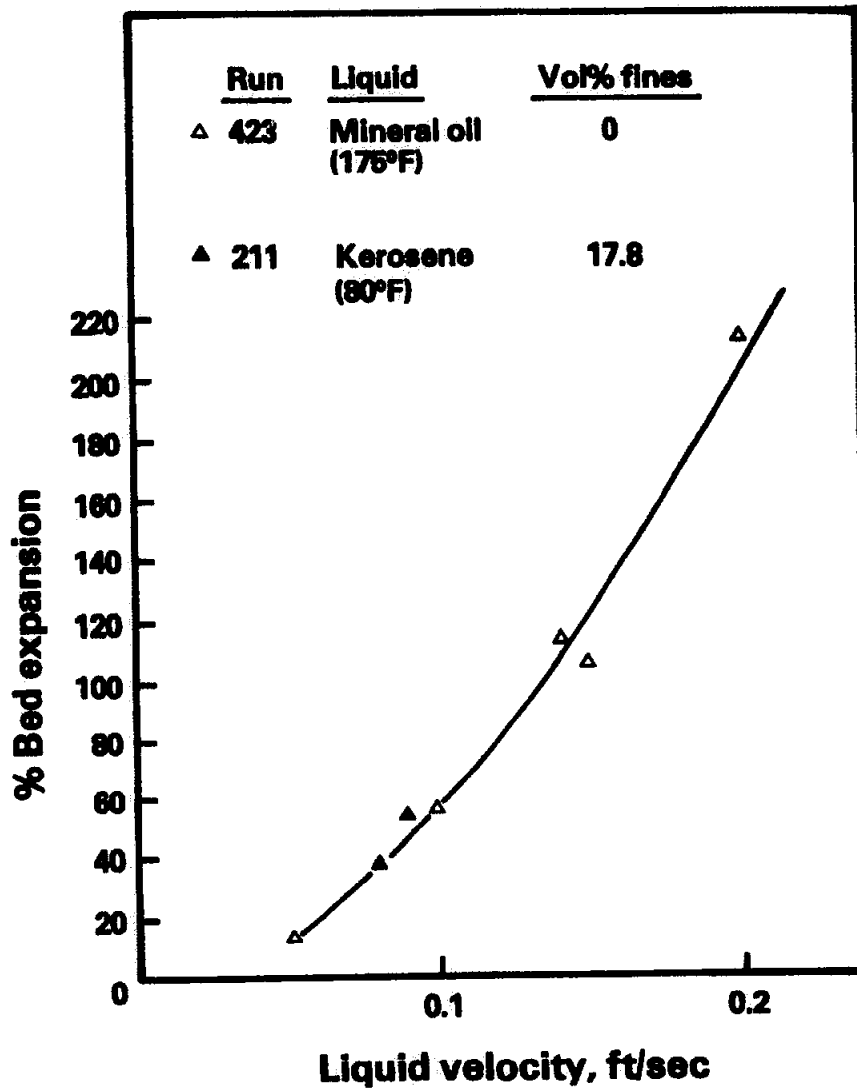
Figure 11
Effect of viscosity on bed expansion
— — Mineral oil — —



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Figure 12.

Bed expansion with kerosene slurries and mineral oil



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Figure 13

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Effect of catalyst particle properties on bed expansion

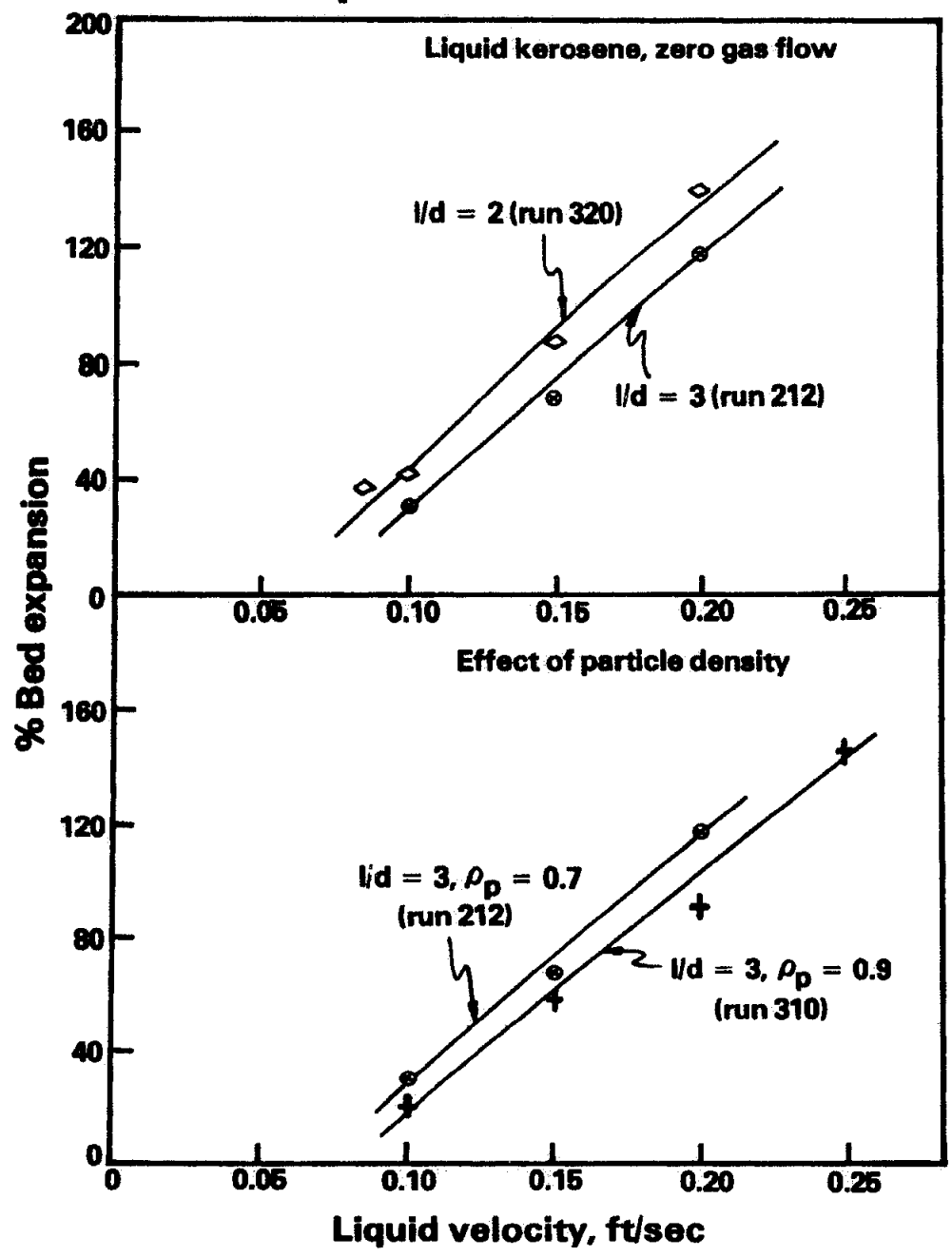


Figure 14
Correlation of liquid – solid data

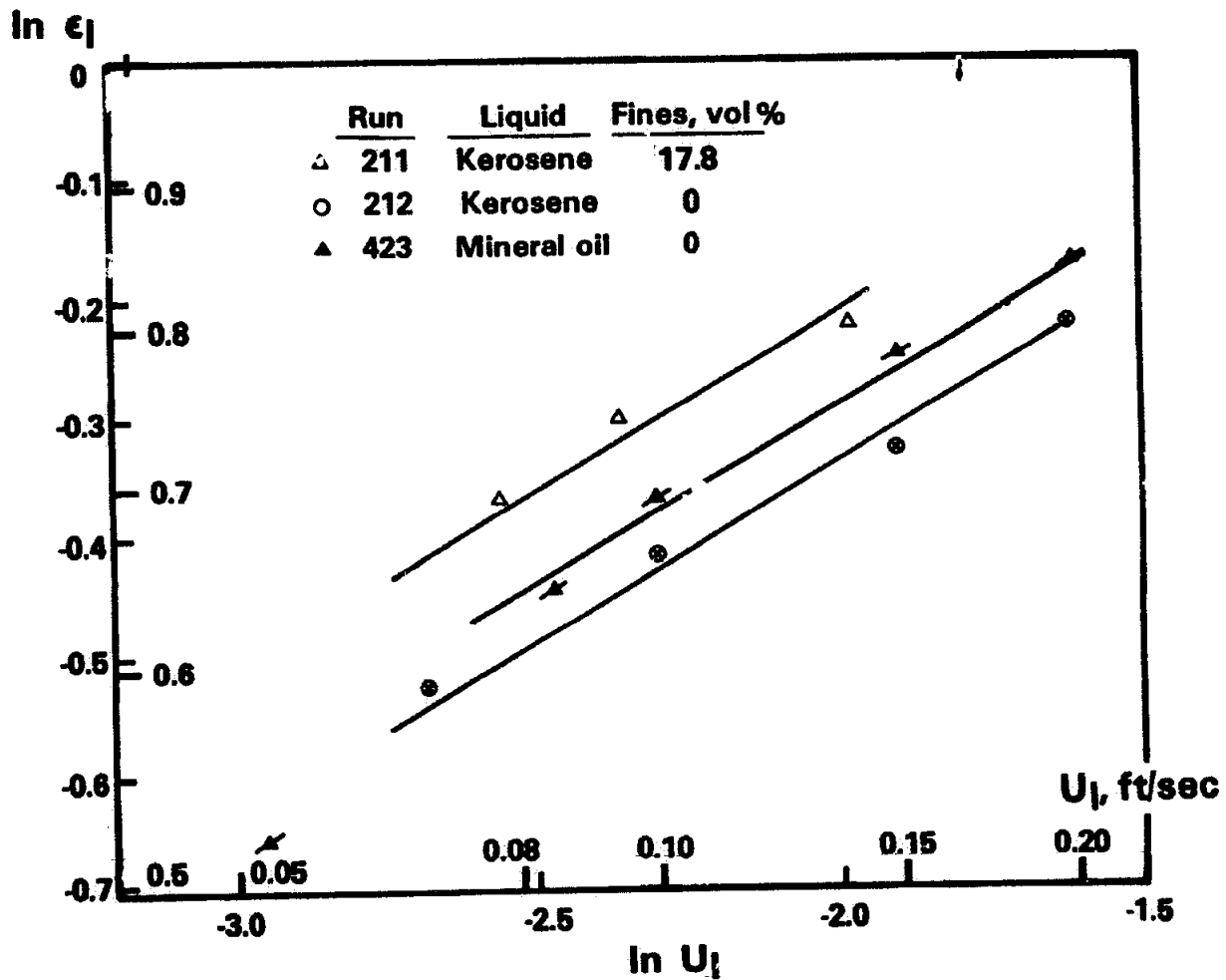


Figure 15

Effect of operating conditions on bed expansion

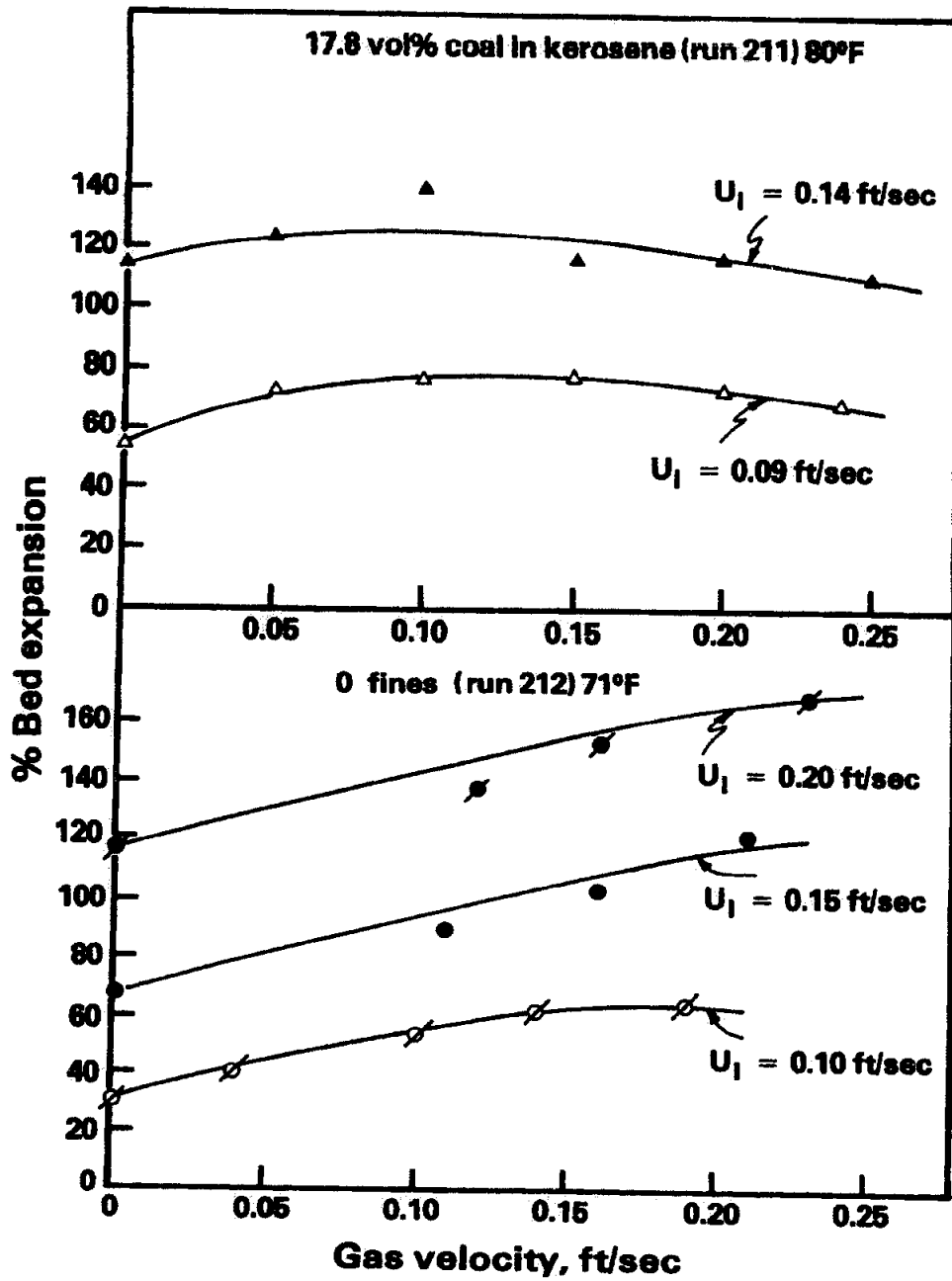


Figure 16

Effect of temperature on bed expansion

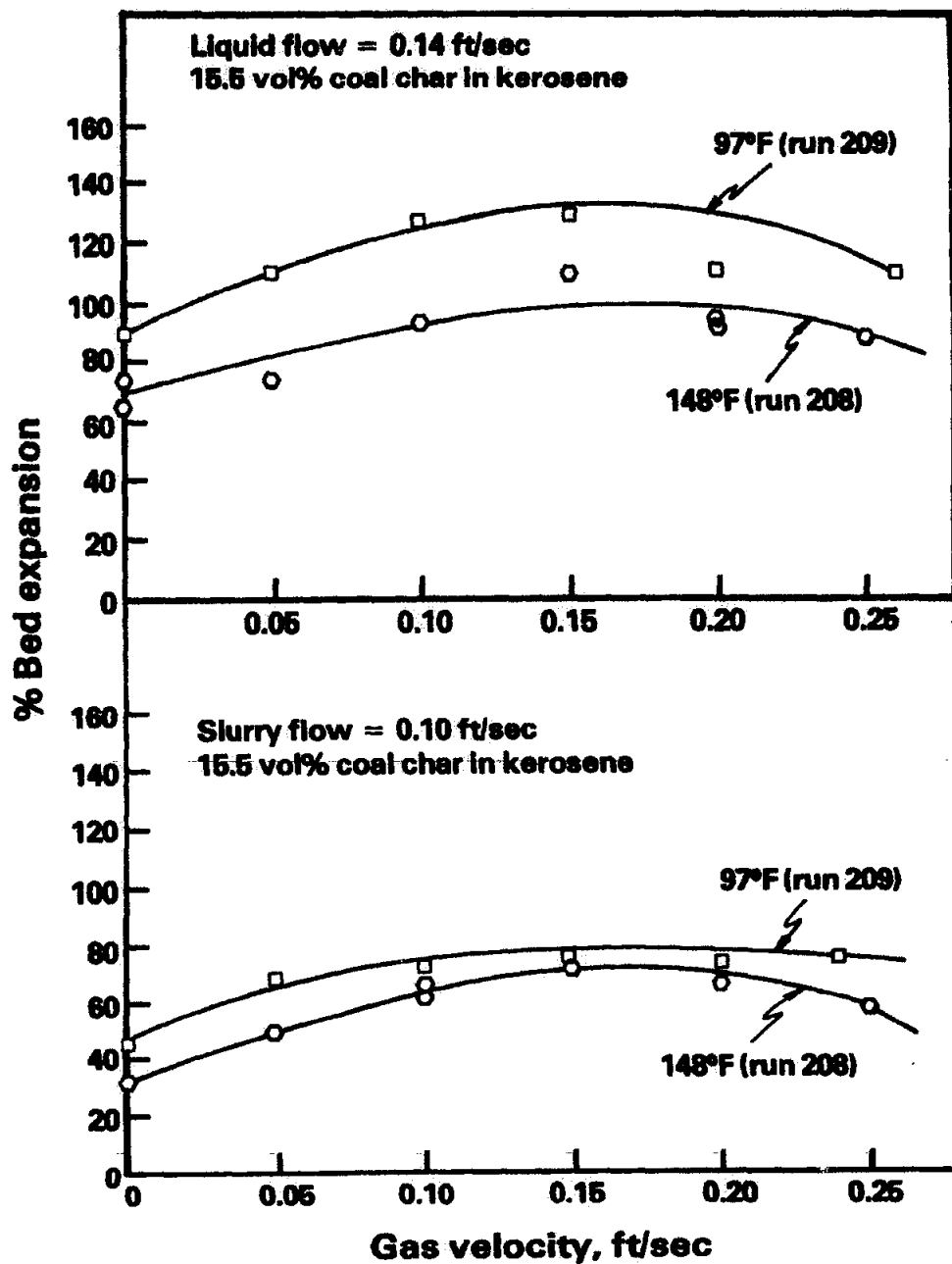


Figure 17

Bed expansion - comparison of various liquids

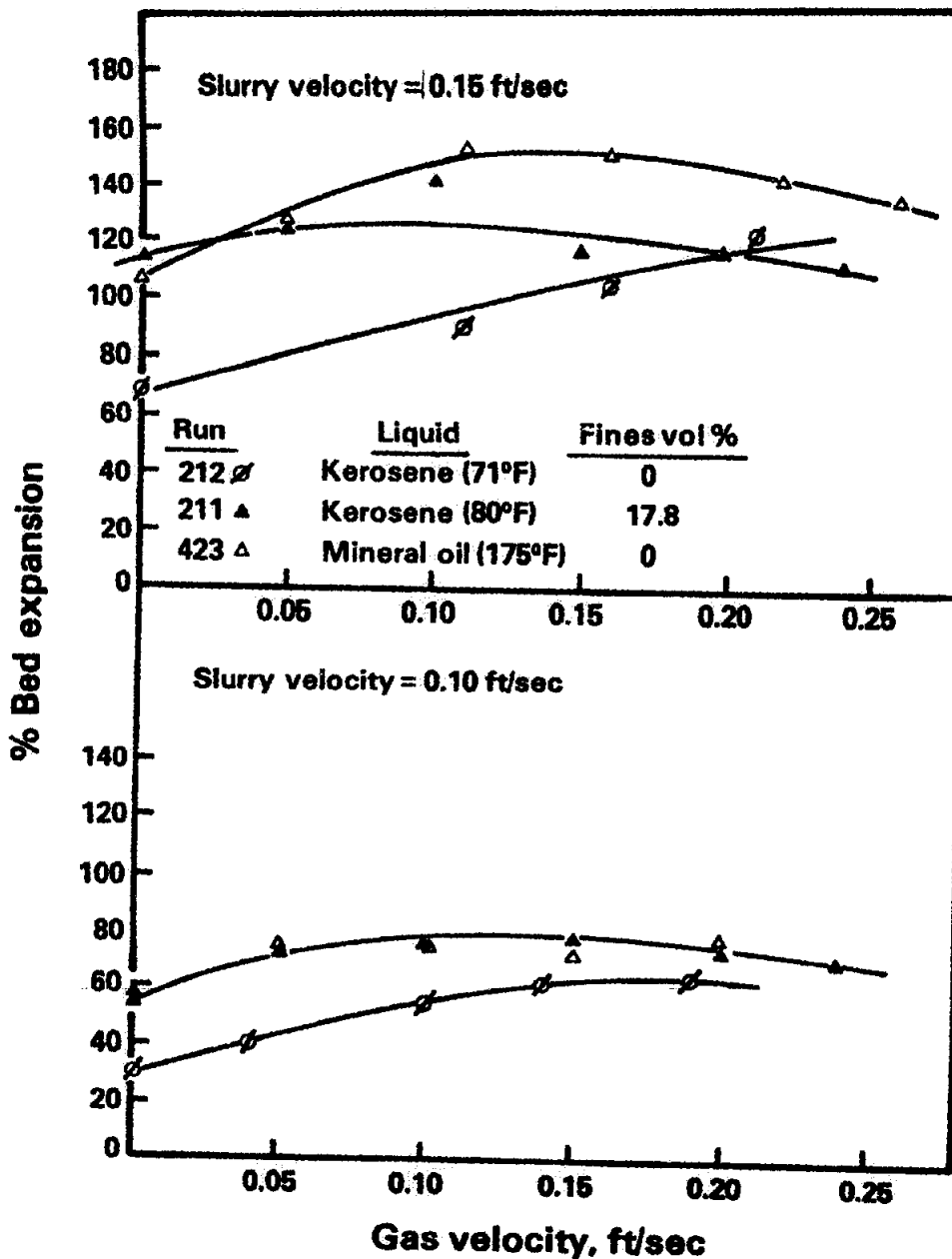


Figure 18

Effect of particle size on bed expansion

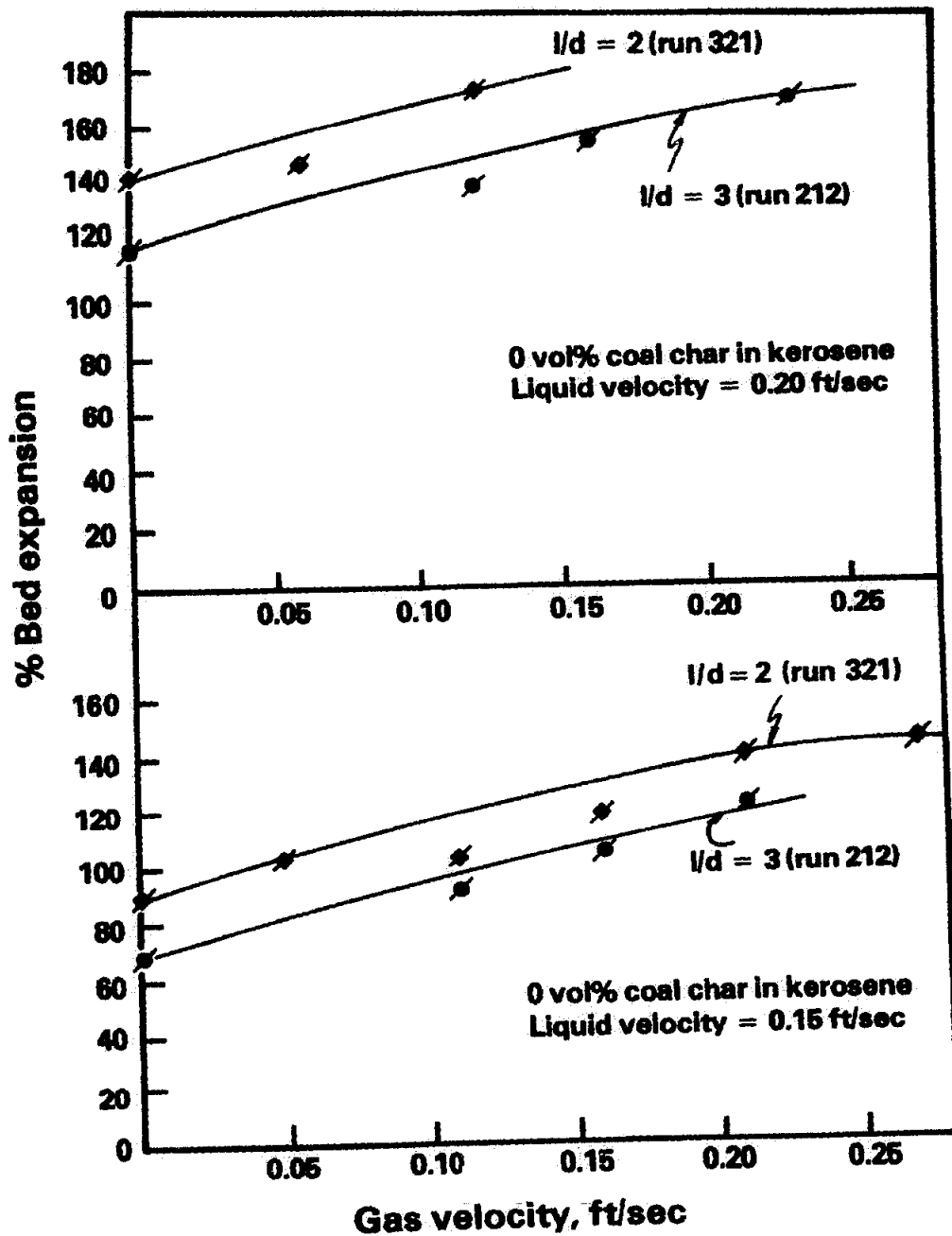


Figure 19

Bed expansion — effect of gas type

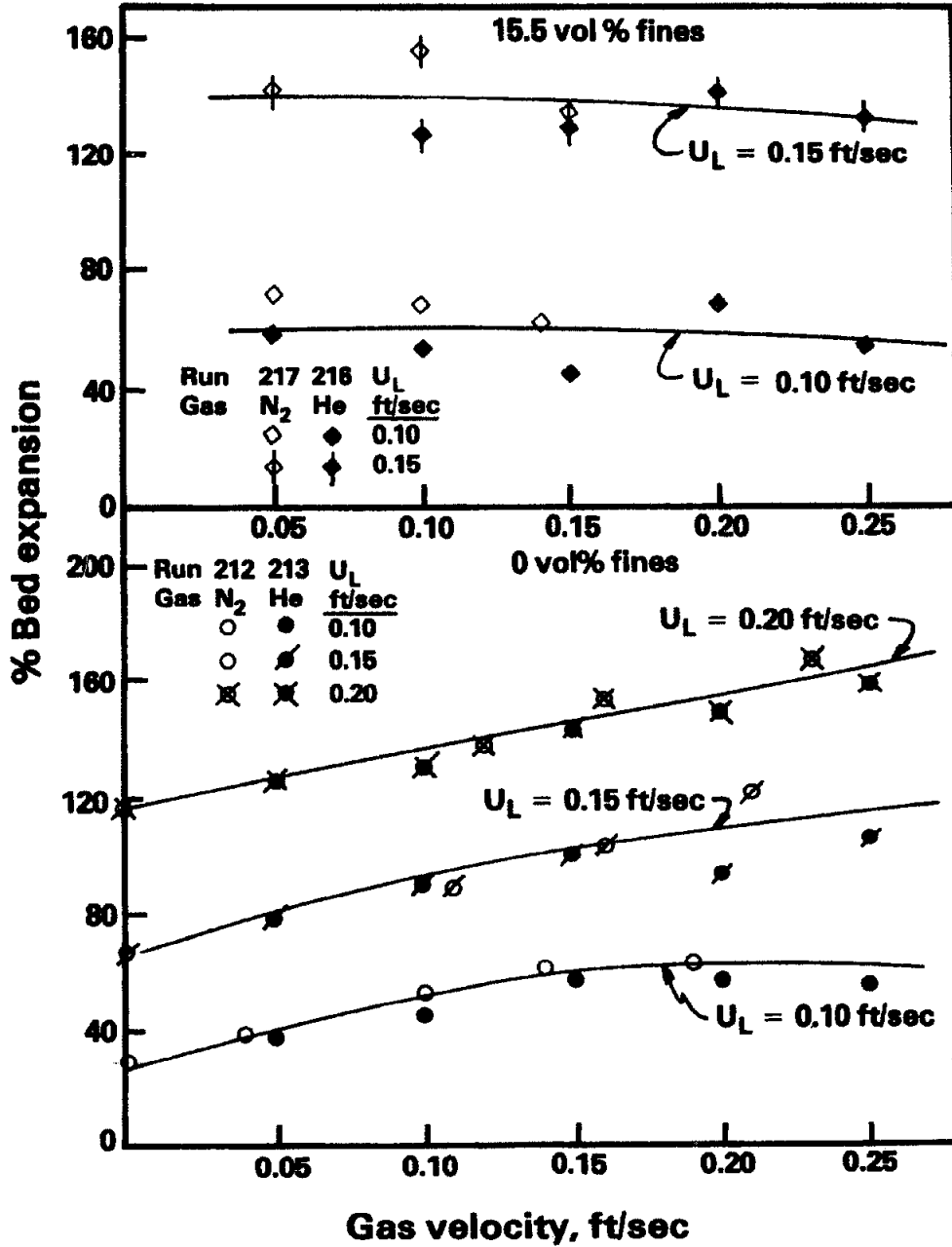


Figure 20

Bed expansion — — Effect of gas type
— — Mineral oil — —

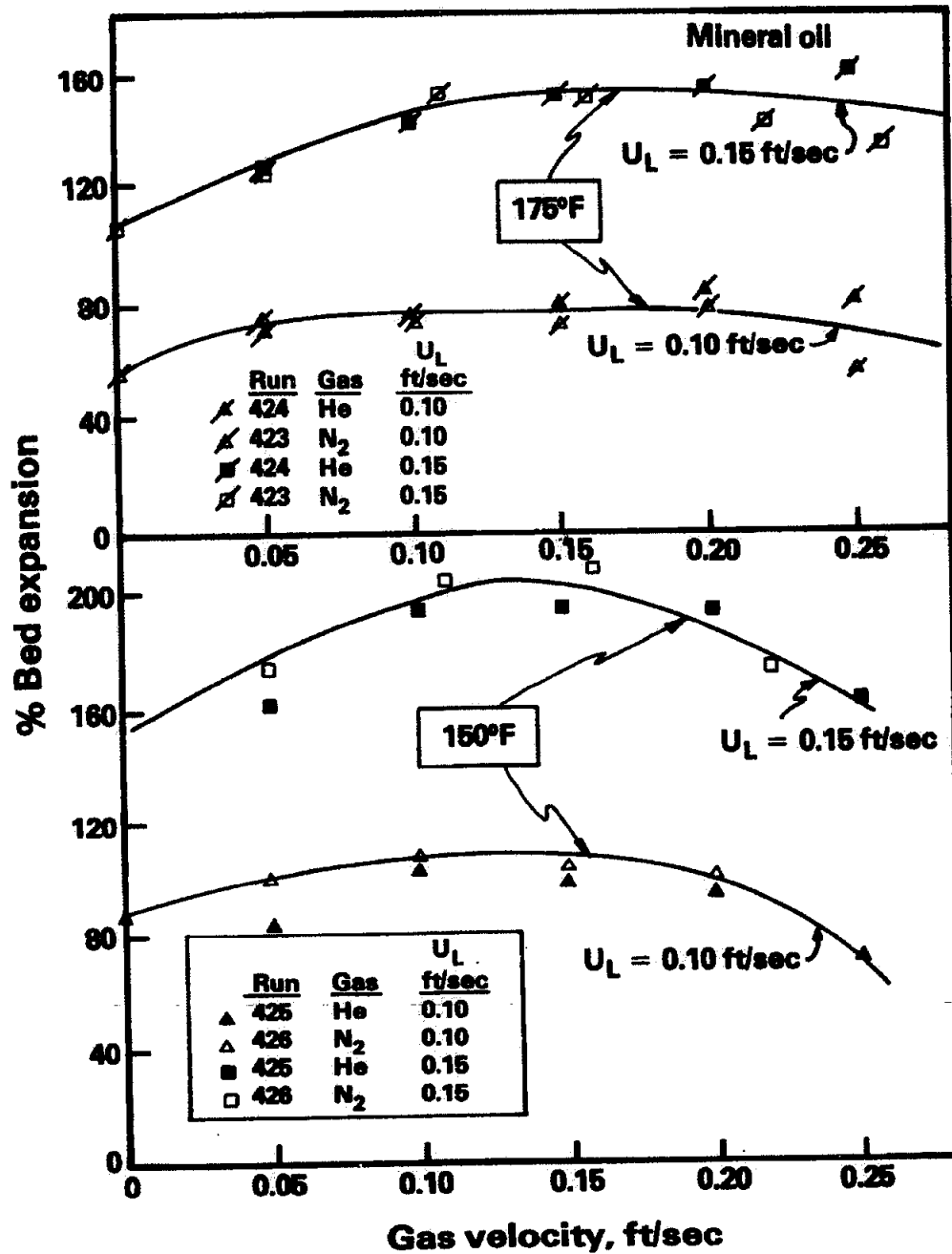
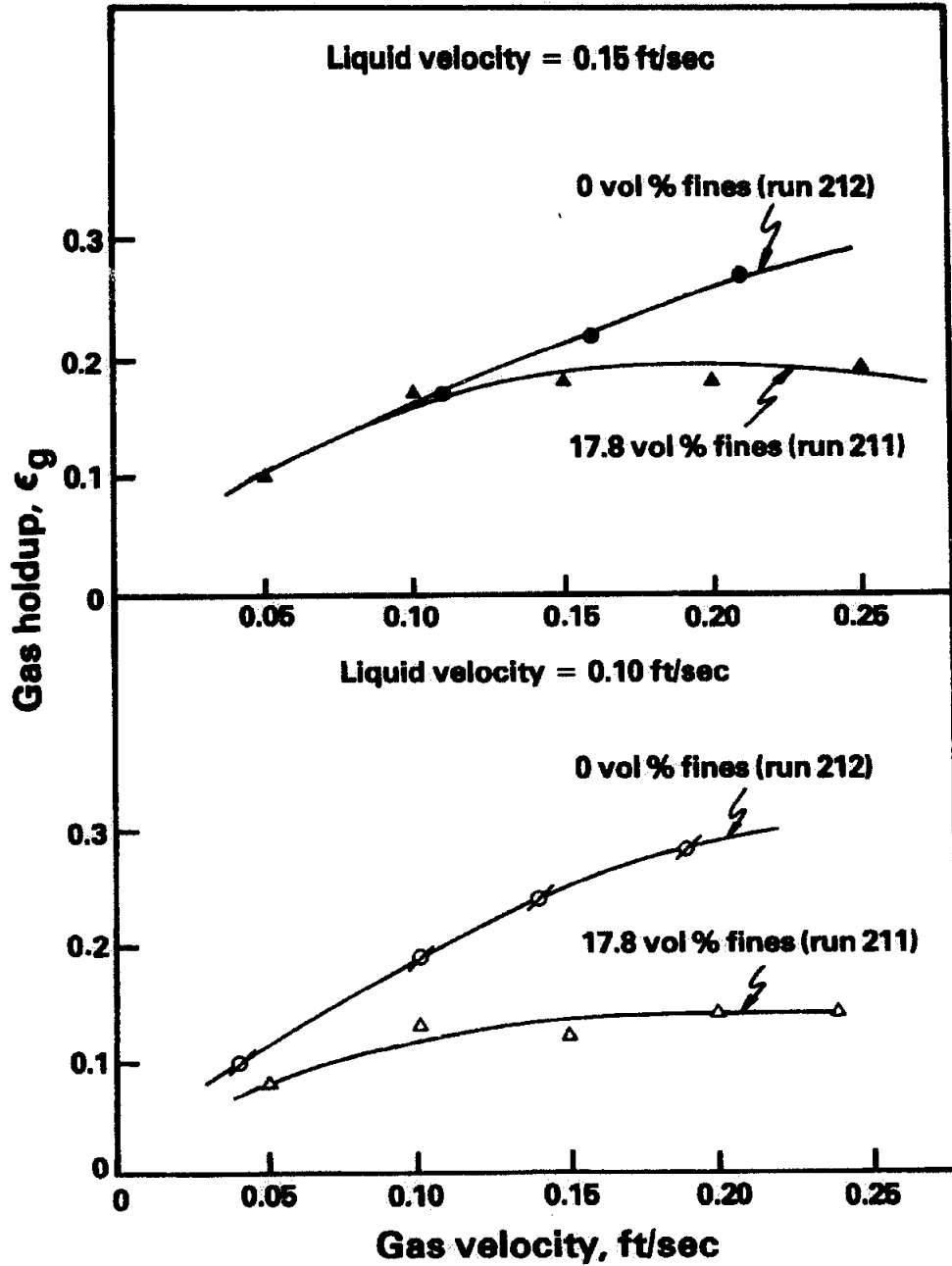


Figure 21
Gas holdup — effect of coal fines



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Gas holdup — comparison of various liquids

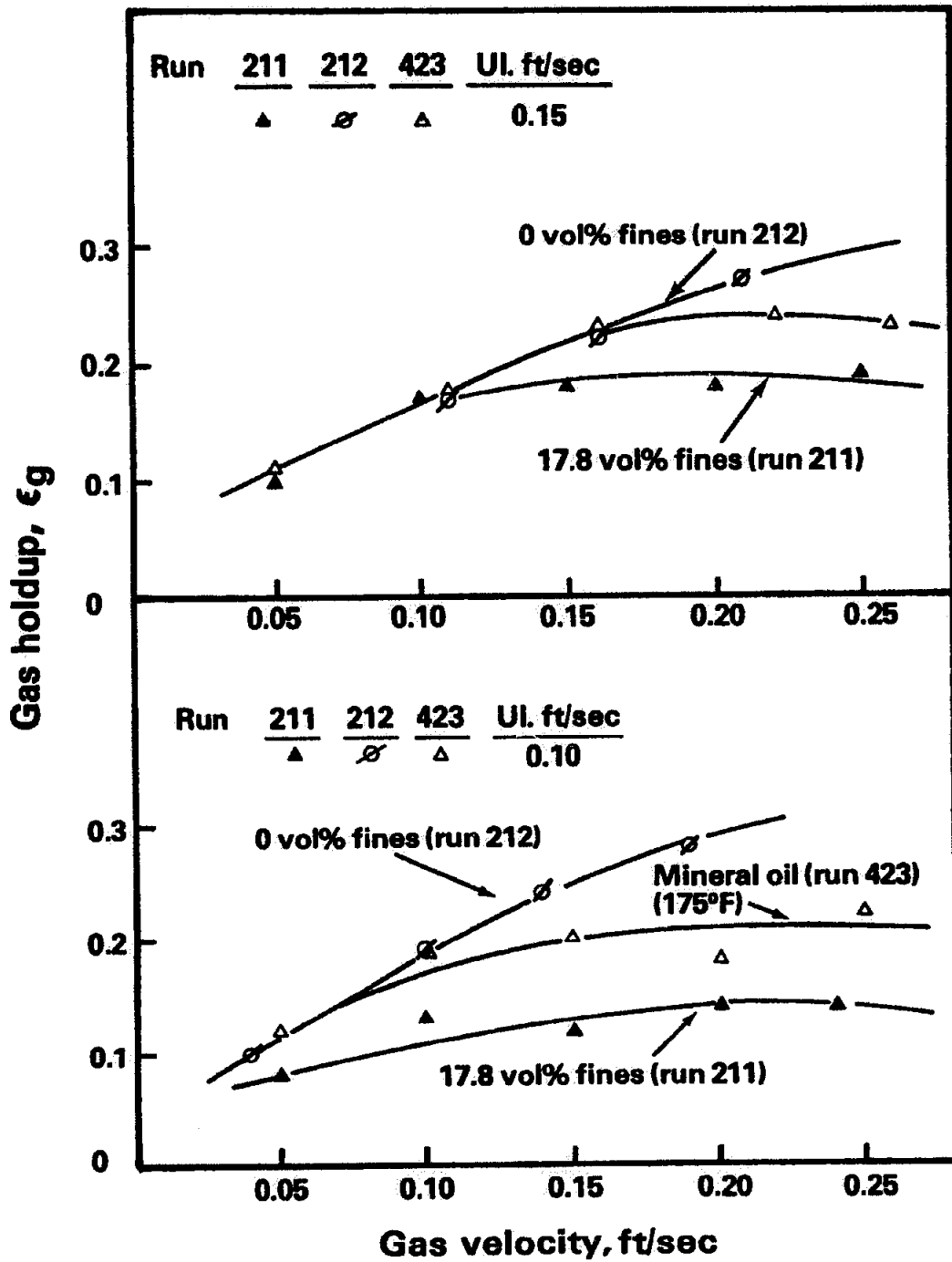


Figure 23

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Tracer results with 0 vol % coal char

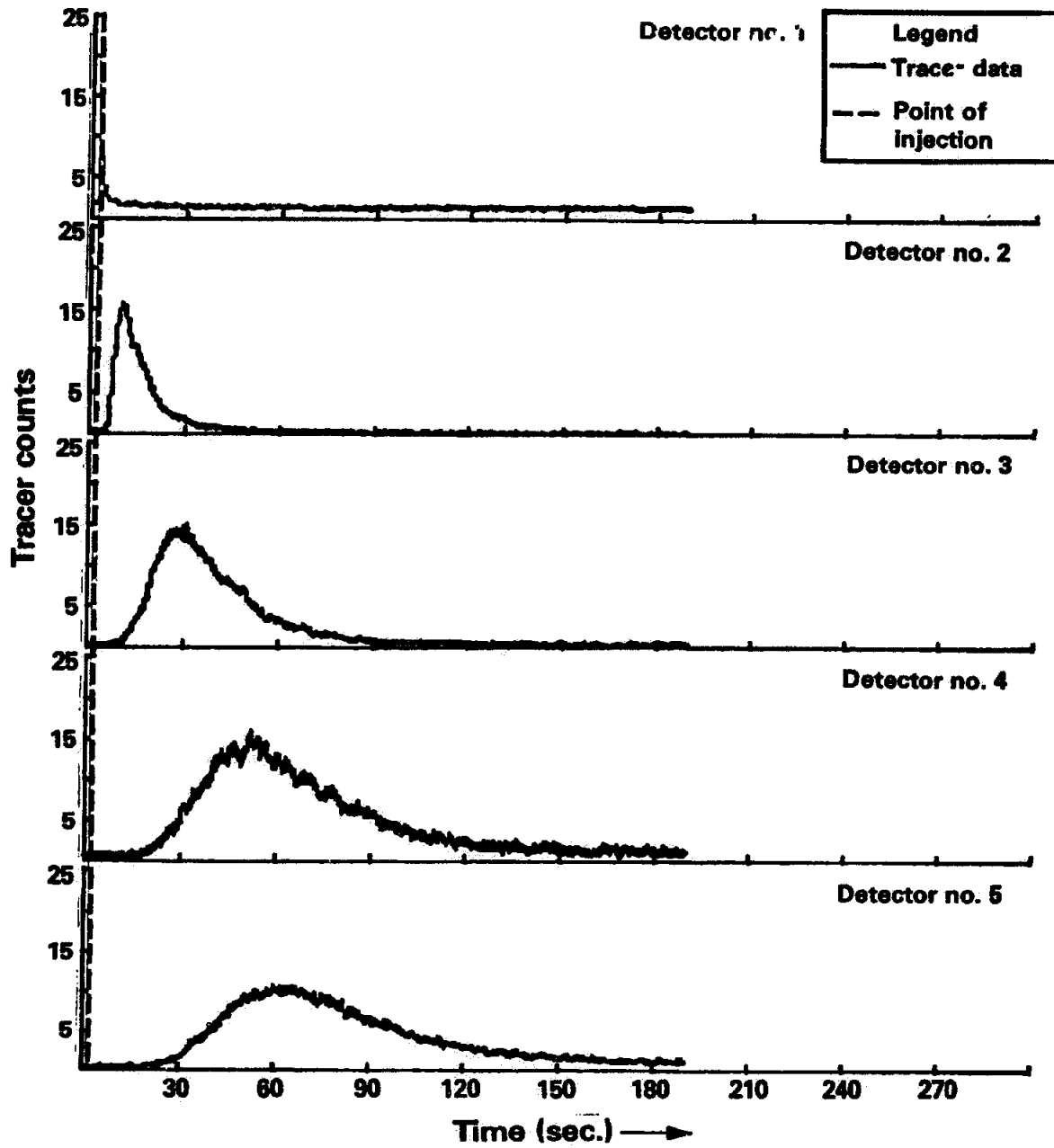


Figure 24

Tracer results with 15.5 vol % coal char

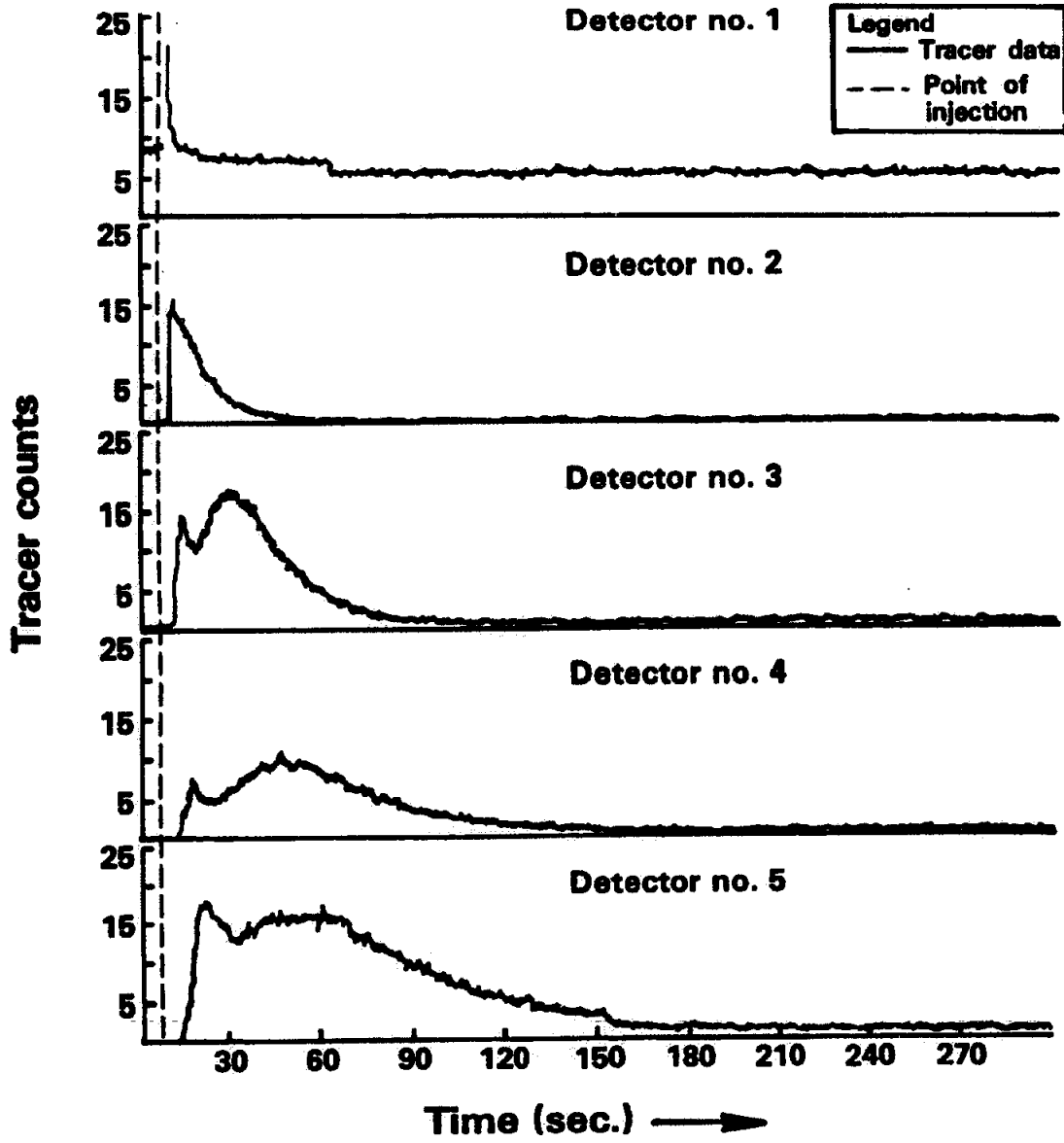


Figure 25
Drift flux — effect of operating conditions

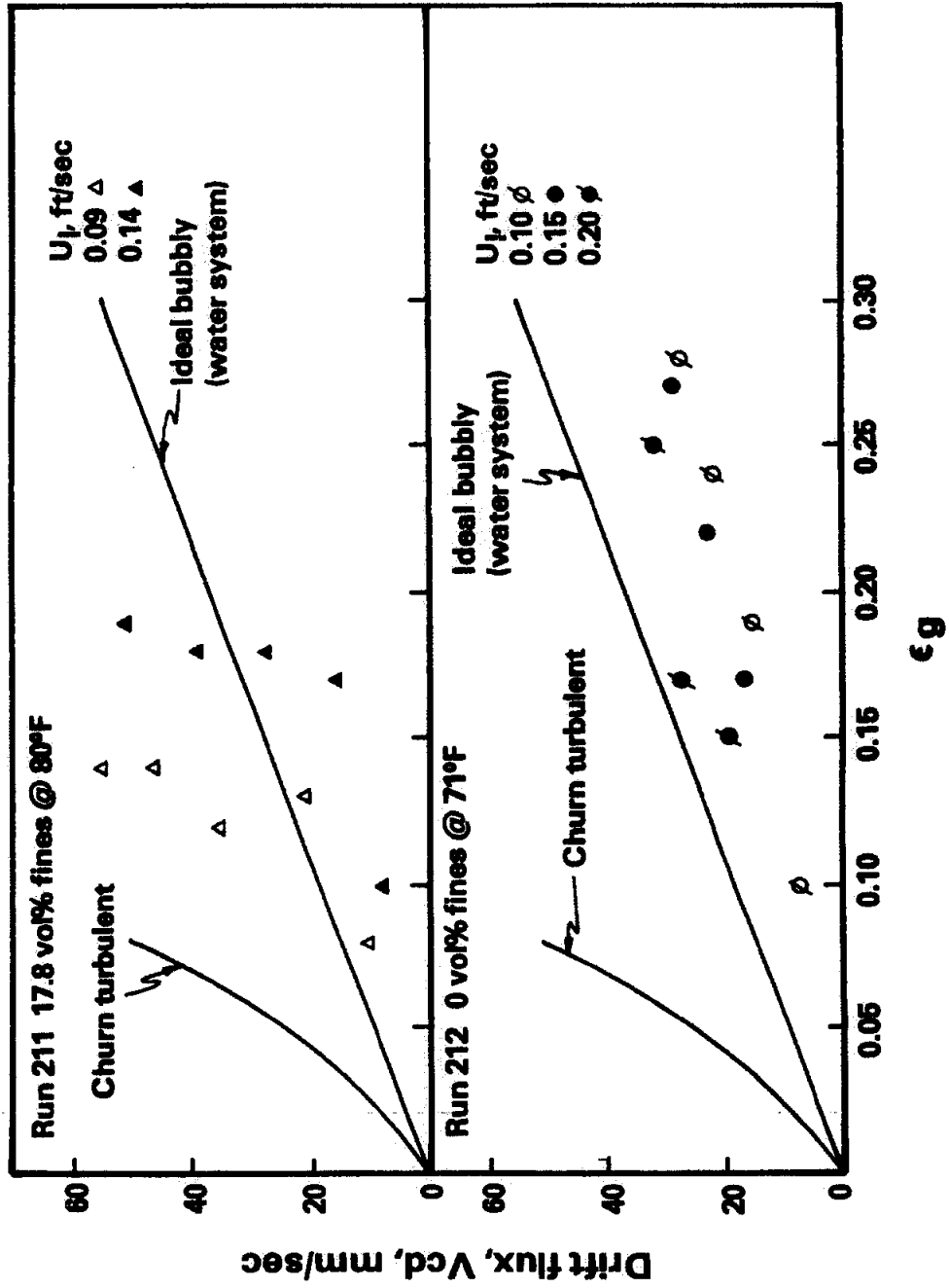


Figure 26
Drift flux — effect of liquid viscosity

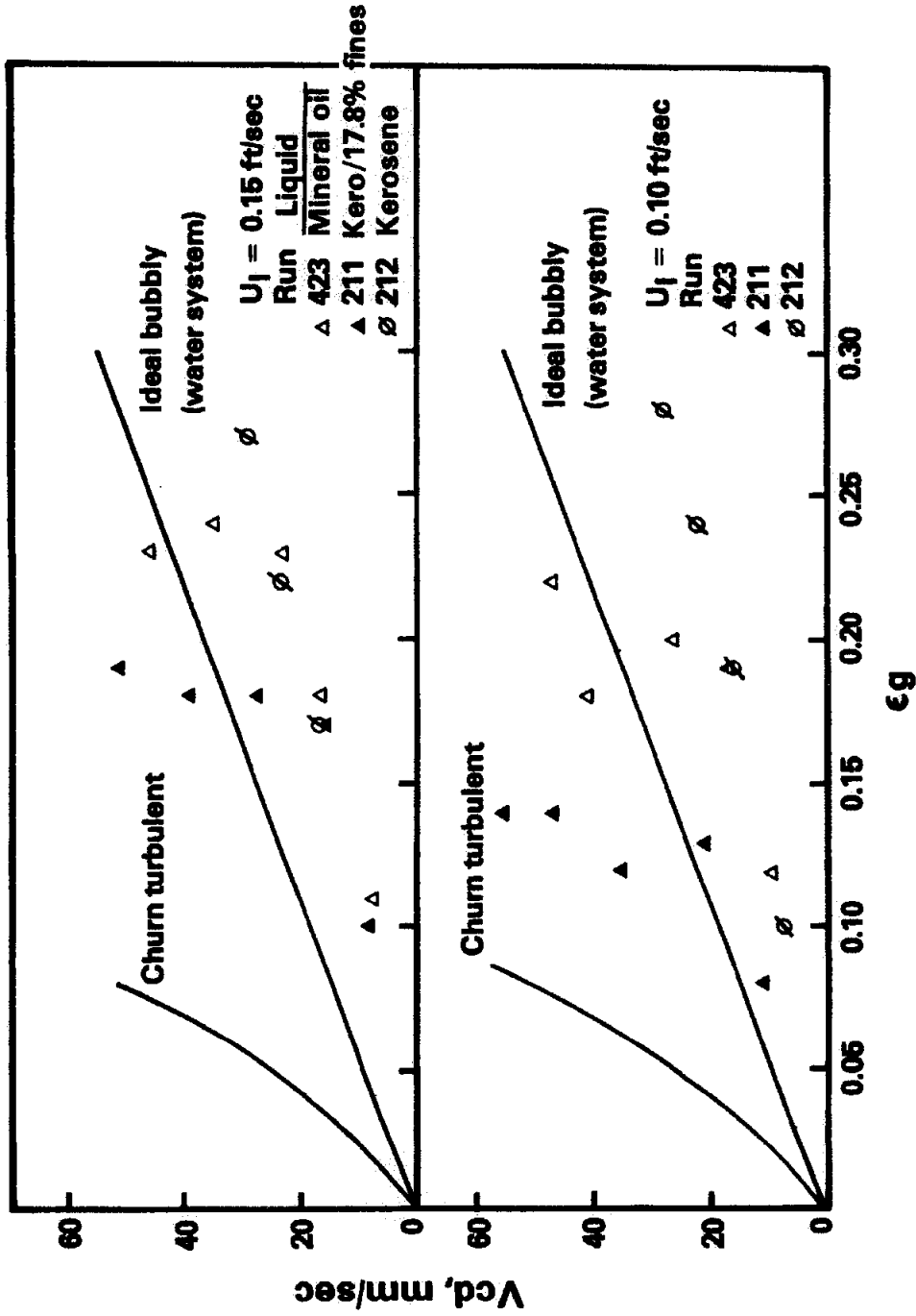


Figure 27
Bed expansion vs. gas velocity
Comparison of HRI PDU run 7 results with 17.8 vol %
coal char in kerosene

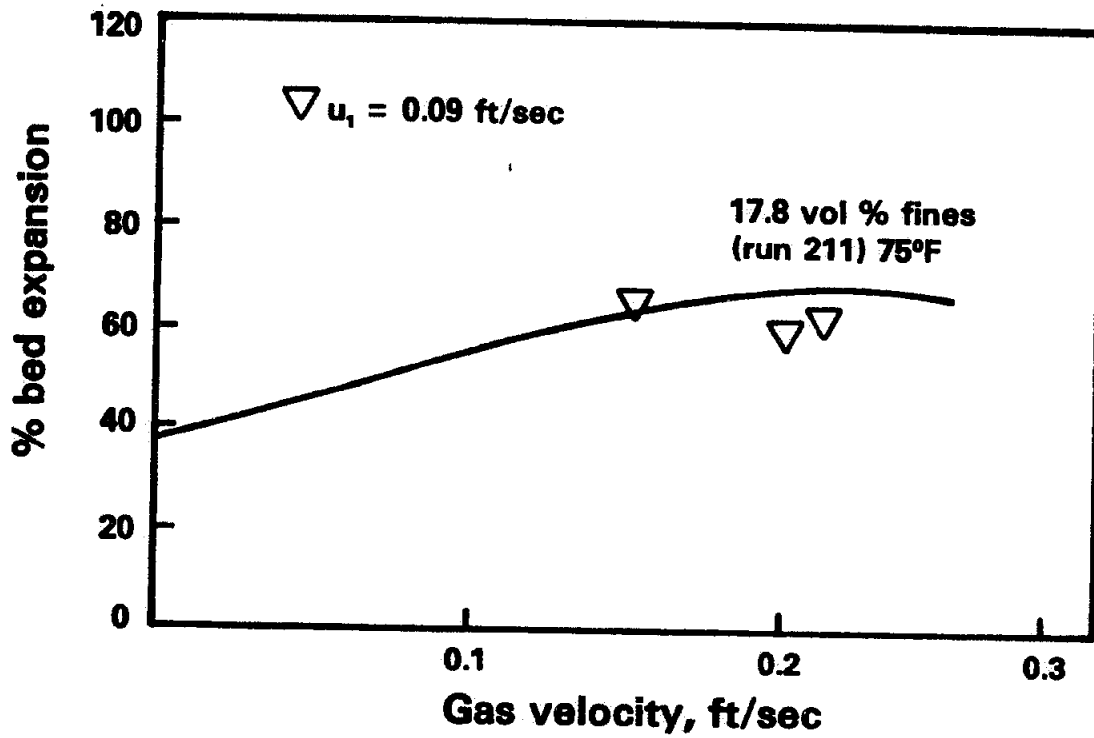


Figure 28

Variation of bubble included angle with liquid viscosity

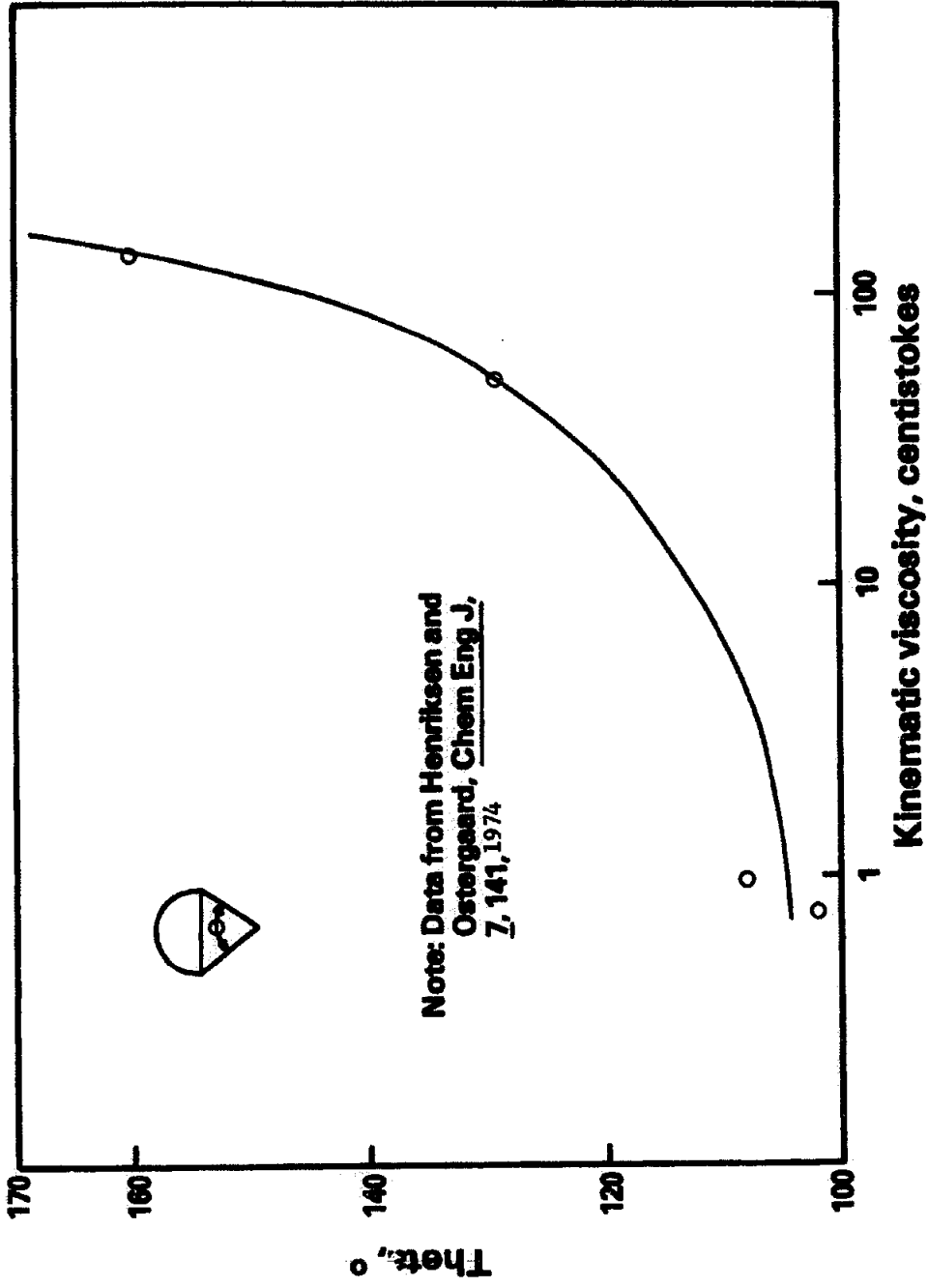


Figure 29

Wake volume — effect of coal fines

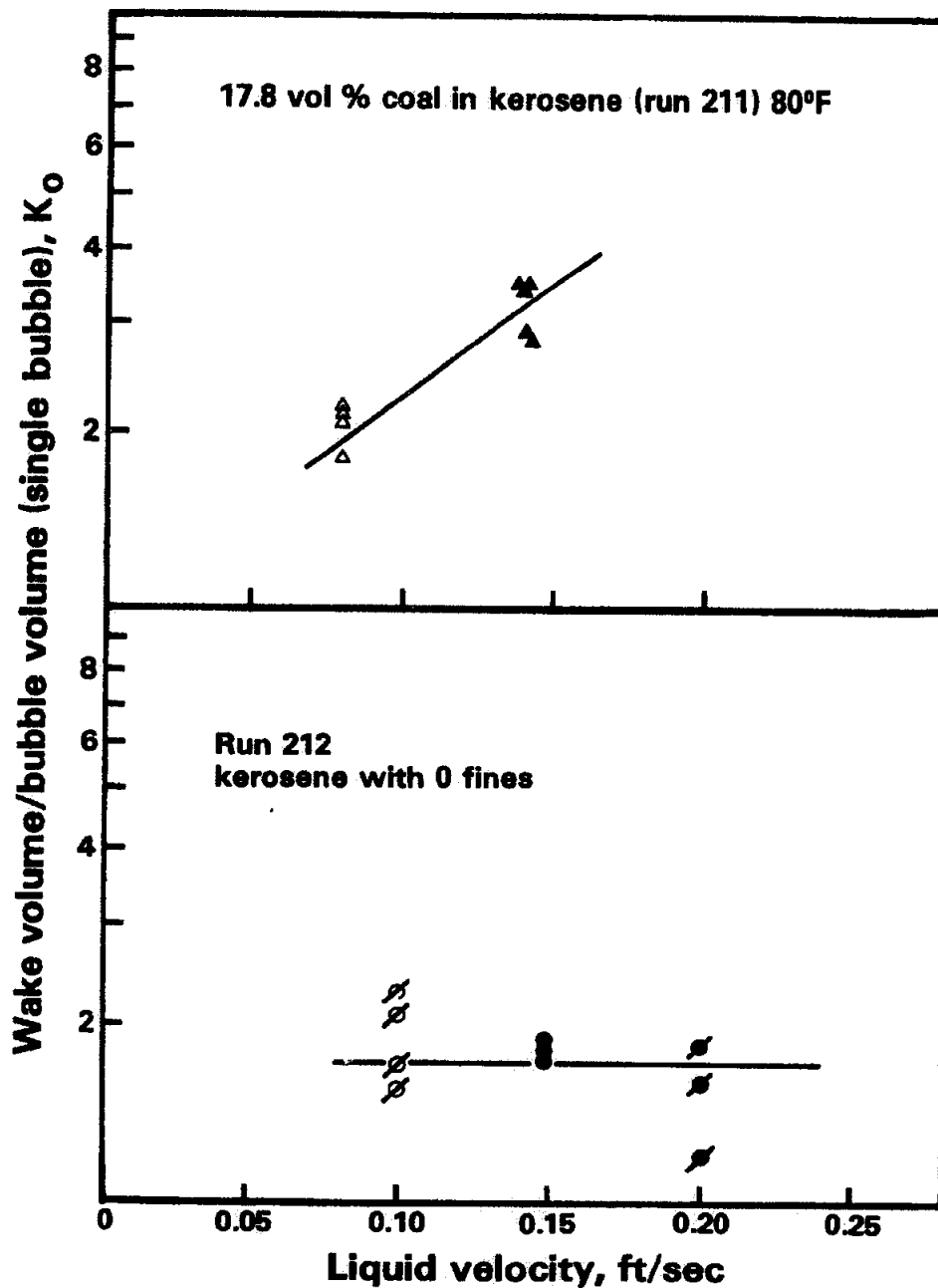


Figure 30

Wake volume — effect of liquid type

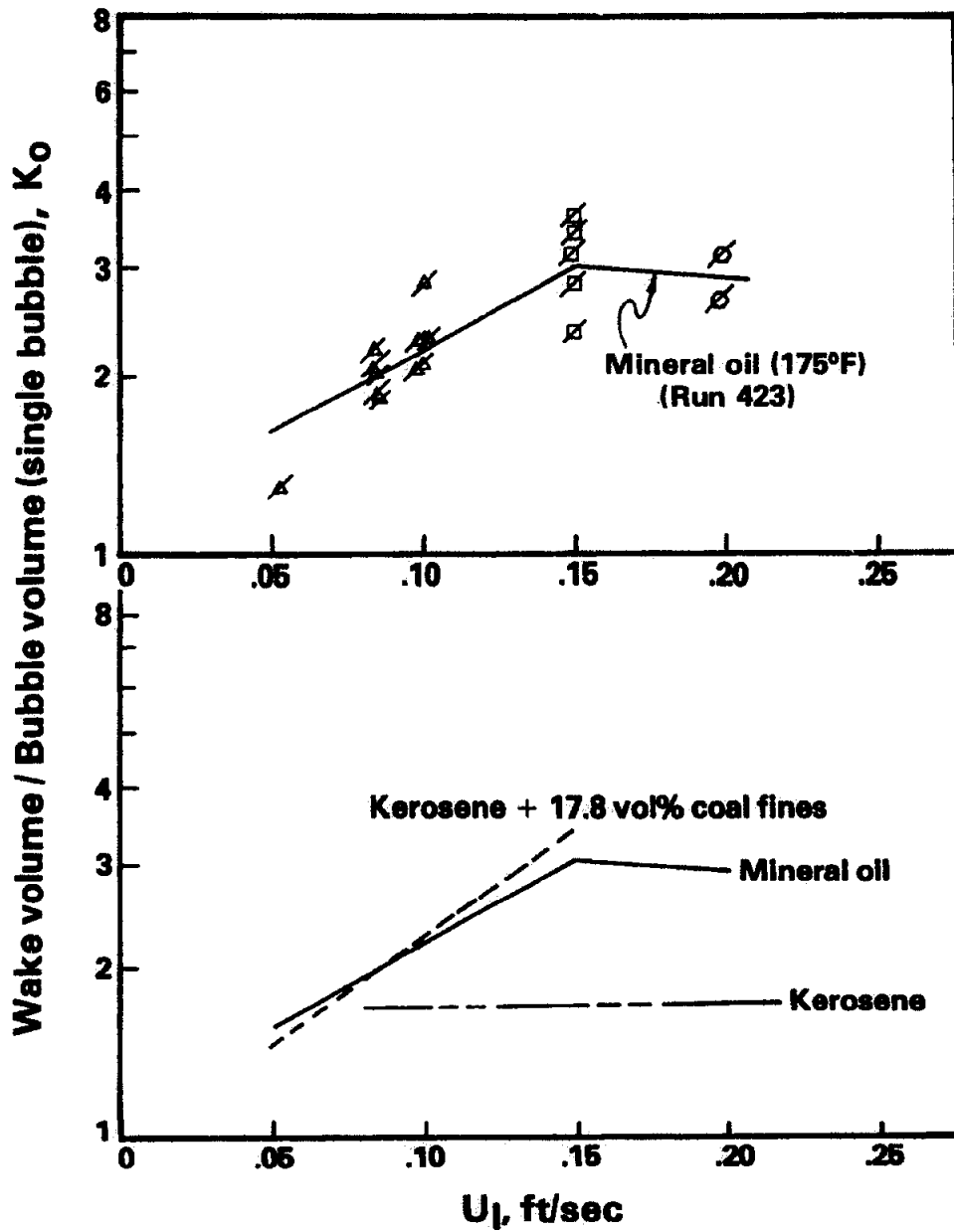


Figure 31

Bubble terminal velocity — effect of coal fines

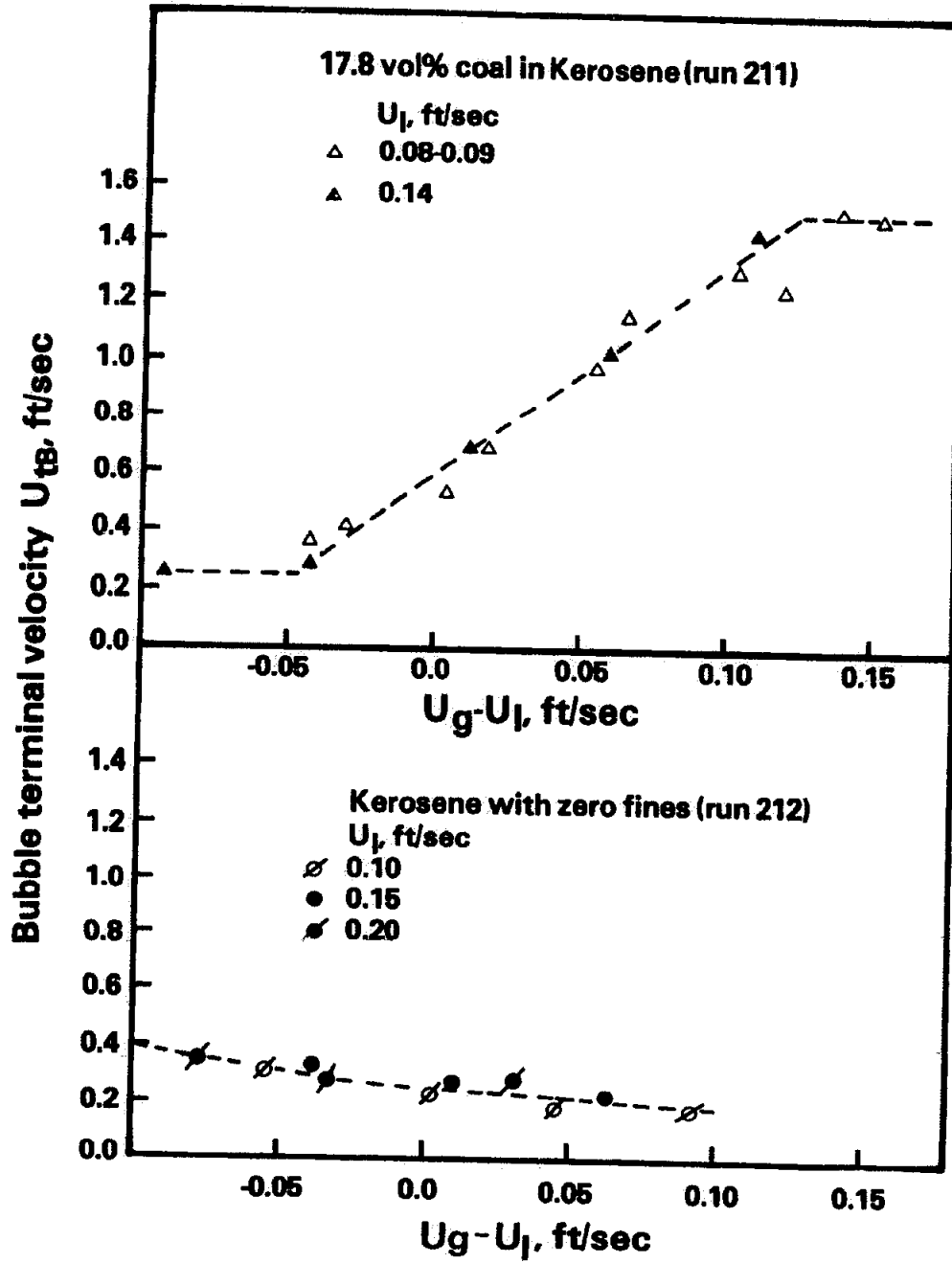


Figure 32

Bubble terminal velocity – effect of liquid type

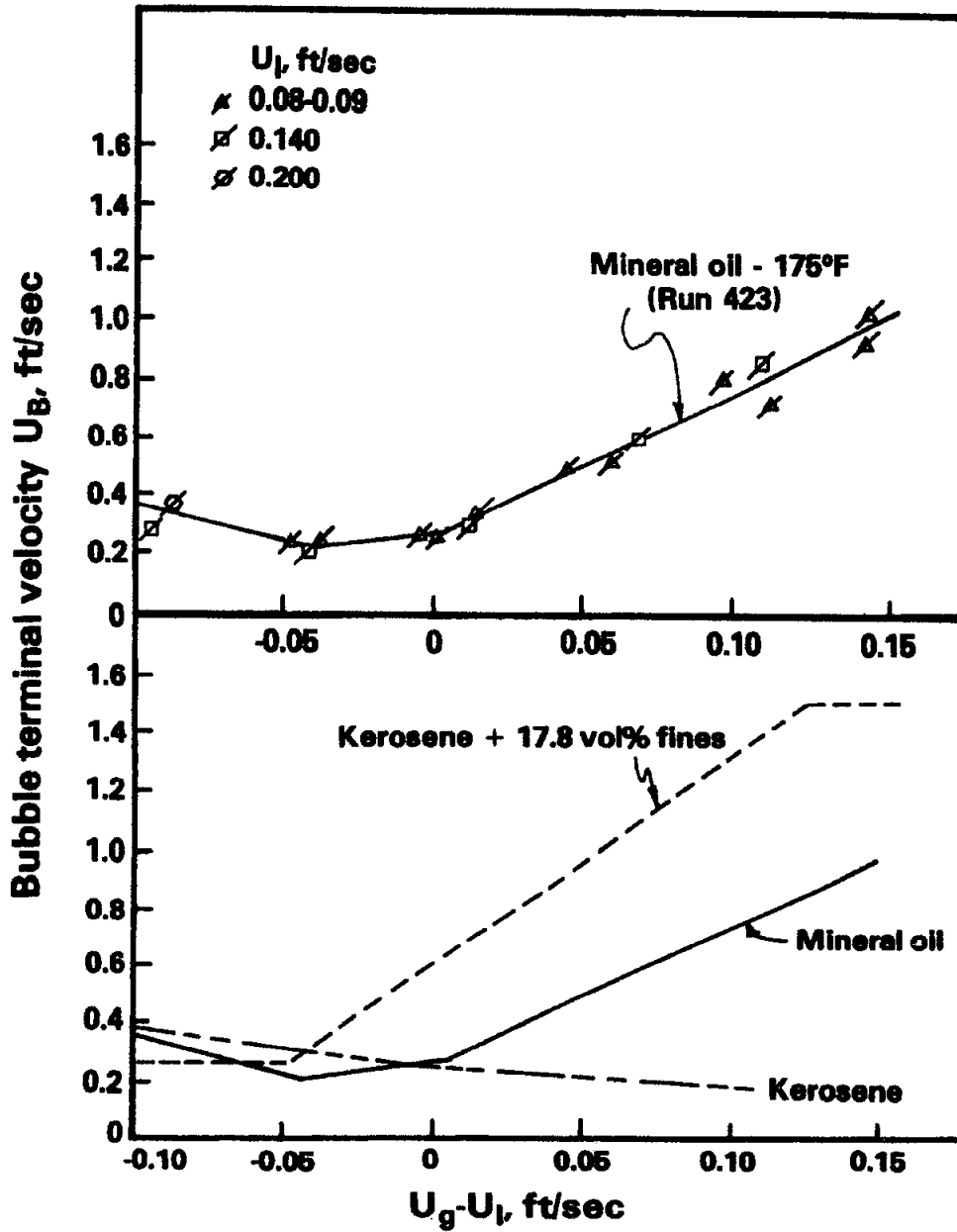


Figure 33
Relative solids holdup — effect of liquid type

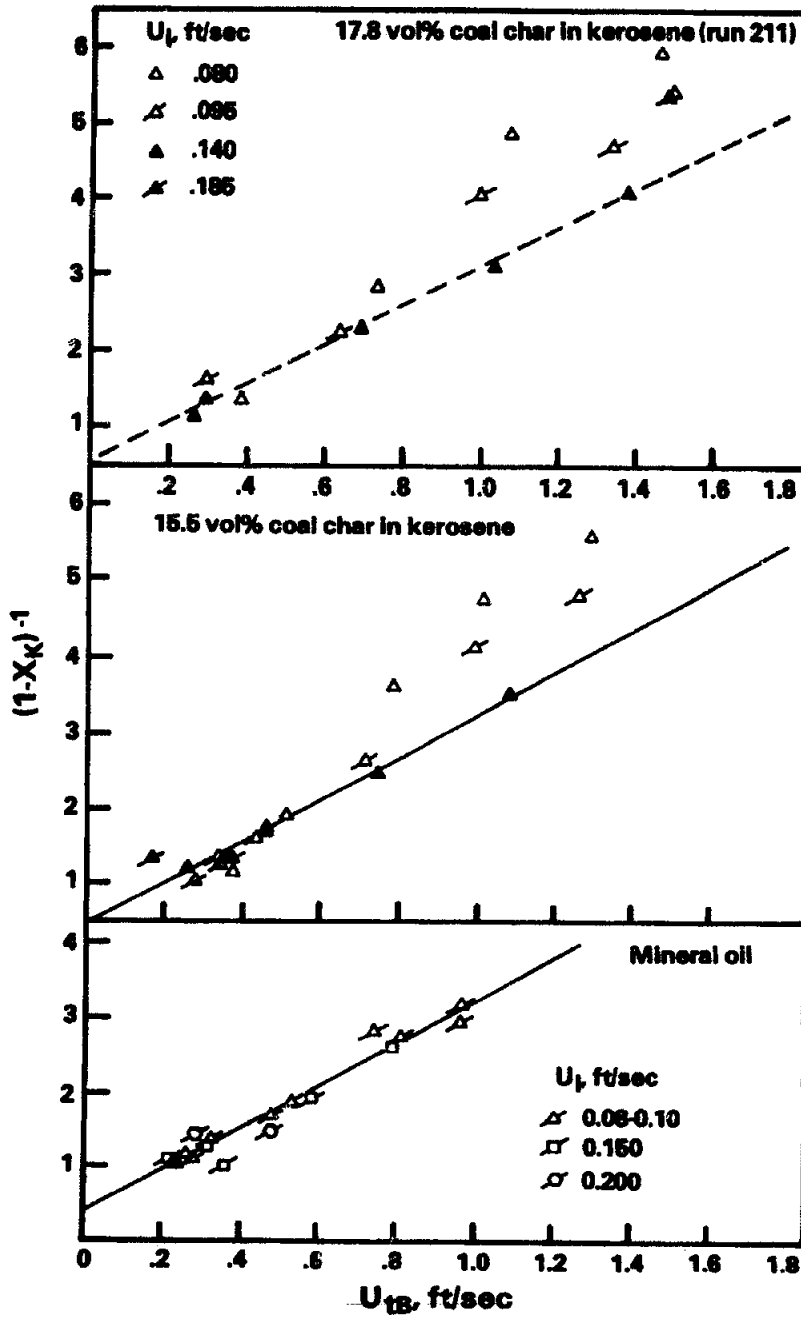


Figure 34

Catalyst holdup — predicted vs actual — kerosene and 17.8 vol % coal char

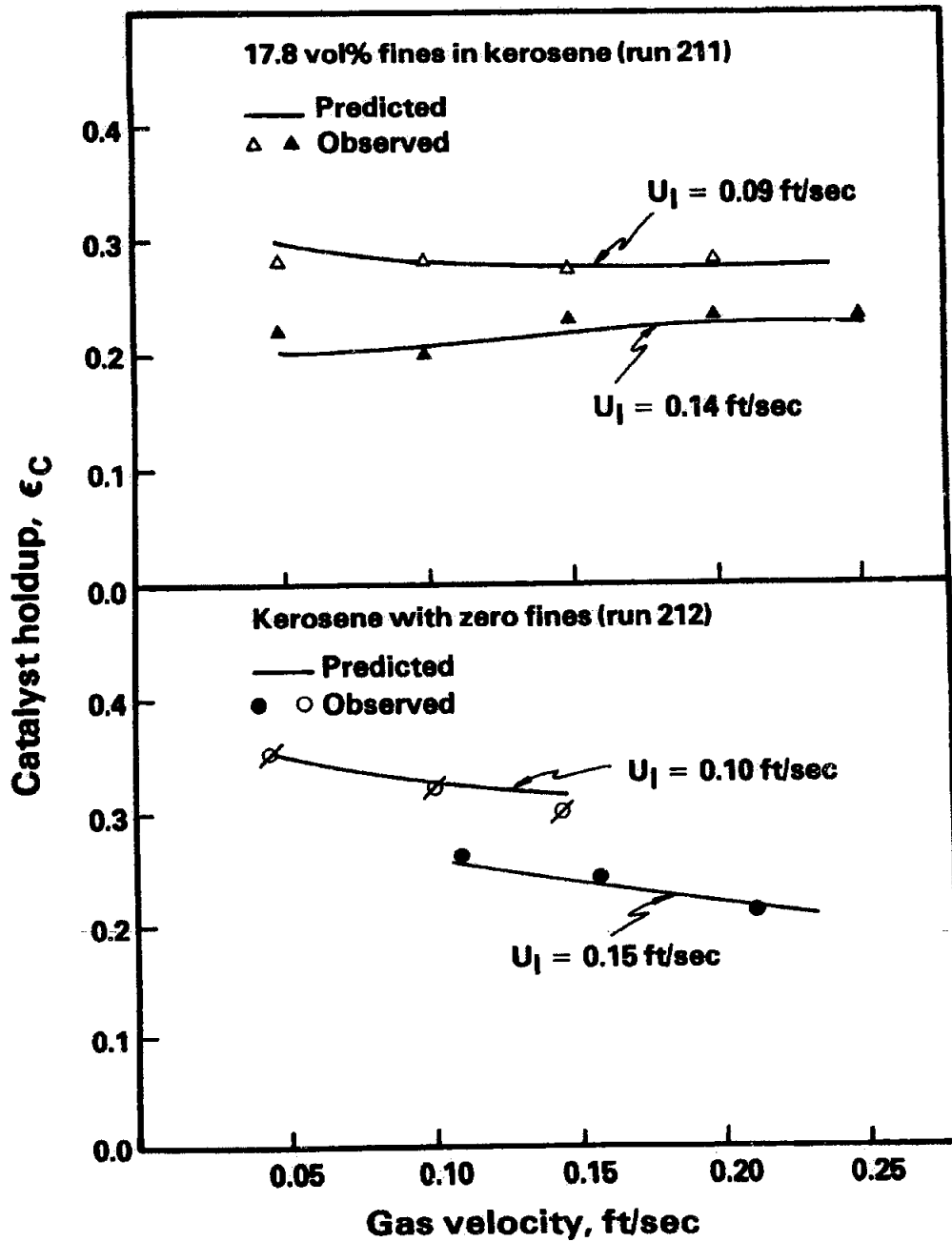


Figure 35
Gas holdup — predicted vs actual —
kerosene and 17.8 vol % coal char

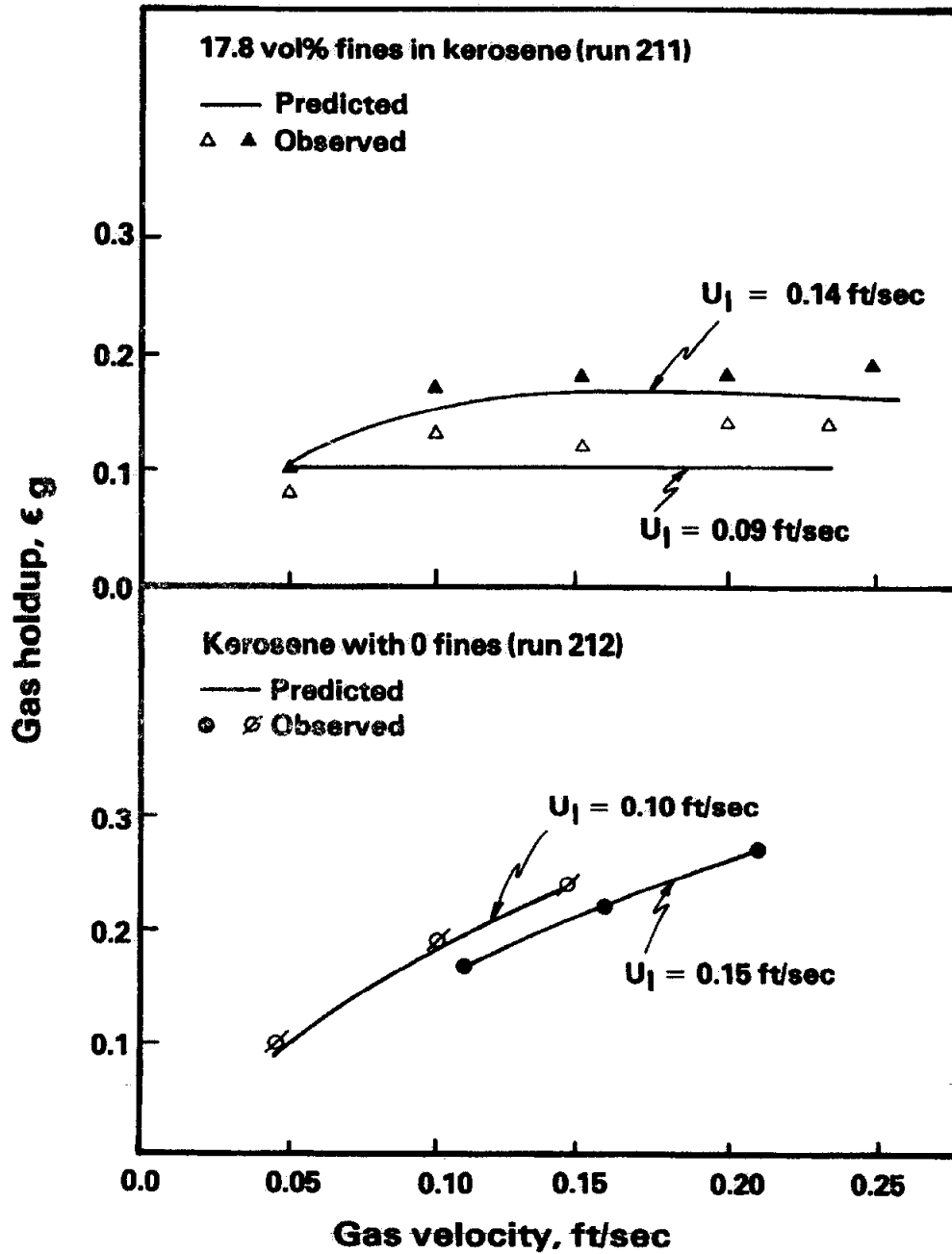


Figure 36
Gas mixing model

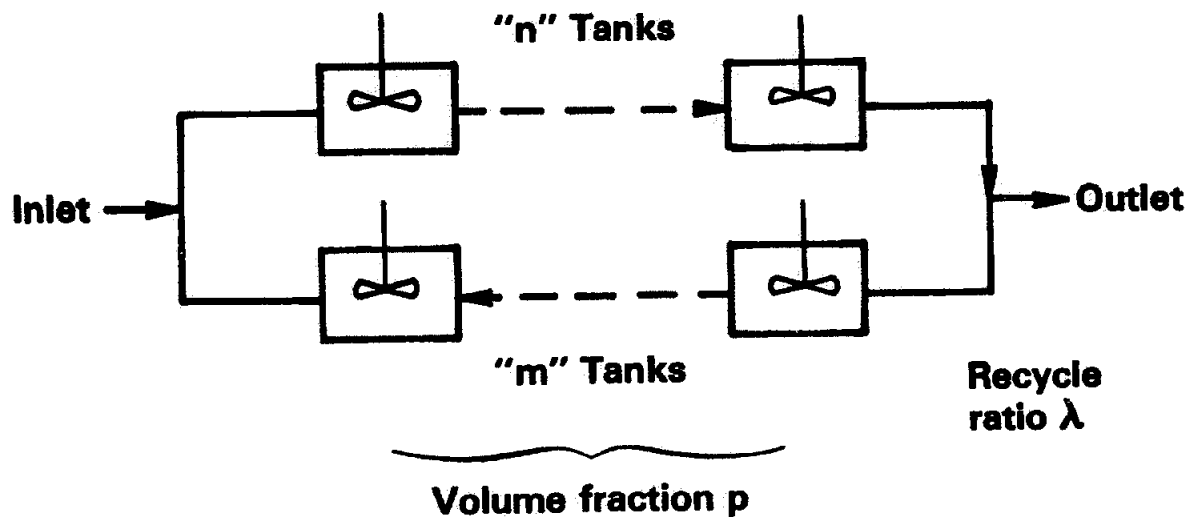


Figure 37
Gas mixing model
Kerosene/zero fines

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