

308 --- 0199702060004
Scientific Notebook #083

Kain K_{54T}

RECORD

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CONTROLLED
COPY 083

~~RT~~

Ronald T Green

Terrie Perry

Note: This notebook was used by Terry Perry during the summer of 1993 prior to initiation of street labwork protocol. This notebook is no longer in use but will be retained for reference. 12/6/94 ~~RF~~ ^{Low} ~~GREEN~~

Pages 1 through 13 of this Scientific Notebook were reviewed for compliance with QAP-001 in response to Corrective Action Request 94-02. Corrections and clarifications were made as appropriate. In some cases, the date of a change will reflect the date of this review rather than the date of the original Scientific Notebook entry.

Randy Hobb
SW RF-QA
12/7/94

Table of Contents

Air Permeability

**Pages 3 Through 6 Are Intentionally
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06/22/93 TP

Initial Entries

Instrumentation

| Date | Initial | Manufacturer | Model |
|---------|---------|---|---|
| 6/22/93 | TP | Brainard-Kilman PO Box 1959 Stone Mtn, GA 30086 | S-480 Permeability Cell |
| 6/22/93 | TP | Miriam Instrument Div. of Scott & Fetzer Co. Cleveland, Ohio 44102 | 10AA25W111 U-Tube Manometer 10" Range (no calibration needed) |
| 6/22/93 | TP | Miriam Instrument Cleveland, Ohio 44102 | 20DA X 40 TM 60" Range (no calibration needed) |
| 6/22/93 | TP | Nullmatic Moore Products Co Spring House, PA | 40-50 Serial# 14870-6113 MK 50 psi range Pressure regulator Gage Calibrated: 03-17-93 (0-60 psi) |
| 6/22/93 | TP | Nullmatic Moore Products Co Spring House, PA | 40-100 Serial# 14870-7/14 MR 100 psi range Gage Calibrated: 06-09-93 (0-100 psi) |
| 6/22/93 | TP | Liquid Carbonic Chicago, Ill 60603 | UN1066 Nitrogen |

Information potentially subject to copyright protection was redacted from this location. The redacted material is from a user manual for a U-Tube Manometer: Manufacturer was Brainard-Kilman, Stone Mountain, Georgia.

Air Permeability Experimental Setup

Information potentially subject to copyright protection was redacted from this location. The redacted material is from a user manual for an S480 Permeability Cell: Manufacturer was Miriam Instrument in Cleveland, Ohio.

Specimen Holder

B-X S480 Permeability Cell

06/18/93 TP

Sample: Ceramic

Length: 2 in

Diameter: 1.9 in

Confining Pressure: 45 psi

 $\mu = 1.76 \times 10^{-5} \text{ N}\cdot\text{s}/\text{m}^2 (20^\circ\text{C} : 1 \text{ atm})$

dp = the change in pressure
across the sample

 P_e = pressure at the sample's exit

V = Volume of air flowing at the
sample exit measured over
a period of time

 t = time

| $dP(\text{in Hg})$ | $P_e(\text{in H}_2\text{O})$ | $V(\text{ml})$ | $t(\text{s})$ |
|--------------------|------------------------------|----------------|---------------|
| 1.8 | 1.1 | 500 | 76.70 |
| 1.9 | 1.2 | 500 | 68.91 |
| 2.0 | 1.3 | 500 | 65.75 |
| 2.1 | 1.4 | 500 | 62.56 |
| 2.2 | 1.5 | 500 | 60.36 |
| 2.4 | 1.6 | 500 | 56.28 |
| 2.5 | 2.95 | 500 | 51.753 |
| 3.3 | 3.3 | 500 | 40.06 |
| 3.6 | 3.4 | 500 | 36.063 |
| 5.0 | 3.5 | 500 | 25.10 |

 Q = volumetric flowrate = V/t P_i = pressure at sample inlet = $P_e(\text{psia}) + \Delta P(\text{psi})$

Eqn. for air permeability obtained
from ASTM D4525

Standard Test Method For

Permeability of Rocks By Flowing Air

$$k = \frac{2 Q_e P_e \mu L}{(P_i^2 - P_e^2) A}$$

$$= \frac{2 Q_e P_e \mu L}{(P_i - P_e)(P_i + P_e) A} = \frac{2 Q_e P_e \mu L}{(dP)(P_i + P_e) A}$$

$$k = \frac{2 Q_e P_e \mu L}{dP (P_i + P_e) A}$$

 $k(\text{m}^2)$ = permeability

A = cross sectional area of the
sample

TP 06/18/93

The ~~atmospheric~~^{exit} pressure was converted

absolute pressure assuming atmospheric
pressure to be 14.7 psi.

The permeability was calculated
by inputting the data into a QPRD
spreadsheet.

The values obtained through
the spreadsheet were then checked
with several hand calculations.

**Pages 12 and 13 Are Intentionally
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06/21/93 TP

Media: Ceramic

Length: 2 in

Diameter: 1.9 in

Conf. Pressure: 45 psi

| dP (in Hg) | P _e (in H ₂ O) | V (ml) | t (s) |
|------------|--------------------------------------|--------|---------------------------|
| 1.0 | 0.4 | 500 | 135.36 |
| | | | 133.88 |
| | | | <u>133.57</u> |
| | | | t _{ave} = 134.27 |

| | | | |
|-----|-----|-----|--------------------------|
| 1.5 | 0.8 | 500 | 86.88 |
| | | | 87.37 |
| | | | <u>87.39</u> |
| | | | t _{ave} = 87.21 |

| | | | |
|-----|-----|-----|--------------------------|
| 2.0 | 1.2 | 500 | 65.16 |
| | | | 65.26 |
| | | | <u>65.91</u> |
| | | | t _{ave} = 65.44 |

| | | | |
|-----|-----|-----|--------------------------|
| 2.2 | 1.4 | 500 | 59.46 |
| | | | 59.70 |
| | | | <u>59.55</u> |
| | | | t _{ave} = 59.57 |

15

| dP (in Hg) | P _e (in H ₂ O) | V (ml) | t (s) |
|------------|--------------------------------------|--------|--------------------------|
| 2.4 | 1.6 | 500 | 54.51 |
| | | | 54.72 |
| | | | <u>54.31</u> |
| | | | t _{ave} = 54.51 |

| | | | |
|-----|-----|-----|--------------------------|
| 2.6 | 1.9 | 500 | 49.06 |
| | | | 49.26 |
| | | | <u>48.95</u> |
| | | | t _{ave} = 49.09 |

| | | | |
|-----|-----|-----|--------------------------|
| 2.8 | 2.1 | 500 | 46.56 |
| | | | 46.50 |
| | | | <u>46.78</u> |
| | | | t _{ave} = 46.61 |

| | | | |
|-----|-----|-----|--------------------------|
| 3.0 | 2.3 | 500 | 43.34 |
| | | | 43.41 |
| | | | <u>43.41</u> |
| | | | t _{ave} = 43.39 |

| | | | |
|-----|-----|-----|--------------------------|
| 3.2 | 2.5 | 500 | 39.80 |
| | | | 40.42 |
| | | | <u>40.31</u> |
| | | | t _{ave} = 40.18 |

| | | | |
|-----|-----|--|--------------------------|
| 3.4 | 2.8 | | 37.70 |
| | | | 37.81 |
| | | | <u>37.51</u> |
| | | | t _{ave} = 37.67 |

TP 06/21/71

| dP_e (in Hg) | P_e (in H ₂ O) | V (ml) | t (s) |
|----------------|-----------------------------|----------|---------|
| 3.8 | 3.4 | 500 | 34.02 |

33.92

34.00 $t_{ave} = 33.98$

| | | | |
|-----|-----|-----|--------|
| 4.0 | 3.6 | 500 | 32.271 |
|-----|-----|-----|--------|

TP 06/21/71

32.53

32.52 $t_{ave} = 32.42$

| | | | |
|-----|-----|-----|-------|
| 4.4 | 4.2 | 500 | 28.84 |
|-----|-----|-----|-------|

28.98

28.99 $t_{ave} = 28.94$

| | | | |
|-----|-----|-----|-------|
| 4.6 | 4.5 | 500 | 27.58 |
|-----|-----|-----|-------|

27.59

27.80 $t_{ave} = 27.66$

| | | | |
|-----|-----|-----|-------|
| 4.8 | 4.8 | 500 | 26.26 |
|-----|-----|-----|-------|

26.31

26.42 $t_{ave} = 26.33$

| | | | |
|-----|-----|-----|-------|
| 5.0 | 5.1 | 500 | 25.51 |
|-----|-----|-----|-------|

25.41

25.61 $t_{ave} = 25.51$

06/21/93 TP

Three times were taken at each differential pressure. The average of these times was then found. The times were averaged to reduce any human error in clocking the bubble.

The average times were used in calculating the flowrate as well as the permeability.

**Pages 18 and 19 Are Intentionally
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06/22/93 TP

media: JRT B3

Length: 0.95 in

Diameter: 1.9 in

Weight: 23.5g

| dP(in Hg) | P _e (in H ₂ O) | V(ml) | t(s) |
|-----------|--------------------------------------|-------|---------------------------|
| 18 | atm (0.0) | 10 | 148.12 |
| | | | 149.26 |
| | | | <u>149.66</u> |
| | | | t _{ave} = 149.01 |
| 20 | 0.0 | 10 | 132.66 |
| | | | 134.16 |
| | | | <u>132.84</u> |
| | | | t _{ave} = 133.22 |
| 22 | 0.0 | 10 | 120.74 |
| | | | 121.03 |
| | | | <u>121.51</u> |
| | | | t _{ave} = 121.09 |
| 24 | 0.0 | 10 | 110.26 |
| | | | 111.21 |
| | | | <u>111.19</u> |
| | | | t _{ave} = 110.89 |
| 26 | 0.0 | 10 | 101.56 |
| | | | 102.41 |
| | | | <u>102.38</u> |
| | | | t _{ave} = 102.12 |

| dP(in Hg) | P _e (in H ₂ O) | V(ml) | t(s) |
|-----------|--------------------------------------|-------|--------------------------|
| 28 | 0.0 | 10 | 93.64 |
| | | | 94.42 |
| | | | <u>93.91</u> |
| | | | t _{ave} = 93.99 |
| 30 | 0.0 | 10 | 91.11 |
| | | | 89.46 |
| | | | <u>88.75</u> |
| | | | t _{ave} = 89.77 |
| 31 | 0.0 | 10 | 86.73 |
| | | | 85.27 |
| | | | <u>85.46</u> |
| | | | t _{ave} = 85.80 |
| 35 | 0.0 | 10 | 76.13 |
| | | | 75.64 |
| | | | <u>75.31</u> |
| | | | t _{ave} = 75.69 |
| 40 | 0.0 | 10 | 65.08 |
| | | | 65.21 |
| | | | <u>65.03</u> |
| | | | t _{ave} = 65.11 |
| 45 | 0.0 | 10 | 56.20 |
| | | | 56.36 |
| | | | <u>56.36</u> |
| | | | t _{ave} = 56.31 |

| dP(in Hg) | P _e (in H ₂ O) | V(ml) | t(s) |
|-----------|--------------------------------------|-------|--------------------------|
| 50 | 0.0 | 10 | 51.93 |
| | | | 51.01 |
| | | | <u>50.85</u> |
| | | | t _{ave} = 51.26 |
| 55 | 0.0 | 10 | 46.40 |
| | | | 45.50 |
| | | | <u>45.51</u> |
| | | | t _{ave} = 45.80 |
| 60 | 0.0 | 10 | 42.16 |
| | | | 41.74 |
| | | | <u>41.20</u> |
| | | | t _{ave} = 41.70 |
| 65 | 0.0 | 10 | 38.42 |
| | | | 37.93 |
| | | | <u>37.59</u> |
| | | | t _{ave} 37.98 |
| 70 | 0.0 | 10 | 35.50 |
| | | | 34.53 |
| | | | <u>34.82</u> |
| | | | t _{ave} 34.95 |

Referenced disk cannot be located.

Above is the disk contained
the programs used to evaluate
the air permeability.
For the bubble flow meter
program: AIRBUBBLE^{TP}.BAS
For digital flowmeter
program: AIRFLOW.BAS

06/23/93 TP

Media: ALT. B4

Diameter: 1.9 in

Length:

Weight:

* visible fracture across rock

| dP(inHg) | Pel(inH ₂ O) | V(ml) | t(s) |
|----------|-------------------------|-------|--------------|
| 2 | 0.0 | 10 | 41.51 |
| | | | 41.58 |
| | | | <u>41.16</u> |
| | | | ave 41.42 |
| 4 | 0.0 | 10 | 21.45 |
| | | | 21.26 |
| | | | <u>21.36</u> |
| | | | ave 21.34 |
| 6 | 0.0 | 10 | 14.32 |
| | | | 14.34 |
| | | | <u>14.52</u> |
| | | | ave 14.39 |

Test terminated;

Volume changed to increase time.

| | | | |
|---|-----|-----|--------------|
| 8 | 0.0 | 100 | 99.10 |
| | | | 98.64 |
| | | | <u>99.82</u> |
| | | | ave 99.19 |

| dP (in Hg) | Pc (in H ₂ O) | V (ml) | t (s) |
|------------|--------------------------|--------|--------------|
| 10 | 0.0 | 100 | 79.52 |
| | | | 77.45 |
| | | | <u>79.05</u> |
| | | | ave 78.61 |

| | | | |
|----|-----|-----|--------------|
| 10 | 0.0 | 100 | 67.46 |
| | | | 67.32 |
| | | | <u>67.82</u> |
| | | | ave 67.53 |

| | | | |
|----|-----|-----|--------------|
| 14 | 0.0 | 100 | 57.69 |
| | | | 58.33 |
| | | | <u>57.72</u> |
| | | | ave 57.91 |

| | | | |
|----|-----|-----|--------------|
| 16 | 0.2 | 100 | 54.52 |
| | | | 53.56 |
| | | | <u>53.99</u> |
| | | | ave 54.02 |

| | | | |
|----|-----|-----|--------------|
| 18 | 0.2 | 100 | 47.79 |
| | | | 47.79 |
| | | | <u>47.92</u> |
| | | | ave 47.83 |

| | | | |
|----|-----|-----|--------------|
| 20 | 0.2 | 100 | 43.34 |
| | | | 42.39 |
| | | | <u>42.43</u> |
| | | | ave 42.79 |

| dP (in Hg) | Pc (in H ₂ O) | V (ml) | t (s) |
|------------|--------------------------|--------|---------------------------------|
| 22 | 0.2 | 100 | 38.87 |
| | | | 39.27 |
| | | | <u>39.26</u> |
| | | | ave ^{TPG 123/93} 39.11 |

| | | | |
|----|-----|-----|--------------|
| 24 | 0.2 | 100 | 35.86 |
| | | | 36.80 |
| | | | <u>35.31</u> |
| | | | ave 35.99 |

| | | | |
|----|-----|-----|--------------|
| 26 | 0.4 | 100 | 32.53 |
| | | | 33.10 |
| | | | <u>32.63</u> |
| | | | ave 32.75 |

| | | | |
|----|-----|-----|--------------|
| 28 | 0.4 | 100 | 30.37 |
| | | | 30.77 |
| | | | <u>30.35</u> |
| | | | ave 30.50 |

| | | | |
|----|-----|-----|--------------|
| 30 | 0.4 | 100 | 28.34 |
| | | | 28.34 |
| | | | <u>28.42</u> |
| | | | ave 28.37 |

| | | | |
|----|-----|-----|--------------|
| 32 | 0.5 | 100 | 26.55 |
| | | | 26.35 |
| | | | <u>26.82</u> |
| | | | ave 26.57 |

| dP (in Hg) | P _e (in H ₂ O) | V (ml) | t (s) |
|------------|--------------------------------------|--------|--------------|
| 34 | 0.5 | 100 | 25.16 |
| | | | 24.86 |
| | | | <u>24.90</u> |
| | | | ave 24.97 |

| | | | |
|----|-----|-----|--------------|
| 36 | 0.5 | 100 | 23.27 |
| | | | 23.40 |
| | | | <u>23.36</u> |
| | | | ave 23.34 |

| | | | |
|----|-----|-----|--------------|
| 38 | 0.6 | 100 | 22.16 |
| | | | 21.84 |
| | | | <u>22.19</u> |
| | | | ave 22.06 |

| | | | |
|----|-----|-----|--------------|
| 40 | 0.6 | 100 | 21.44 |
| | | | 20.98 |
| | | | <u>21.34</u> |
| | | | ave 21.25 |

| | | | |
|----|-----|-----|--------------|
| 42 | 0.7 | 100 | 20.07 |
| | | | 20.40 |
| | | | <u>19.81</u> |
| | | | ave 20.09 |

| | | | |
|----|-----|-----|--------------|
| 44 | 0.7 | 100 | 18.94 |
| | | | 19.24 |
| | | | <u>18.92</u> |
| | | | ave 19.03 |

| dP (in Hg) | P _e (in H ₂ O) | V (ml) | t (s) |
|------------|--------------------------------------|--------|--------------|
| 46 | 0.7 | 100 | 18.15 |
| | | | 18.43 |
| | | | <u>18.39</u> |
| | | | ave 18.32 |

| | | | |
|----|----------------------------|-----|--------------|
| 48 | ^{TP 66/23} 0.7 | 100 | 17.77 |
| | | | 17.53 |
| | | | <u>17.56</u> |
| | | | ave 17.62 |

| | | | |
|----|-----|-----|--------------|
| 50 | 0.8 | 100 | 17.09 |
| | | | 17.09 |
| | | | <u>16.87</u> |
| | | | ave 17.02 |

| | | | |
|---|-----|-----|---------------|
| 6 | 0.0 | 100 | 127.53 |
| | | | 127.52 |
| | | | <u>125.27</u> |
| | | | ave 126.77 |

**Pages 30 and 31 Are Intentionally
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07/01/93

Media: JRT.B2

Diameter: 1.9"

Length:

Weight: 28.299g

| dP (in Hg) | P _e (in H ₂ O) | V (ml) | t (s) |
|------------|--------------------------------------|--------|--------|
| 30 | 0.0 | 10 | 147.57 |
| | | | 148.79 |
| | | | 147.90 |

t_{ave} = 147.89

| | | | |
|----|-----|----|-------------------------|
| 40 | 0.0 | 10 | 108.10 |
| | | | 108.61 |
| | | | 107.79 |
| | | | t _{ave} 108.17 |

| | | | |
|----|-----|----|------------------------|
| 48 | 0.0 | 10 | 88.52 |
| | | | 88.21 |
| | | | 87.75 |
| | | | t _{ave} 88.16 |

| | | | |
|----|-----|----|-------|
| 50 | 0.0 | 10 | 84.75 |
| | | | 85.00 |
| | | | 85.08 |
| | | | 84.94 |

| dP (in Hg) | P _e (in H ₂ O) | V (ml) | t (s) |
|------------|--------------------------------------|--------|------------------------|
| 52 | 0.0 | 10 | 82.38 |
| | | | 81.84 |
| | | | 82.04 |
| | | | t _{ave} 82.09 |

| | | | |
|----|-----|----|------------------------|
| 54 | 0.0 | 10 | 78.09 |
| | | | 78.06 |
| | | | 77.84 |
| | | | t _{ave} 78.00 |

| | | | |
|----|-----|--|------------------------|
| 56 | 0.0 | | 74.31 |
| | | | 74.22 |
| | | | TP 07/01/93 |
| | | | 73.88 |
| | | | t _{ave} 74.14 |

| | | | |
|----|-----|----|------------------------|
| 58 | 0.0 | 10 | 71.58 |
| | | | 71.77 |
| | | | 71.85 |
| | | | t _{ave} 71.73 |

| | | | |
|----|-----|----|-------|
| 60 | 0.0 | 10 | 68.92 |
| | | | 69.20 |
| | | | 67.76 |
| | | | 68.63 |

| | | | |
|----|-----|----|-------|
| 64 | 0.0 | 10 | 66.43 |
| | | | 66.28 |
| | | | 65.95 |
| | | | 66.22 |

| $dP(\text{in Hg})$ | $P_e(\text{in H}_2\text{O})$ | $V(\text{ml})$ | $t(\text{s})$ |
|--------------------|------------------------------|----------------|---------------|
| 66 | 0.0 | 10 | 61.77 |
| | | | 61.14 |
| | | | <u>61.67</u> |
| | | ave | 61.53 |
| 68 | 0.0 | 10 | 59.75 |
| | | | 59.46 |
| | | | <u>59.84</u> |
| | | ave | 59.68 |
| 70 | 0.0 | 10 | 57.50 |
| | | | 57.40 |
| | | | <u>57.12</u> |
| | | ave | 57.34 |
| 72 | 0.0 | 10 | 55.38 |
| | | | 55.69 |
| | | | <u>55.27</u> |
| | | ave | 55.45 |
| 74 | 0.0 | 10 | 53.95 |
| | | | 53.70 |
| | | | <u>53.52</u> |
| | | ave | 53.72 |
| 76 | 0.0 | 10 | 52.41 |
| | | | 51.99 |
| | | | <u>51.77</u> |
| | | ave | 52.06 |

| $dP(\text{in Hg})$ | $P_e(\text{in H}_2\text{O})$ | $V(\text{ml})$ | $t(\text{s})$ |
|---|------------------------------|----------------|--|
| ^{TP07/01/93} 39.78 | 0.0 | 10 | 50.50 |
| | | | 50.11 |
| | | | <u>50.05</u> |
| | | ave | 50.22 |
| 79.6 | 0.0 | 10 | 49.21 |
| | | | ^{TP07/01/93} 24.48.90 |
| | | | <u>48.72</u> |
| | | ave | 48.94 |

**Pages 36 and 37 Are Intentionally
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07/07/93 TP

media: NRG1 Bxy. 1
 Length: .700 cm
 Diameter: 1.9 in
 Pconf: 60 psi

| dP (in Hg) | Pe (in H ₂ O) | V (ml) | t (s) |
|------------|--------------------------|--------|---|
| 2 | atm (0.0) | 10 | TP 07/07/93 61.58 TP 07/07/93 60 |
| | | | 180.13 |
| | | | 177.24 |
| | | | 179.96 |
| | | tave | 179.11 |

| | | | |
|---|-------|------|-------|
| 4 | (0.0) | 10 | 91.12 |
| | | | 91.66 |
| | | | 91.05 |
| | | tave | 91.28 |

| | | | |
|---|-----|------|-------|
| 6 | 0.0 | 10 | 61.58 |
| | | | 60.28 |
| | | | 60.38 |
| | | tave | 60.75 |

| | | | |
|---|-----|------|-------|
| 8 | 0.0 | 10 | 44.85 |
| | | | 44.73 |
| | | | 44.24 |
| | | tave | 44.61 |

| dP (in Hg) | Pe (in H ₂ O) | V (ml) | t (s) |
|------------|--------------------------|--------|--|
| 10 | 0.0 | 10 | 35.20 34.98 34.84 tave = 35.01 |
| 15 | 0.0 | 10 | TP 07/07/93 35.20 TP 07/07/93 32.60 32.40 22.26 tave = 22.42 |
| 20 | 0.0 | 10 | 16.59 16.38 16.38 tave = 16.45 |
| 25 | 0.0 | 100 | 124.02 121.71 125.38 tave: 123.70 |
| 30 | 0.0 | 100 | 99.88 101.81 98.86 tave: 100.18 |

| dP | P _e | V | t |
|---------|-----------------------|------|--------------|
| (in Hg) | (in H ₂ O) | (ml) | (s) |
| 35 | 0.0 | 100 | 84.45 |
| | | | 84.17 |
| | | | <u>84.33</u> |
| | | | ave: 84.32 |

| | | | |
|----|-----|-----|--------------|
| 40 | 0.0 | 100 | 70.89 |
| | | | 71.10 |
| | | | <u>71.04</u> |
| | | | ave 71.01 |

| | | | |
|----|-----|-----|--------------|
| 45 | 0.1 | 100 | 61.23 |
| | | | 61.14 |
| | | | <u>61.91</u> |
| | | | ave 61.43 |

| | | | |
|----|-----|-----|--------------|
| 50 | 0.2 | 100 | 54.00 |
| | | | 54.10 |
| | | | <u>54.16</u> |
| | | | ave 54.09 |

| | | | |
|----|-----|-----|--------------|
| 55 | 0.2 | 100 | 48.77 |
| | | | 48.36 |
| | | | <u>48.32</u> |
| | | | ave 48.48 |

| | | | |
|----|------|-----|--------------|
| 60 | 0.25 | 100 | 43.39 |
| | | | 43.60 |
| | | | <u>43.99</u> |
| | | | ave 43.46 |

| dP | P _e | V | t |
|---------|-----------------------|------|--------------|
| (in Hg) | (in H ₂ O) | (ml) | (s) |
| 65 | 0.3 | 100 | 38.77 |
| | | | 38.50 |
| | | | <u>39.32</u> |
| | | | ave 38.84 |

| | | | |
|----|-----|-----|--------------|
| 70 | 0.3 | 100 | 35.18 |
| | | | 35.48 |
| | | | <u>35.15</u> |
| | | | ave 35.21 |

| | | | |
|----|------|-----|--------------|
| 75 | 0.45 | 100 | 31.87 |
| | | | 32.45 |
| | | | <u>31.22</u> |
| | | | ave 31.85 |

| | | | |
|----|------|-----|--------------|
| 80 | 0.45 | 100 | 29.07 |
| | | | 29.39 |
| | | | <u>29.34</u> |
| | | | ave 29.27 |

SAMPLE: NRG1.BXY.1
 DIAMETER: 5.01 cm
 LENGTH: 0.70 cm

| dP (in Hg) | Pe (in H2O) | $2/(P_i+P_e)$ | Pa ⁻¹ | Vol (ml) | Time (s) | Q (ml/s) | k (m ⁻²) |
|------------|-------------|---------------|------------------|----------|----------|----------|----------------------|
| 2 | 0.00 | | 9.55E-06 | 10 | 179.11 | 0.056 | 4.99E-16 |
| 4 | 0.00 | | 9.25E-06 | 10 | 91.28 | 0.110 | 4.74E-16 |
| 6 | 0.00 | | 8.97E-06 | 10 | 60.75 | 0.165 | 4.60E-16 |
| 8 | 0.00 | | 8.70E-06 | 10 | 44.61 | 0.224 | 4.56E-16 |
| 10 | 0.00 | | 8.45E-06 | 10 | 35.01 | 0.286 | 4.52E-16 |
| 15 | 0.00 | | 7.89E-06 | 10 | 22.42 | 0.446 | 4.39E-16 |
| 20 | 0.00 | | 7.40E-06 | 10 | 16.45 | 0.608 | 4.21E-16 |
| 25 | 0.00 | | 6.96E-06 | 100 | 123.7 | 0.808 | 4.21E-16 |
| 30 | 0.00 | | 6.57E-06 | 100 | 100.18 | 0.998 | 4.09E-16 |
| 35 | 0.00 | | 6.23E-06 | 100 | 84.32 | 1.186 | 3.95E-16 |
| 40 | 0.00 | | 5.91E-06 | 100 | 71.01 | 1.408 | 3.90E-16 |
| 45 | 0.10 | | 5.63E-06 | 100 | 61.43 | 1.628 | 3.81E-16 |
| 50 | 0.20 | | 5.37E-06 | 100 | 54.09 | 1.849 | 3.72E-16 |
| 55 | 0.20 | | 5.14E-06 | 100 | 48.48 | 2.063 | 3.61E-16 |
| 60 | 0.25 | | 4.93E-06 | 100 | 43.66 | 2.290 | 3.52E-16 |
| 65 | 0.30 | | 4.73E-06 | 100 | 38.86 | 2.573 | 3.50E-16 |
| 70 | 0.30 | | 4.55E-06 | 100 | 35.27 | 2.835 | 3.45E-16 |
| 75 | 0.45 | | 4.38E-06 | 100 | 31.85 | 3.140 | 3.43E-16 |
| 80 | 0.45 | | 4.22E-06 | 100 | 29.27 | 3.416 | 3.38E-16 |

07/08/93 TP

Media = NR61.BZ.1

Length = 7.5cm

Diameter = 5.01cm

Weight = 26.864g

| ΔP (in Hg) | P_c (in H ₂ O) | V (ml) | t (s) |
|-----------------------|--------------------------------|-------------|---------------|
| 2 | 0.0 | 10 | 193.69 |
| | | | 195.99 |
| | | | <u>197.24</u> |
| | | | tave = 195.64 |
| 4 | 0.0 | 10 | 97.59 |
| | | | 98.12 |
| | | | <u>98.34</u> |
| | | | tave = 98.02 |
| 6 | 0.0 | 10 | 64.34 |
| | | | 63.87 |
| | | | <u>63.79</u> |
| | | | tave = 64.0 |

| | | | |
|---|-----|----|--------------|
| 8 | 0.0 | 10 | 47.66 |
| | | | 47.97 |
| | | | <u>47.84</u> |
| | | | 47.82 |

| ΔP (in Hg) | P_c (in H ₂ O) | V (ml) | t (s) |
|-----------------------|--------------------------------|---------------|------------------------|
| 10 | 0.0 | 10 | 24.38 |
| | | | TP 07/08/93 |
| | | | TP 07/08/93 |
| | | | 24.56 |
| | | | TP 07/08/93 |
| | | | 24.45 |
| 10 | 0.0 | 10 | 37.34 |
| | | | 37.87 |
| | | | <u>37.48</u> |
| | | | tave = 37.56 |

| | | | |
|----------------|-----|----|--------------|
| 15 TP 07/08/93 | | | |
| 12 | 0.0 | 10 | 24.38 |
| | | | 24.56 |
| | | | <u>24.45</u> |
| | | | tave = 24.46 |

| | | | |
|----|-----|----|--------------|
| 20 | 0.0 | 10 | 17.99 |
| | | | 18.10 |
| | | | <u>18.03</u> |
| | | | tave = 18.04 |

Increase Volume

| | | | |
|----|-----|-----|---------------|
| 20 | 0.0 | 100 | 177.10 |
| | | | 176.85 |
| | | | <u>173.59</u> |
| | | | tave = 176.85 |

| | | | |
|----|-----|-----|---------------|
| 25 | 0.0 | 100 | 134.84 |
| | | | 135.50 |
| | | | <u>135.64</u> |
| | | | 135.33 |

07/08/93 TP

| ΔP (in Hg) | P_e (in H ₂ O) | V (ml) | t (s) |
|-----------------------|--------------------------------|-------------|---------------|
| 30 | 0.0 | 100 | 109.38 |
| | | | 110.99 |
| | | | <u>111.24</u> |
| | | tave | 110.54 |
| 35 | 0.0 | 100 | 94.12 |
| | | | 94.13 |
| | | | <u>94.46</u> |
| | | tave | 94.24 |
| 40 | 0.0 | 100 | 80.73 |
| | | | 79.77 |
| | | | <u>79.91</u> |
| | | tave | 80.14 |
| 45 | 0.1 | 100 | 70.75 |
| | | | 69.86 |
| | | | <u>69.93</u> |
| | | tave | 70.18 |
| 50 | 0.1 | 100 | 60.48 |
| | | | 61.56 |
| | | | <u>61.38</u> |
| | | tave | 61.14 |
| 55 | 0.1 | 100 | 55.45 |
| | | | 54.29 |
| | | | <u>53.95</u> |
| | | tave | 54.56 |

| ΔP (in Hg) | P_e (in H ₂ O) | V (ml) | t (s) |
|-----------------------|--------------------------------|-------------|--------------|
| 60 | 0.2 | 100 | 48.74 |
| | | | 48.52 |
| | | | <u>48.63</u> |
| | | tave | 48.63 |
| 65 | 0.2 | 100 | 44.20 |
| | | | 44.84 |
| | | | <u>43.93</u> |
| | | tave | 44.32 |
| 70 | 0.25 | 100 | 39.88 |
| | | | 39.99 |
| | | | <u>40.17</u> |
| | | tave | 40.01 |
| 75 | 0.3 | 100 | 37.59 |
| | | | 36.78 |
| | | | <u>36.50</u> |
| | | | 36.95 |
| 80 | 0.3 | 100 | 33.69 |
| | | | 33.87 |
| | | | <u>33.88</u> |
| | | | 33.81 |

MEDIA: NFG1.BZ1

LENGTH (m) 0.0075

DIAMETER (m) 0.0501

u (Ns/m²) 1.79E-05

RECORDED DATA

| | | | | | | | |
|-------------|--------|-------|-------|-------|-------|-------|-------|
| Volume (ml) | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| t (sec) | 195.64 | 98.02 | 64.00 | 47.82 | 37.56 | 24.46 | 18.04 |
| dp (in Hg) | 2.00 | 4.00 | 6.00 | 8.00 | 10.00 | 15.00 | 20.00 |
| Pe (in H2O) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

CALCULATIONS

| | | | | | | | |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Volume (m ³) | 1E-05 | 1E-05 | 1E-05 | 1E-05 | 1E-05 | 1E-05 | 1E-05 |
| t (sec) | 195.64 | 98.02 | 64.00 | 47.82 | 37.56 | 24.46 | 18.04 |
| dp (Pa) | 6772.78 | 13545.55 | 20318.33 | 27091.11 | 33863.88 | 50795.82 | 67727.76 |
| Pe (Pa) | 101325.00 | 101325.00 | 101325.00 | 101325.00 | 101325.00 | 101325.00 | 101325.00 |
| Pl (Pa) | 108087.78 | 114870.55 | 121643.33 | 128416.11 | 135188.88 | 152120.82 | 169052.76 |
| Q (ml/s) | 0.05111 | 0.10202 | 0.15625 | 0.20912 | 0.26624 | 0.40883 | 0.55432 |
| 2/(Pl+Pe) (1/KPa) | 0.00935 | 0.00925 | 0.00897 | 0.00871 | 0.00846 | 0.00789 | 0.00740 |
| K(m ⁻²) | 4.880E-16 | 4.727E-16 | 4.690E-16 | 4.559E-16 | 4.511E-16 | 4.309E-16 | 4.105E-16 |

RECORDED DATA

| | | | | | | | | | | | |
|-------------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| Volume (ml) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| t (sec) | 178.85 | 135.33 | 110.54 | 94.54 | 80.14 | 70.18 | 61.14 | 54.56 | 48.63 | 44.32 | 40.01 |
| dp (in Hg) | 20.00 | 25.00 | 30.00 | 35.00 | 40.00 | 45.00 | 50.00 | 55 | 60 | 65 | 70 |
| Pe (in H2O) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.10 | 0.1 | 0.2 | 0.2 | 0.25 |

CALCULATIONS

| | | | | | | | | | | | |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Volume (m ³) | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| t (sec) | 178.85 | 135.33 | 110.54 | 94.54 | 80.14 | 70.18 | 61.14 | 54.56 | 48.63 | 44.32 | 40.01 |
| dp (Pa) | 67727.76 | 84659.70 | 101591.64 | 118523.59 | 135455.53 | 152397.47 | 169319.41 | 186251.35 | 203183.29 | 220115.23 | 237047.17 |
| Pe (Pa) | 101325.00 | 101325.00 | 101325.00 | 101325.00 | 101325.00 | 101349.88 | 101349.88 | 101349.88 | 101374.77 | 101374.77 | 101399.65 |
| Pl (Pa) | 169052.76 | 185994.70 | 202916.64 | 219849.59 | 236780.53 | 253737.55 | 270669.28 | 287601.23 | 304558.06 | 321490.00 | 338434.38 |
| Q (ml/s) | 5.655E-01 | 7.388E-01 | 9.046E-01 | 1.058E+00 | 1.248E+00 | 1.425E+00 | 1.595E+00 | 1.763E+00 | 1.927E+00 | 2.096E+00 | 2.259E+00 |
| 2/(Pl+Pe) (1/KPa) | 7.397E-03 | 6.981E-03 | 6.574E-03 | 6.227E-03 | 5.915E-03 | 5.632E-03 | 5.376E-03 | 5.142E-03 | 4.927E-03 | 4.730E-03 | 4.547E-03 |
| K(m ⁻²) | 4.190E-16 | 4.122E-16 | 3.972E-16 | 3.770E-16 | 3.667E-16 | 3.574E-16 | 3.524E-16 | 3.434E-16 | 3.389E-16 | 3.291E-16 | 3.255E-16 |

07/09/93 TP

Media: NRG2.BYX.1

Length: 0.63 cm

Diameter 5.01 cm

| ΔP | P_e | V | t |
|------------|-----------------------|------|---------------|
| (in Hg) | (in H ₂ O) | (ml) | (s) |
| 2 | 0.0 | 10 | 333.09 |
| | | | 329.27 |
| | | | <u>330.60</u> |
| | | | tave = 330.99 |

| | | | |
|---|-----|----|---------------|
| 4 | 0.0 | 10 | 166.36 |
| | | | 166.22 |
| | | | <u>165.50</u> |
| | | | tave 166.03 |

| | | | |
|---|-----|----|---------------|
| 6 | 0.0 | 10 | 108.49 |
| | | | 108.55 |
| | | | <u>108.56</u> |
| | | | 108.53 |

| | | | |
|---|-----|----|--------------|
| 8 | 0.0 | 10 | 80.40 |
| | | | 80.26 |
| | | | <u>80.37</u> |
| | | | tave 80.34 |

| | | | |
|----|-----|----|----------------------|
| 10 | 0.0 | 10 | 07/09/93 TP 63.52 |
| | | | <u>63.72</u> |
| | | | 63.99 |
| | | | <u>63.66</u> |
| | | | tave 63.72 |

TP 07/09/93

| ΔP | P_e | V | t |
|------------|-----------------------|------|--------------|
| (in Hg) | (in H ₂ O) | (ml) | (s) |
| 15 | 0.0 | 10 | 41.37 |
| | | | 41.28 |
| | | | <u>41.44</u> |
| | | | tave 41.36 |

| | | | |
|----|-----|----|--------------|
| 20 | 0.0 | 10 | 30.03 |
| | | | 29.92 |
| | | | <u>30.33</u> |
| | | | tave 30.09 |

| | | | |
|----|-----|----|--------------|
| 25 | 0.0 | 10 | 23.53 |
| | | | 23.61 |
| | | | <u>23.42</u> |
| | | | tave 23.52 |

| | | | |
|----|-----|----|--------------|
| 30 | 0.0 | 10 | 19.18 |
| | | | 19.07 |
| | | | <u>19.02</u> |
| | | | tave 19.09 |

Increase volume to 100 ml

| | | | |
|----|-----|-----|---------------|
| 30 | 0.0 | 100 | 182.21 |
| | | | 184.88 |
| | | | <u>183.94</u> |
| | | | tave 183.68 |

| | | | |
|----|-----|-----|------------------------------------|
| 35 | 0.0 | 100 | TP 07/09/93 14 <u>155.62</u> |
| | | | 157.59 |
| | | | <u>153.52</u> |
| | | | 155.62 |

TP 07/09/93

| ΔP | P_e | V | t |
|------------|-----------------------|------|---------------|
| (in Hg) | (in H ₂ O) | (ml) | (s) |
| 40 | 0.0 | 100 | 132.06 |
| | | | 132.83 |
| | | | <u>132.08</u> |
| | | | ave 132.32 |

| | | | |
|----|-----|-----|---------------|
| 45 | 0.0 | 100 | 116.27 |
| | | | 116.13 |
| | | | <u>116.48</u> |
| | | | ave 116.29 |

| | | | |
|----|-----|-----|---------------|
| 50 | 0.0 | 100 | 102.22 |
| | | | 102.86 |
| | | | <u>103.26</u> |
| | | | ave 102.78 |

| | | | |
|----|-----|-----|--------------|
| 55 | 0.0 | 100 | 91.34 |
| | | | 90.02 |
| | | | <u>89.35</u> |
| | | | ave 90.24 |

| | | | |
|----|-----|-----|--------------|
| 60 | 0.0 | 100 | 81.12 |
| | | | 81.13 |
| | | | <u>82.01</u> |
| | | | ave 81.42 |

| | | | |
|----|-----|-----|--------------|
| 65 | 0.0 | 100 | 73.16 |
| | | | 73.49 |
| | | | <u>73.32</u> |
| | | | ave 73.32 |

TP 07/09/93

| ΔP | P_e | V | t |
|------------|-----------------------|------|--------------|
| (in Hg) | (in H ₂ O) | (ml) | (s) |
| 70 | 0.1 | 100 | 66.74 |
| | | | 66.88 |
| | | | <u>65.88</u> |
| | | | ave 66.50 |

| | | | |
|----|-----|-----|--------------|
| 75 | 0.1 | 100 | 60.28 |
| | | | 60.99 |
| | | | <u>60.68</u> |
| | | | ave 60.65 |

| | | | |
|----|------|-----|--------------|
| 80 | 0.15 | 100 | 54.76 |
| | | | 55.00 |
| | | | <u>54.88</u> |
| | | | ave 54.88 |

SAMPLE: NRG2BYX1
 DIAMETER: 5.01 cm
 LENGTH: 0.63 cm

| dP (in Hg) | Pe (in H ₂ O) | $2/(P_i + P_e)$ | Pa ⁻¹ | Vol (ml) | Time (s) | Q (ml/s) | k (m ⁻²) |
|------------|--------------------------|-----------------|------------------|----------|----------|----------|----------------------|
| 2 | 0.00 | | 9.55E-06 | 10 | 330.99 | 0.03 | 2.43E-16 |
| 4 | 0.00 | | 9.25E-06 | 10 | 166.03 | 0.06 | 2.34E-16 |
| 6 | 0.00 | | 8.97E-06 | 10 | 108.53 | 0.09 | 2.32E-16 |
| 8 | 0.00 | | 8.70E-06 | 10 | 80.34 | 0.12 | 2.28E-16 |
| 10 | 0.00 | | 8.45E-06 | 10 | 63.72 | 0.16 | 2.23E-16 |
| 15 | 0.00 | | 7.89E-06 | 10 | 41.36 | 0.24 | 2.14E-16 |
| 20 | 0.00 | | 7.40E-06 | 10 | 30.09 | 0.33 | 2.07E-16 |
| 25 | 0.00 | | 6.96E-06 | 10 | 23.52 | 0.43 | 1.99E-16 |
| 30 | 0.00 | | 6.57E-06 | 10 | 19.09 | 0.52 | 1.93E-16 |
| 30 | 0.00 | | 6.57E-06 | 100 | 183.68 | 0.54 | 2.01E-16 |
| 35 | 0.00 | | 6.23E-06 | 100 | 155.62 | 0.64 | 1.92E-16 |
| 40 | 0.00 | | 5.91E-06 | 100 | 132.32 | 0.76 | 1.88E-16 |
| 45 | 0.00 | | 5.63E-06 | 100 | 116.29 | 0.86 | 1.81E-16 |
| 50 | 0.00 | | 5.38E-06 | 100 | 102.78 | 0.97 | 1.76E-16 |
| 55 | 0.00 | | 5.14E-06 | 100 | 90.24 | 1.11 | 1.74E-16 |
| 60 | 0.00 | | 4.93E-06 | 100 | 81.42 | 1.23 | 1.70E-16 |
| 65 | 0.00 | | 4.73E-06 | 100 | 73.32 | 1.36 | 1.67E-16 |
| 70 | 0.10 | | 4.55E-06 | 100 | 66.50 | 1.50 | 1.65E-16 |
| 75 | 0.10 | | 4.38E-06 | 100 | 60.65 | 1.65 | 1.62E-16 |
| 80 | 0.15 | | 4.22E-06 | 100 | 54.88 | 1.82 | 1.62E-16 |

07/12/93 TP

Media: NRG2.BZ.1

Length: 0.6 cm

Diameter: 5.01 cm

Confining Pressure: 62 psi

| ΔP | P_e | V | t |
|------------|-----------------------|------|---------------|
| (in Hg) | (in H ₂ O) | (ml) | (s) |
| 2 | 0.0 | 10 | 104.41 |
| | | | 104.34 |
| | | | <u>104.30</u> |
| | | | tave 104.35 |

| | | | |
|---|-----|----|--------------|
| 4 | 0.0 | 10 | 51.0 |
| | | | 51.07 |
| | | | <u>51.22</u> |
| | | | tave 51.10 |

| | | | |
|---|-----|----|--------------|
| 6 | 0.0 | 10 | 32.71 |
| | | | 32.88 |
| | | | <u>32.58</u> |
| | | | tave 32.72 |

| | | | |
|-----------------|-----|----|--------------|
| 8 10 | 0.0 | 10 | 19.22 |
| | | | 19.25 |
| | | | <u>19.27</u> |
| | | | tave 19.25 |

| | | | |
|-----------------|-----|----|--------------|
| 10 8 | 0.0 | 10 | 24.39 |
| | | | 24.45 |
| | | | <u>24.48</u> |
| | | | tave 24.44 |

TP 07/12/93
TP 07/12/93

| ΔP | P_e | V | t |
|-------------------------|-----------------------|------|---------------|
| (in Hg) | (in H ₂ O) | (ml) | (s) |
| 12 | 0.0 | 10 | 15.65 |
| | | | 15.58 |
| | | | <u>15.66</u> |
| | | | tave 15.63 |
| change volume to 100 ml | | | |
| 12 | 0.0 | 100 | 155.22 |
| | | | 155.30 |
| | | | <u>154.46</u> |
| | | | tave 154.99 |
| 15 | 0.0 | 100 | 116.72 |
| | | | 116.24 |
| | | | <u>115.62</u> |
| | | | tave 116.19 |
| 20 | 0.0 | 100 | 81.32 |
| | | | <u>82.59</u> |
| | | | <u>82.59</u> |
| | | | tave 82.17 |
| 25 | 0.1 | 100 | 63.27 |
| | | | 62.94 |
| | | | <u>64.71</u> |
| | | | tave 63.64 |
| 30 | 0.2 | 100 | 48.15 |
| | | | 48.31 |
| | | | <u>48.39</u> |
| | | | 48.28 |

TP 07/12/93

| ΔP | P_c | V | t |
|------------|-----------------------|------|--------------|
| (in Hg) | (in H ₂ O) | (ml) | (s) |
| 35 | 0.2 | 100 | 41.01 |
| | | | 41.09 |
| | | | <u>41.19</u> |
| | | ave | 41.10 |

| | | | |
|----|-----|-----|--------------|
| 40 | 0.3 | 100 | 34.16 |
| | | | 34.48 |
| | | | <u>34.41</u> |
| | | | 34.35 |

| | | | |
|----|-----|-----|--------------|
| 45 | 0.4 | 100 | 29.58 |
| | | | 29.51 |
| | | | <u>29.52</u> |
| | | | 29.54 |

| | | | |
|----|-----|-----|--------------|
| 50 | 0.5 | 100 | 25.18 |
| | | | 25.38 |
| | | | <u>24.87</u> |
| | | | 25.14 |

| | | | |
|----|-----|-----|--------------|
| 55 | 0.6 | 100 | 21.91 |
| | | | 21.95 |
| | | | <u>21.76</u> |
| | | | 21.87 |

| | | | |
|----|------|-----|--------------|
| 60 | 0.70 | 100 | 19.2 |
| | | | 19.35 |
| | | | <u>18.91</u> |
| | | | 19.15 |

07/12/93 TP

| ΔP | P_c | V | t |
|------------|-----------------------|------|--------------|
| (in Hg) | (in H ₂ O) | (ml) | (s) |
| 65 | 6.80 | 100 | 16.26 |
| | | | 17.02 |
| | | | <u>16.74</u> |
| | | | 16.67 |

| | | | |
|----|-----|-----|--------------|
| 70 | 1.0 | 100 | 14.90 |
| | | | 14.97 |
| | | | <u>15.12</u> |
| | | | 15.00 |

| | | | |
|----|-----|-----|--------------|
| 75 | 1.2 | 100 | 12.99 |
| | | | 13.33 |
| | | | <u>13.10</u> |
| | | | 13.14 |

| | | | |
|---|-----|-----|--------------|
| 8 | 1.4 | 100 | 11.55 |
| | | | 11.81 |
| | | | <u>11.79</u> |
| | | | 11.72 |

| SAMPLE: NRG2.BZ.1 | | | | | | |
|-------------------|------------|-----------|----------|----------|----------|---------------------|
| DIAMETER: 5.01 cm | | | | | | |
| LENGTH: 0.60 cm | | | | | | |
| dP (in Hg) | Pe (in H2) | 2/(Pi+Pe) | Vol (ml) | Time (s) | Q (ml/s) | k (m ²) |
| 2 | 0.00 | 9.55E-06 | 10 | 104.35 | 0.10 | 7.33E-16 |
| 4 | 0.00 | 9.25E-06 | 10 | 51.10 | 0.20 | 7.25E-16 |
| 6 | 0.00 | 8.97E-06 | 10 | 32.72 | 0.31 | 7.32E-16 |
| 10 | 0.00 | 8.45E-06 | 10 | 19.25 | 0.52 | 7.04E-16 |
| 8 | 0.00 | 8.70E-06 | 10 | 24.44 | 0.41 | 7.14E-16 |
| 12 | 0.00 | 8.22E-06 | 10 | 15.63 | 0.64 | 7.03E-16 |
| 12 | 0.00 | 8.22E-06 | 100 | 154.99 | 0.65 | 7.09E-16 |
| 15 | 0.00 | 7.89E-06 | 100 | 116.19 | 0.86 | 7.26E-16 |
| 20 | 0.00 | 7.40E-06 | 100 | 82.17 | 1.22 | 7.22E-16 |
| 25 | 0.10 | 6.96E-06 | 100 | 63.64 | 1.57 | 7.01E-16 |
| 30 | 0.20 | 6.57E-06 | 100 | 48.28 | 2.07 | 7.28E-16 |
| 35 | 0.20 | 6.22E-06 | 100 | 41.10 | 2.43 | 6.94E-16 |
| 40 | 0.30 | 5.91E-06 | 100 | 34.35 | 2.91 | 6.90E-16 |
| 45 | 0.40 | 5.63E-06 | 100 | 29.54 | 3.39 | 6.80E-16 |
| 50 | 0.50 | 5.37E-06 | 100 | 25.14 | 3.98 | 6.86E-16 |
| 55 | 0.60 | 5.14E-06 | 100 | 21.87 | 4.57 | 6.86E-16 |
| 60 | 0.70 | 4.92E-06 | 100 | 19.15 | 5.22 | 6.88E-16 |
| 65 | 0.80 | 4.73E-06 | 100 | 16.67 | 6.00 | 7.01E-16 |
| 70 | 1.00 | 4.54E-06 | 100 | 15.00 | 6.67 | 6.95E-16 |
| 75 | 1.20 | 4.37E-06 | 100 | 13.14 | 7.61 | 7.14E-16 |
| 80 | 1.40 | 4.22E-06 | 100 | 11.72 | 8.53 | 7.24E-16 |

TP 07/13/93

Media: NRG2 BXY.2

Length: .64 cm

Diameter: .0501 m

| ΔP (in Hg) | P_c (in H ₂ O) | V (ml) | t (s) |
|-----------------------|--------------------------------|-------------|---------------|
| 4 | 0.0 | 10 | 189.82 |
| | | | 189.87 |
| | | | <u>188.09</u> |
| | | | ave 189.26 |
| 6 | 0.0 | 10 | 121.74 |
| | | | 122.06 |
| | | | <u>122.21</u> |
| | | | ave 122.00 |
| 8 | 0.0 | 10 | 93.98 |
| | | | 92.56 |
| | | | <u>91.95</u> |
| | | | ave 92.83 |
| 10 | 0.0 | 10 | 72.58 |
| | | | 72.49 |
| | | | <u>72.85</u> |
| | | | ave 72.64 |
| 12 | 0.0 | 10 | 59.70 |
| | | | 59.66 |
| | | | <u>59.05</u> |
| | | | ave 59.47 |

TP 07/13/93

| ΔP (in Hg) | P_c (in H ₂ O) | V (ml) | t (s) |
|-----------------------|--------------------------------|-------------|---------------|
| 15 | 0.0 | 10 | 47.02 |
| | | | 46.63 |
| | | | <u>46.27</u> |
| | | | ave 46.64 |
| 20 | 0.0 | 10 | 34.43 |
| | | | 34.30 |
| | | | <u>34.31</u> |
| | | | ave 34.35 |
| 25 | 0.0 | 10 | 26.75 |
| | | | 26.84 |
| | | | <u>26.89</u> |
| | | | ave 26.83 |
| 30 | 0.0 | 10 | 21.83 |
| | | | 21.73 |
| | | | <u>21.74</u> |
| | | | ave 21.77 |
| Increase Volume | | | |
| 30 | 0.0 | 100 | 210.55 |
| | | | 208.89 |
| | | | <u>212.06</u> |
| | | | ave 210.50 |
| 35 | 0.0 | 100 | 178.46 |
| | | | 176.50 |
| | | | <u>177.95</u> |
| | | | ave 177.64 |

4D 07/13/93

| ΔP (in Hg) | P_e (in H ₂ O) | V (ml) | t (s) |
|-----------------------|--------------------------------|-------------|---------------|
| 40 | 0.0 | 100 | 150.74 |
| | | | 152.74 |
| | | | <u>152.63</u> |
| | | | ave 152.64 |

| | | | |
|----|-----|-----|---------------|
| 45 | 0.0 | 100 | 132.51 |
| | | | 134.56 |
| | | | <u>134.27</u> |
| | | | ave 133.78 |

| | | | |
|----|-----|-----|---------------|
| 50 | 0.0 | 100 | 117.58 |
| | | | 118.59 |
| | | | <u>117.96</u> |
| | | | ave 118.04 |

| | | | |
|----|-----|-----|---------------|
| 55 | 0.0 | 100 | 105.53 |
| | | | 103.13 |
| | | | <u>104.00</u> |
| | | | ave 104.22 |

| | | | |
|----|-----|-----|--------------|
| 60 | 0.0 | 100 | 93.66 |
| | | | 93.91 |
| | | | <u>92.52</u> |
| | | | ave 93.36 |

| | | | |
|----|-----|-----|--------------|
| 65 | 0.0 | 100 | 84.59 |
| | | | 83.95 |
| | | | <u>85.02</u> |
| | | | ave 84.52 |

TP 07/13/93

| ΔP (in Hg) | P_e (in H ₂ O) | V (ml) | t (s) |
|-----------------------|--------------------------------|-------------|--------------|
| 70 | 0.1 | 100 | 77.92 |
| | | | 76.64 |
| | | | <u>77.71</u> |
| | | | ave 77.43 |

| | | | |
|----|-----|-----|--------------|
| 75 | 0.1 | 100 | 70.43 |
| | | | 69.79 |
| | | | <u>70.45</u> |
| | | | ave 70.22 |

| | | | |
|----|-----|-----|--------------|
| 80 | 0.1 | 100 | 63.63 |
| | | | 62.42 |
| | | | <u>64.28</u> |
| | | | 63.44 |

SAMPLE: NRG2BXY2

DIAMETER: 5.01 cm

LENGTH: 0.64 cm

| dP (in Hg) | Pe (in H2) | 2/(Pi+Pe) | Vol (ml) | Time (s) | Q (ml/s) | k (m ²) |
|------------|------------|-----------|----------|----------|----------|---------------------|
| 4 | 0.00 | 9.25E-06 | 10 | 189.26 | 0.05 | 2.09E-16 |
| 6 | 0.00 | 8.97E-06 | 10 | 122.00 | 0.08 | 2.10E-16 |
| 8 | 0.00 | 8.70E-06 | 10 | 92.83 | 0.11 | 2.00E-16 |
| 10 | 0.00 | 8.45E-06 | 10 | 72.64 | 0.14 | 1.99E-16 |
| 12 | 0.00 | 8.22E-06 | 10 | 59.47 | 0.17 | 1.97E-16 |
| 15 | 0.00 | 7.89E-06 | 10 | 46.64 | 0.21 | 1.93E-16 |
| 20 | 0.00 | 7.40E-06 | 10 | 34.35 | 0.29 | 1.84E-16 |
| 25 | 0.00 | 6.96E-06 | 10 | 26.83 | 0.37 | 1.77E-16 |
| 30 | 0.00 | 6.57E-06 | 10 | 21.77 | 0.46 | 1.72E-16 |
| 30 | 0.00 | 6.57E-06 | 100 | 210.50 | 0.48 | 1.78E-16 |
| 35 | 0.00 | 6.23E-06 | 100 | 177.64 | 0.56 | 1.71E-16 |
| 40 | 0.00 | 5.91E-06 | 100 | 152.04 | 0.66 | 1.66E-16 |
| 45 | 0.00 | 5.63E-06 | 100 | 133.78 | 0.75 | 1.60E-16 |
| 50 | 0.00 | 5.38E-06 | 100 | 118.04 | 0.85 | 1.56E-16 |
| 55 | 0.00 | 5.14E-06 | 100 | 104.22 | 0.96 | 1.53E-16 |
| 60 | 0.00 | 4.93E-06 | 100 | 93.36 | 1.07 | 1.50E-16 |
| 65 | 0.00 | 4.73E-06 | 100 | 84.52 | 1.18 | 1.47E-16 |
| 70 | 0.10 | 4.55E-06 | 100 | 77.43 | 1.29 | 1.44E-16 |
| 75 | 0.10 | 4.38E-06 | 100 | 70.22 | 1.42 | 1.42E-16 |
| 80 | 0.10 | 4.22E-06 | 100 | 63.44 | 1.58 | 1.42E-16 |

07/13/93 TP

Media: NRG2.BXY.2

Length: 0.64 cm

Diameter: .0501 m

The soap bubble meter is replaced
with ADM 1000 Intelligent Flowmeter.

| ΔP | P_e | $Q (ml/min)$ |
|------------|----------------------------------|--------------|
| 2.0 | 0.0 | 1.23 |
| 4.0 | 0.0 | 2.69 |
| 6.0 | 0.0 | 4.13 |
| 8.0 | 0.0 | 5.68 |
| 10.0 | 0.0 | 7.23 |
| 12.0 | 0.0 | 8.80 |
| 15.0 | 0.0 | 11.2 |
| 20.0 | 0.0 | 15.7 |
| 25.0 | 0.0 | 20.2 |
| 30.0 | 0.0 | 24.8 |
| 35.0 | 0.0 | 29.9 |
| 40.0 | 0.0 | 35.1 |
| 45.0 | 0.0 | 40.5 |
| 50.0 | 0.0 | 46.1 |
| 55.0 | 0.10 | 51.9 |
| 60.0 | 0.15 | 58.3 |
| 65.0 | 0.15 TP 07/13 0.20 | 64.9 |
| 70.0 | 0.20 TP 07/13 0.25 | 71.6 |
| 75.0 | 0.25 | 79.4 |
| 80.0 | 0.30 | 86.8 |

SAMPLE: NRG2.BXY.2

DIAMETER: 5.01 cm

LENGTH: 0.60 cm

| dP (in Hg) | P_e (in H ₂) | $2/(P_i + P_e) Pa^{-1}$ | Q (ml/min) | Q (ml/s) | k (m ²) |
|------------|----------------------------|-------------------------|------------|----------|---------------------|
| 2 | 0.00 | 9.55E-06 | 1.23 | 0.02 | 3.46E-16 |
| 4 | 0.00 | 9.25E-06 | 2.69 | 0.04 | 3.78E-16 |
| 6 | 0.00 | 8.97E-06 | 4.13 | 0.07 | 3.87E-16 |
| 8 | 0.00 | 8.70E-06 | 5.68 | 0.09 | 3.99E-16 |
| 10 | 0.00 | 8.45E-06 | 7.23 | 0.12 | 4.07E-16 |
| 12 | 0.00 | 8.22E-06 | 8.8 | 0.15 | 4.12E-16 |
| 15 | 0.00 | 7.89E-06 | 11.2 | 0.19 | 4.20E-16 |
| 20 | 0.00 | 7.40E-06 | 15.7 | 0.26 | 4.42E-16 |
| 25 | 0.00 | 6.96E-06 | 20.2 | 0.34 | 4.54E-16 |
| 30 | 0.00 | 6.57E-06 | 24.8 | 0.41 | 4.65E-16 |
| 35 | 0.00 | 6.23E-06 | 29.9 | 0.50 | 4.81E-16 |
| 40 | 0.00 | 5.91E-06 | 35.1 | 0.59 | 4.94E-16 |
| 45 | 0.00 | 5.63E-06 | 40.5 | 0.68 | 5.06E-16 |
| 50 | 0.00 | 5.38E-06 | 46.1 | 0.77 | 5.19E-16 |
| 55 | 0.10 | 5.14E-06 | 51.9 | 0.87 | 5.31E-16 |
| 60 | 0.15 | 4.93E-06 | 58.3 | 0.97 | 5.47E-16 |
| 65 | 0.15 | 4.73E-06 | 64.9 | 1.08 | 5.62E-16 |
| 70 | 0.20 | 4.55E-06 | 71.6 | 1.19 | 5.75E-16 |
| 75 | 0.25 | 4.38E-06 | 79.4 | 1.32 | 5.95E-16 |
| 80 | 0.30 | 4.22E-06 | 86.8 | 1.45 | 6.10E-16 |

07/15/93 TP

Media: NRG2 BZ2

Length: 0.60cm

 ΔP (in Hg) P_e (in H₂O) Q (mL/min)

| | | |
|----|-----------------------|------------|
| 2 | — | 3.79 |
| 4 | — | 8.05 |
| 6 | — | 12.4 |
| 8 | — | 17.2 |
| 10 | — | not stable |
| 12 | 0.05 | 22.3 |
| 15 | 0.05 | 38.0 |
| 20 | 0.10 | 55.7 |
| 25 | 0.20 | 77.3 |
| 30 | 0.25 | 102 |
| 35 | 0.30 | 131 |
| 40 | 0.7 | 166 |
| 45 | 0.9 | 210 |
| 50 | 1.2 | 256 |
| 55 | 1.7 | 319 |
| 60 | 2.1 | 374 |
| 65 | 2.8 ^{not/15} | 449 |
| 70 | 3.5 | 522 |
| 75 | 4.5 | 615 |
| 80 | 5.5 | Overflow |

SAMPLE: NRG2.BZ.2

DIAMETER: 5.01 cm

LENGTH: 0.64 cm

| dP (in Hg) | Pe (in H2O) | 2/(Pi+Pe) Pa ⁻¹ | Q (ml/min) | Q (ml/s) | k (m ⁻²) |
|------------|-------------|----------------------------|------------|----------|----------------------|
| 2 | 0.00 | 9.55E-06 | 3.79 | 0.06 | 1.05E-15 |
| 4 | 0.00 | 9.25E-06 | 8.05 | 0.13 | 1.11E-15 |
| 6 | 0.00 | 8.97E-06 | 12.4 | 0.21 | 1.14E-15 |
| 8 | 0.00 | 8.70E-06 | 17.2 | 0.29 | 1.19E-15 |
| 12 | 0.05 | 8.22E-06 | 22.3 | 0.37 | 1.03E-15 |
| 15 | 0.05 | 7.89E-06 | 38.0 | 0.63 | 1.40E-15 |
| 20 | 0.10 | 7.39E-06 | 55.7 | 0.93 | 1.54E-15 |
| 25 | 0.20 | 6.96E-06 | 77.3 | 1.29 | 1.71E-15 |
| 30 | 0.25 | 6.57E-06 | 102 | 1.70 | 1.88E-15 |
| 35 | 0.30 | 6.22E-06 | 131 | 2.18 | 2.07E-15 |
| 40 | 0.70 | 4.54E-06 | 166 | 2.77 | 1.31E-15 |
| 45 | 0.90 | 5.63E-06 | 210 | 3.50 | 2.58E-15 |
| 50 | 1.20 | 5.37E-06 | 256 | 4.27 | 2.84E-15 |
| 55 | 1.70 | 5.13E-06 | 319 | 5.32 | 3.21E-15 |
| 60 | 2.10 | 4.91E-06 | 374 | 6.23 | 3.45E-15 |
| 65 | 2.80 | 4.71E-06 | 449 | 7.48 | 3.82E-15 |
| 70 | 3.50 | 4.53E-06 | 522 | 8.70 | 4.13E-15 |
| 75 | 4.50 | 4.36E-06 | 615 | 10.25 | 4.54E-15 |

07/19/93

Media: NRG1BYX1

Length: 0.63 cm

| ΔP (in Hg) | P_e (in H ₂ O) | Q (ml/min) |
|--------------------|-----------------------------|--------------|
| 0.2 | - | 1.49 |
| 0.4 | - | 3.90 |
| 0.6 | - | 5.00 |
| 0.8 | - | 7.82 |
| 1.0 | - | 8.55 |
| 2.0 | - | 17.4 |
| 4.0 | - | 34.3 |
| 6.0 | 0.1 | 51.7 |
| 8 | 0.15 | 69.1 |
| 10 | 0.3 | 86.3 |
| 12 | 0.3 | 104 |
| 15 | 0.5 | 131 |
| 20 | 0.7 | 176 |
| 25 | 1.05 | 222 |
| 30 | 1.3 | 271 |
| 35 | 1.7 | 320 |
| 40 | 2.1 | 367 |
| 45 | 2.5 | 416 |
| 50 | 3.0 | 467 |
| 55 | 3.5 | 518 |
| 60 | 4.1 | 563 |
| 65 | 4.7 | 615 |
| 70 | 5.3 | 666 |
| 75 | 6.0 | 730 |
| 80 | 6.7 | 793 |

SAMPLE: NRG1BYX1

DIAMETER: 5.01 cm

LENGTH: 0.63 cm

| dP (in Hg) | P_e (in H ₂ O) | $2/(P_i + P_e)$ Pa ⁻¹ | Q (ml/min) | Q (ml/s) | k (m ²) |
|------------|-----------------------------|----------------------------------|------------|----------|---------------------|
| 0.2 | 0.00 | 9.83E-06 | 1.49 | 0.02 | 4.13E-15 |
| 0.4 | 0.00 | 9.80E-06 | 3.90 | 0.07 | 5.40E-15 |
| 0.6 | 0.00 | 9.77E-06 | 5.00 | 0.08 | 4.61E-15 |
| 0.8 | 0.00 | 9.74E-06 | 7.82 | 0.13 | 5.41E-15 |
| 1 | 0.00 | 9.70E-06 | 8.55 | 0.14 | 4.73E-15 |
| 2 | 0.00 | 9.55E-06 | 17.4 | 0.29 | 4.82E-15 |
| 4 | 0.00 | 9.25E-06 | 34.3 | 0.57 | 4.75E-15 |
| 6 | 0.10 | 8.97E-06 | 51.7 | 0.86 | 4.77E-15 |
| 8 | 0.15 | 8.70E-06 | 69.1 | 1.15 | 4.78E-15 |
| 10 | 0.30 | 8.45E-06 | 86.3 | 1.44 | 4.78E-15 |
| 12 | 0.30 | 8.21E-06 | 104 | 1.73 | 4.80E-15 |
| 15 | 0.50 | 7.88E-06 | 131 | 2.18 | 4.84E-15 |
| 20 | 0.70 | 7.39E-06 | 176 | 2.93 | 4.87E-15 |
| 25 | 1.05 | 6.95E-06 | 222 | 3.70 | 4.92E-15 |
| 30 | 1.30 | 6.56E-06 | 271 | 4.52 | 5.00E-15 |
| 35 | 1.70 | 6.21E-06 | 320 | 5.33 | 5.06E-15 |
| 40 | 2.10 | 5.90E-06 | 367 | 6.12 | 5.08E-15 |
| 45 | 2.50 | 5.61E-06 | 416 | 6.93 | 5.12E-15 |
| 50 | 3.00 | 5.35E-06 | 467 | 7.78 | 5.17E-15 |
| 55 | 3.50 | 5.12E-06 | 518 | 8.63 | 5.21E-15 |
| 60 | 4.10 | 4.90E-06 | 563 | 9.38 | 5.20E-15 |
| 65 | 4.70 | 4.70E-06 | 615 | 10.25 | 5.24E-15 |
| 70 | 5.30 | 4.52E-06 | 666 | 11.10 | 5.27E-15 |
| 75 | 6.00 | 4.35E-06 | 730 | 12.17 | 5.39E-15 |
| 80 | 6.70 | 4.19E-06 | 793 | 13.22 | 5.49E-15 |

07/21/93 TP

Media: NRIBX1

Length:

 ΔP (in Hg) P_e (in H₂O) Q (m³/s)

| | | |
|----|------|------|
| 2 | — | 3.2 |
| 4 | — | 6.97 |
| 6 | — | 10.8 |
| 8 | — | 14.9 |
| 10 | — | 19.6 |
| .2 | — | .14 |
| .4 | — | .54 |
| .8 | — | 1.16 |
| 1 | — | 1.5 |
| 12 | — | 23.3 |
| 15 | 0.1 | 29.8 |
| 20 | 0.1 | 41.2 |
| 25 | 0.15 | 53.9 |
| 30 | 0.2 | 66.8 |
| 35 | 0.3 | 80.7 |
| 40 | 0.3 | 95.6 |
| 45 | 0.35 | 111 |
| 50 | 0.5 | 129 |
| 55 | 0.55 | 143 |
| 60 | 0.65 | 161 |
| 65 | 0.7 | 179 |
| 70 | 0.85 | 197 |
| 75 | 1.0 | 216 |
| 80 | 1.1 | 237 |

**Pages 75 Through 100 Are Intentionally
Left Blank**

08/27/93 TP

Below is the program
used to evaluate the saturated
permabilities of the
unconsolidated media.

The program is within
the Ksat directory

Referenced disk cannot be located.

07/30/93 TP

Media - T-64 100 Mesh Alumina
(149 micron)

Diameter - 2.8 inches

Length - 2 ³/₈ inches = 2.375 in

$\mu = 850 \times 10^{-6} \text{ N}$

$P_{\text{conf}} = 30 \text{ psi}$

Volume = 23 ml

| P (in Hg) | t | t (s) |
|-----------|-----------------------------------|----------|
| 5 | 5:29:29 | (329.29) |
| 5 | 5:20:68 | (320.68) |
| 5 | 5:16:01 | (316.01) |
| 5 | 5:09:38 | (309.38) |
| 5 | 5:05:92 | (305.92) |
| 10 | 2:46:84 | (166.84) |
| 10 | 2:46:39 | (166.39) |
| 10 | 2:26:49 ^{45 TP 07/30/93} | (165.49) |
| 10 | 2:44:47 | (164.47) |
| 10 | 2:41:69 | (161.69) |
| 20 | 1:13:92 | (73.92) |
| 20 | 1:13:68 | (73.68) |
| 20 | 1:13:51 | (73.51) |
| 20 | 1:13:14 | (73.14) |
| 20 | 1:12:52 | (72.52) |
| 25 | 51.68 | (51.68) |
| 25 | 52.29 | (52.29) |
| 25 | 51.95 | (51.95) |
| 25 | 51.25 | (51.25) |
| 25 | 52.19 | (52.19) |

08/02/93

Media : Glass Beads 1420/2740

Length: 2.5 in

P (in Hg)

t (s)

| | | |
|---|---------------------|-----------|
| 2 | 91.66, 88.73, 86.85 | AVE 89.08 |
| 3 | 55.2, 53.10, 53.06 | AVE 53.79 |
| 4 | 40.92, 41.23, 39.65 | AVE 40.6 |
| 5 | 32.59, 32.77, 33.08 | AVE 32.81 |
| 6 | 21.28, 20.43, 19.99 | AVE 20.57 |
| 7 | 17.37, 16.56, 17.09 | AVE 17.01 |
| 8 | 14.69, 14.82, 14.82 | AVE 14.78 |

08/09 TP

Media: 60 Mesh (249 μ m)

Length: 2 7/8 in

V = 23 mL

P (in Hg)

t

5

415.30

5

421.53

422.31

417.30

419.2

ave $\frac{419.2}{5} = 417.14$

10

190.83

197.08

197.24

197.97

198.03

196.23

20

89.66

89.89

90.84

92.26

93.08

91.14

08/09 TP

P (in Hg)

25

t (s)

71.87

73.29

73.16

73.06

75.26

AVE 73.33

MEDIA: 60 MESH
 DIAMETER: 2.8 IN
 LENGTH: 2 7/8 IN
 VOLUME: 23 ml

| P (in Hg) | Time (s) | ksat (m ⁻⁴) |
|-----------|----------|-------------------------|
| 5 | 415.3 | 5.11E-14 |
| 5 | 421.53 | 5.04E-14 |
| 5 | 422.31 | 5.03E-14 |
| 5 | 417.3 | 5.09E-14 |
| 5 | 419.2 | 5.06E-14 |
| 10 | 190.83 | 5.56E-14 |
| 10 | 197.08 | 5.38E-14 |
| 10 | 197.24 | 5.38E-14 |
| 10 | 197.97 | 5.36E-14 |
| 10 | 198.03 | 5.36E-14 |
| 20 | 89.66 | 5.92E-14 |
| 20 | 89.89 | 5.9E-14 |
| 20 | 90.84 | 5.84E-14 |
| 20 | 92.26 | 5.75E-14 |
| 20 | 93.08 | 5.7E-14 |
| 25 | 71.87 | 5.91E-14 |
| 25 | 73.16 | 5.8E-14 |
| 25 | 73.29 | 5.79E-14 |
| 25 | 73.06 | 5.81E-14 |
| 25 | 75.26 | 5.64E-14 |

08/12/93TP

media: 60 mesh Alumina

Length: 2.75 in

Vol: 24 ml

P (in Hg)
5

t (s)

423.22

421.04

421.11

418.02

415.18

10

173.35

174.06

174.61

174.82

175.05

20

86.05

86.81

87.15

87.59

87.90

08/12/93TP

P (in Hg)
25

t (s)

67.61

68.99

68.96

69.19

MEDIA: 60 MESH ALUMINA
 DIAMETER: 2.8 in
 LENGTH: 2.75 in
 VOLUME: 24 ml

| P (in Hg) | Time (s) | ksat (m ⁻¹) |
|-----------|----------|-------------------------|
| 5 | 423.22 | 5.01E-14 |
| 5 | 421.04 | 5.03E-14 |
| 5 | 421.11 | 5.03E-14 |
| 5 | 418.02 | 5.07E-14 |
| 5 | 415.18 | 5.1E-14 |
| 10 | 173.35 | 6.11E-14 |
| 10 | 174.06 | 6.09E-14 |
| 10 | 174.61 | 6.07E-14 |
| 10 | 174.82 | 6.06E-14 |
| 10 | 175.05 | 6.05E-14 |
| 20 | 86.05 | 6.15E-14 |
| 20 | 86.81 | 6.1E-14 |
| 20 | 87.15 | 6.08E-14 |
| 20 | 87.59 | 6.05E-14 |
| 20 | 87.8 | 6.03E-14 |
| 25 | 67.61 | 6.27E-14 |
| 25 | 68.99 | 6.14E-14 |
| 25 | 68.96 | 6.14E-14 |
| 25 | 69.27 | 6.12E-14 |
| 25 | 69.19 | 6.12E-14 |

08/13/93 TP

Media: 100 mesh L= V=24mL

P (in Hg) t (s)

5 419.37
 10 196.25
 15 124.69
 20 91.15
 25 72.88

5 435.41
 10 196.49
 15 125.70
 20 91.91
 25 71.87

5 416.02
 10 196.72
 15 126.72
 20 91.63
 25 73.48

5 384.78
 10 186.11
 15 120.71
 20 91.84
 25 70.79

MEDIA: 100 mesh alumina

DIAMETER: 2.8 in

LENGTH:

VOLUME: 24 ml

| P (in Hg) | Time (s) | ksat (m [^]) |
|-----------|----------|------------------------|
| 5 | 329.29 | 5.32E-14 |
| 5 | 320.68 | 5.47E-14 |
| 5 | 316.01 | 5.55E-14 |
| 5 | 309.38 | 5.67E-14 |
| 5 | 305.92 | 5.73E-14 |
| 10 | 166.84 | 5.25E-14 |
| 10 | 166.39 | 5.27E-14 |
| 10 | 165.49 | 5.3E-14 |
| 10 | 164.47 | 5.33E-14 |
| 10 | 161.69 | 5.42E-14 |
| 20 | 73.92 | 5.93E-14 |
| 20 | 73.68 | 5.95E-14 |
| 20 | 73.51 | 5.96E-14 |
| 20 | 73.14 | 5.99E-14 |
| 20 | 72.52 | 6.04E-14 |
| 25 | 51.68 | 6.79E-14 |
| 25 | 52.29 | 6.71E-14 |
| 25 | 51.95 | 6.75E-14 |
| 25 | 51.25 | 6.84E-14 |
| 25 | 52.19 | 6.72E-14 |

Pages 112 Through 129 Are Intentionally
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ADDITIONAL INFORMATION FOR SCIENTIFIC NOTEBOOK #: 083

| | |
|--|---|
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| Data Sensitivity: | <input checked="" type="checkbox"/> "Non-Sensitive" <input type="checkbox"/> Sensitive <input type="checkbox"/> "Non-Sensitive - Copyright" <input type="checkbox"/> Sensitive - Copyright |
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| Application Used: (including version number) | Various |
| Media Type: (CDs, 3 1/2, 5 1/4 disks, etc.) | 1 - 3 1/2 disk |
| File Types: (.exe, .bat, .zip, etc.) | Various |
| Remarks: (computer runs, etc.) | Media contains: Program used to communicate the experiment setup to measure the weight gain of a rock core immersed only slightly in water; net liquid infiltration. |

07/01 Net LIQUID INFILTRATION

This experiment was setup to measure the weight gain of a rock core immersed only slightly in water. The disk below contains the program used to communicate.

07/01 TP

The disk on the previous page contains a program to record the weight as a function of time.

To enter program:

A:\ cd scale
A:\scale\ gwbasic

load Scale.bas

then execute.

The times to take weights are listed in the file
"timdat.dat"

9/12/57

I have reviewed
this notebook for
compliance with
QAP-GOI. It appears
deficient in some
aspects, but pages
1-131 have been
previously reviewed
by R. VOLCK for
compliance.

E.C. Ray
1/17/57

This project ended
some time ago and
this notebook is now
being closed.

E.C. Ray
1/17/57