Scientific Notebook # 271

LABORATORY NOTEBOOK

CNWRA / SWRI

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NOTEBOOK NO. _____
ISSUED TO Jim Winterle
ON 5.25. 19 98
DEPARTMENT CNWRA (Div 20)
RETURNED _____ 19 ____

Entries made by: Melissa Hill MHill
Dwayne Halbardier D. Hal

—SCIENTIFIC NOTEBOOK CO.—
2831 LAWRENCE AVE.
P.O. BOX 238
STEVENSVILLE, MI 49127
616-429-8285

Table of Contents	Page

From Page No. ___ 5-25-98

Introduction:

* This notebook to be used for Laboratory experiments conducted in support of USFIC KTI. The first set of experiments begins on following page, and deals with Unsaturated Zone (UZ) rock Properties. Sample preparation, methods, equipment used; and results shall all be documented. Expts. to be conducted by B. Pedroza under my supervision.

James R. Winterle.

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No. | 5-26-98

Cored samples SC5-98-1 thru SC5-98-7 using 2.5cm diameter (inner) drill. Labeled ~~Sub~~ Core 5/26/98 samples using following nomenclature:
SC5-98-1 ~~sub~~ Core BP 5/26/98 sample labeled SC5-98-1A.
Ben Pedroza

5-28-98
Took ~~additional~~ BP 5/28/98 two additional core samples for SC5-98-2, SC5-98-3, SC5-98-4, SC5-98-6. Labeled the additional ~~sub~~ BP 5/28/98 core samples using the ~~c~~ BP 5/28/98 nomenclature mentioned above. For example for SC5-98-2 the two additional samples have been labeled SC5-98-2B and SC5-98-2C.
Ben Pedroza

5-29-98
Cut 1cm sub samples from core # SC5-98-2A, SC5-98-2B, SC5-98-2C the sub samples have been labeled SC5-98-2A1, SC5-98-2B1, SC5-98-2C1. The core samples have been cut to 4cm length. Samples ~~4B and~~ BP 5/29/98 4A and 4B have been discarded and 4C has been changed to 4A. The new core # SC5-98-4A has been cut to 4cm & its 1cm subsample SC5-98-4A1 has also been cut. These samples have all been placed in an oven at 105°C.
Ben Pedroza

~~5~~ BP
6-2-98
Took out the samples that were in the oven and weighed them one at a time on the METTLER PM 480 Delta Range Serial # N45601 scale. Following are the masses that were measured:

* SC5-98-2A	41.031 g	SC5-98-4A	47.635 g
" " 2A1	9.860 g	" " 4A1	12.376 g
" " 2B	40.640 g		
" " 2B1	10.436 g		
" " 2C	41.322 g		
" " 2C1	10.259 g		

To Page No. 3

From Page No. 2 | ~~Continued to cut 1cm subsamples~~ BP 6/2/98
After samples were weighed they were put back into the oven to keep them dry.
Continued to cut 1cm subsamples from remaining core samples.
Note: The following samples were discarded due to micro cracks and visible pits: SC5-98-1, SC5-98-7, SC5-98-6C
Following are the core samples and their constituent subsamples that were prepared today:

SC5-98-3A	→	SC5-98-3A1	
" " 3B		" " 3B1	
" " 3C		" " 3C1	
" " 5A		" " 5A1	
" " 6A		" " 6A1	
" " 6B		" " 6B1	

~~These samples~~ BP 6/2/98
Samples SC5-98-3A thru SC5-98-3C and their subsamples had noticeable inclusions.
Samples ~~5A~~ BP 6/2/98 SC5-98-5A, SC5-98-6A & 6B appeared homogeneous.
These samples were at BP 6/2/98 all placed in the oven at 105°C.

* Note the samples that were weighed today were allowed to cool for one hour in an airtight container containing drierite before the samples were weighed.
Also Samples SC5-98-2A thru SC5-98-2C and there subsamples had noticeable inclusions. Sample SC5-98-4A appeared Homogereous.
Ben Pedroza

To Page No.

Project No.
Book No.
TITLE

From Page No. | 6-4-98

Cleaned out the Nold Dearator serial #634. Removed samples that were weighed ON 6-2-98 from the over and weighed them again. Following are the sample #'s and the measurements made ON 6-2-98 and again today.

Sample #	Weight meas. 6-2-98	Weight meas. 6-4-98
SC5-98- 2A	41.031 g	41.014 g
" " 2A1	9.860 g	9.852 g
" " 2B	40.640 g	40.621 g
" " 2B1	10.436 g	10.425 g
" " 2C	41.322 g	41.306 g
" " 2C1	10.259 g	10.251 g
" " 4A	47.635 g	47.629 g
" " 4A1	12.376 g	12.368 g

The samples which have yet to be weighed will be left in the oven for a total of six days to be consistent.

The weighed samples were placed in a vacuum chamber and we initiated saturation. The samples are being left overnight in the chamber at 30 inches of Mercury to check if the seal is adequate and not leaking.

Ben Pedroza

6-5-98

Checked pressure reading on vacuum chamber. The chamber had leaked overnight. Tore down chamber to clean and reassemble. The samples will be left at 30 inches of Mercury to check if the seal is adequate. Will check it on Monday.

Prepared permeate solution of ~~0.01%~~ BP 6/5/98 0.01% sodium hypochloride. This solution is being used to inhibit microbial growth in the lines and the samples.

Ben Pedroza

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No.
Book No.
TITLE

From Page No. | 6-8-98

Checked Pressure on vacuum chamber. The chamber had a leak. Tore down chamber to clean and reassemble. Again, the samples will be left at 30 inches of Mercury to check if seal is adequate. Took out samples which were put into the oven ON 6-2-98 and weighed them on the METTLER PM 480 Delta Range Serial # N45601 scale. Following are the masses that were measured:

	mass
SC5-98-3A	41.697 g
" " 3A1	11.558 g
" " 3B	41.670
" " 3B1	10.763
" " 3C	42.772
" " 3C1	10.784
" " 5A	42.780
" " 5A1	11.577
" " 6A	47.432
" " 6A1	11.981
" " 6B	45.751
" " 6B1	12.640

After samples were weighed they were put back into the oven to keep them dry.

Ben Pedroza

6-10-98

Checked Pressure on vacuum chamber. No leak detected. Evacuated sample in vacuum chamber and then saturated with CO_2 gas. Repeated Process 3 times. Then the sample was saturated in de-aired water. It will be left saturated for several days. Tore down the permeameter cell to clean and prepare for later use.

Ben Pedroza

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

From Page No.

6-11-98
Introduced CO_2 into chamber then ran vacuum to ensure saturation. Left samples in chamber. Tore down annuluses on control panel to clean them out. Left annuluses and pippetes in .035 solution of sodium hypochlorite to soak for a day.
Ben Pedroza

6-12-98
Introduced CO_2 into chamber then ran vacuum to ensure saturation. Left samples in chamber. Used pipe cleaner to clear annuleses and base and top.
Ben Pedroza

6-15-98
Was going to pull samples out of vacuum chamber to weigh them but vacuum chamber had leaked over weekend and gauge showed only 25 inches of Mercury. Tore down vacuum chamber again to clean and reassemble. Placed samples in deionized water while I prepared vacuum chamber. Reassembled the chamber and placed samples inside. Initiated saturation after evacuating the samples. Left samples at 30 inches of Mercury.
Ben Pedroza

6-17-98
Checked Vacuum chamber. Chamber had a leak. Tore down chamber, cleaned it, and reassembled it. Samples were placed in deionized water while chamber was being cleaned and reassembled. Initiated saturation and ran two cycles in which CO_2 was introduced and then vacuum was pulled. Left samples at 30 inches of ~~mercury~~ BP 6/17/98 Mercury in ~~deaired water~~ BP 6/17/98 0.01% Sodium hypochlorite solution.
Ben Pedroza

To Page No.

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.

6-22-98
Checked Vacuum chamber. Chamber had a leak. Tore down chamber, cleaned it, and reassembled it. Samples were placed in deionized water. Reassembled chamber and put samples back in. Followed same procedure ~~as~~ mentioned in entry for 6-17-98.
Ben Pedroza

6-25-98
Checked Chamber. No leak. Introduced CO_2 then ran vacuum pulling more deaired water into the chamber.
Ben Pedroza

6-29-98
Chamber developed leak over weekend. Also discovered not enough water was getting into chamber. After rigorous investigation discovered inlet valve was clogged.
Ben Pedroza

~~6-29-98~~ BP 6/30/98
6-30-98
Sent out vacuum chamber with inlet valve to be bead blasted. Reassembled vacuum chamber and changed pourous plate for new pourous plate. Ran saturation cycles to be sure water was entering chamber at an acceptable rate. Everything checked out.
Ben Pedroza

7-6-98
Took apart Nold deaerator to clear. Reassembled deaerator. Note: samples SC5-98-2A, 2A1, 2B, 2B1, 2C, 2C1, 4A, 4A1 ~~were left~~ BP 7/6/98 which had been in the vacuum chamber, have been in deaired water since vacuum chamber was disassembled on 6-29-98.
Ben Pedroza

To Page No.

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No._____
Book No._____ TITLE_____

From Page No.___

7-7-98

Since another division will be using the vacuum chamber for a couple of days, the samples have been put back into the oven to dry out.

Ben Pedroza

7-10-98

While waiting for the vacuum chamber, Samples:

SC5-98-3A
" " 3A1
" " 3B
" " 3B1
" " 3C
" " 3C1
" " 5A
" " 5A1
" " 6A
" " 6A1
" " 6B
" " 6B1

have been pulled out to take porosity measurements using the MultiPycnometer manufactured by Quantachrome. The samples have been sitting in drierite for almost 2 hrs to let them cool down.

Note: Will be using Helium as the permeate. BP 7/14/98 ~~148.107~~
Will be using V_c & V_p (V_c = ~~148.105~~, V_p = 89.519) found when calibration performed on 7-8-98 using large cell. The calibration notes can be found on p. 32 of Lab Notebook #279

Will first run through a sample of NON-~~poro~~ BP 7/10/98 porous ceramic with known volume to be sure measurements are accurate.

To Page No.___

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No._____
TITLE_____ Book No._____

From Page No.___

NON-porous ceramic cylinder

RUN 1: P_1 = 18.100 BP 7/14/98
P_2 = 6.910
V_p = ~~3.139 cm³~~ 3.141 cm³

Note:
Using this eqn
$V_p = V_c - V_R((P_1/P_2) - 1)$

RUN 2: P_1 = 17.789
P_2 = 6.791
V_p = ~~3.129 cm³~~ BP 7/14/98 3.131 cm³ ~~3.141~~ BP 7/14/98

RUN 3: P_1 = 18.107
P_2 = 6.912
V_p = ~~3.116~~ BP 7/14/98 3.118 cm³

Dimensions of NON-porous ceramic cylinder measured with vernier calipers L = 2.560 cm
D = 1.250 cm

D/2 = r = 0.625

Geometric Volume ~~of~~ BP 7/10/98 of NON-porous ceramic cylinder = 3.142 cm³

NON-porous Ceramic cylinder

RUN 1*	~~3.139 cm³~~ BP 7/14/98	3.141	* refers to volume of skeletal material
RUN 2	~~3.129 cm³~~ BP 7/14/98	3.131	
RUN 3	~~3.116 cm³~~ BP 7/14/98	3.118	

Average ~~3.128~~ BP 7/14/98 3.130
Stdev
CV

error = ~~.44%~~ BP 7/10/98 .45% BP 7/14/98 .38%

$$\text{error}\% = \left| \frac{\text{Geometric Vol} - \text{Meas Vol}}{\text{Geometric Vol}} \right| \times 100\%$$

To Page No.___

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No.
Book No. TITLE

From Page No.

Sample #
SC5-98-3B

RUN 1: $P_1 = 17.771$, $P_2 = 7.269$ — $V_p = \cancel{18.771}$ BP 7/14/98, 18.773

RUN 2: $P_1 = 17.963$, $P_2 = 7.349$ — $V_p = \cancel{18.814}$ BP 7/14/98, 18.817

RUN 3: $P_1 = 18.050$, $P_2 = 7.385$ — $V_p = \cancel{18.827}$ BP 7/14/98, 18.829

RUN 1	$\cancel{18.771}$ BP 7/14/98	18.773
RUN 2	$\cancel{18.814}$ BP 7/14/98	18.817
RUN 3	$\cancel{18.827}$ BP 7/14/98	18.829

Average = $\cancel{18.804\ cm^3}$ BP 7/14/98 $18.806\ cm^3$

Dimensions of sample

Samples dimensions were measured with vernier calipers.
$h = 4$ cm
$d = 2.5$ cm, $r = d/2 = 1.25$ cm

Geom. Vol. $= 19.880\ cm^3$

Porosity (ϕ)

$$\phi = \left[\frac{\text{Geom. Vol.} - \text{Vol. of skeletal material}}{\text{Geom. Vol}}\right] \times 100\%$$

$$= \left[\frac{19.880 - 18.806}{19.880}\right] \times 100\%$$

$\phi = \cancel{9.2\%}$ BP 7/10/98 9.2%

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No.
TITLE Book No.

From Page No.

Sample #
SC5-98-3C

RUN 1: $P_1 = 18.128$, $P_2 = 7.431$ — $V_p = \cancel{19.241}$ BP 7/14/98, 19.243

RUN 2: $P_1 = 17.870$, $P_2 = 7.328$ — $V_p = \cancel{19.324}$ BP 7/14/98, 19.326

RUN 3: $P_1 = 18.071$, $P_2 = 7.411$ — $V_p = \cancel{19.341}$ BP 7/14/98, 19.343

RUN 1	$\cancel{19.241}$ BP 7/14/98	19.243
RUN 2	$\cancel{19.324}$ BP 7/14/98	19.326
RUN 3	$\cancel{19.341}$ BP 7/14/98	19.343

Average = $\cancel{19.302\ cm^3}$ BP 7/14/98 $19.304\ cm^3$

Dimensions of sample taken with vernier calipers.
$h = 4.09$ cm
$d = 2.5$ cm, $r = 1.25$ cm

Geom. Vol. $= 20.077\ cm^3$

Porosity (ϕ)

$$\phi = \left[\frac{20.077 - 19.304}{20.077}\right] \times 100\%$$

$\phi = 3.9\%$

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No.
Book No. TITLE

From Page No. | Sample # SCS-98-3A

Run 1: $P_1 = 17.850$, $P_2 = 7.300$ — $V_p = \cancel{18.732}$ BP 7/14/98, 18.734

Run 2: $P_1 = 17.915$, $P_2 = 7.330$ — $V_p = \cancel{18.834}$ BP 7/14/98, 18.836

Run 3: $P_1 = 17.909$, $P_2 = 7.328$ — $V_p = \cancel{18.847}$ BP 7/14/98, 18.849

Run 1	~~18.732~~ BP 7/14/98	18.734
Run 2	~~18.834~~ BP 7/14/98	18.836
Run 3	~~18.847~~ BP 7/14/98	18.849

Average = ~~18.804 cm³~~ BP 7/14/98
18.806 cm³

Dimensions of sample taken with vernier calipers
$h = 4.05$ cm
$d = 2.5$ cm, $r = 1.25$ cm

Geom. Vol. = 19.880 cm³

Porosity (ϕ)

$$\phi = \left[\frac{19.880 - 18.806}{19.880}\right] \times 100\%$$

$\phi = 5.4\%$

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

TITLE
Project No.
Book No.

From Page No. | Sample # SCS-98-5A

Run 1: $P_1 = 17.968$, $P_2 = 7.320$ — $V_p = \cancel{17.887}$ BP 7/14/98, 17.889

Run 2: $P_1 = 18.002$, $P_2 = 7.331$ — $V_p = \cancel{17.801}$ BP 7/14/98, 17.803

Run 3: $P_1 = 18.181$, $P_2 = 7.406$ — $V_p = \cancel{17.864}$ BP 7/14/98, 17.866

Run 1	~~17.887~~ BP 7/14/98	17.889
Run 2	~~17.801~~ BP 7/14/98	17.803
Run 3	~~17.864~~ BP 7/14/98	~~17.806~~ BP 7/14/98 17.866

Average = ~~17.851 cm³~~ BP 7/14/98
17.853 cm³

Dimensions of sample taken with vernier calipers
$h = 3.82$ cm
$d = 2.5$ cm, $r = 1.25$ cm

Geom. Vol. = 18.751 cm³

Porosity (ϕ)

$$\phi = \left[\frac{18.751 - 17.853}{18.751}\right] \times 100\%$$

$\phi = 4.8\%$

Samples were placed back in the oven.
B.P 7/10/98

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No.____
Book No.____ TITLE____

From Page No.____ 7/13/98

Took samples back out & placed in sealed jar w/drierite and allowed them to cool for an hour.

Will first run through a sample of non-porous ceramic cylinder with known volume to check if pycnometer needs to be recalibrated. Will be using Helium as permeate.

Non-Porous Ceramic Cylinder

Run1: $P_1 = 17.838$ $V_p = 3.139\ cm^3$
$P_2 = 6.810$

Note: Will be using this eqn.

$$V_p = V_c - V_R\left[\left(\frac{P_1}{P_2}\right) - 1\right]$$

Where $V_c = 148.105$ and $V_R = 89.519$
These values were found when calibration was performed 7-8-98 using the large cell.
Calibration notes can be found on p. 32 of lab notebook #279.

Run 2: $P_1 = 18.003$ $V_p = 3.071$
$P_2 = 6.871$

Run 3: $P_1 = 18.051$ $V_p = 3.061$
$P_2 = 6.889$

Run1 3.139
Run2 3.071
Run3 3.061

Average = 3.090

To Page No.____

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

TITLE____ Book No.____ Project No.____

From Page No.____

Dimensions of non-porous ceramic cylinder measured with vernier calipers
$L = 2.560$
$D = 1.250$

$r = D/2 = \frac{1.250}{2} = 0.625$

Geometric Volume of non-porous ceramic cylinder = 3.142

$$\text{error\%} = \left(\frac{\text{Geometric vol.} - \text{meas. vol.}}{\text{Geometric Vol.}}\right) \times 100\%$$

error % = 1.65%

Pycnometer needs to be recalibrated

Calibration of Multipycnometer using large calibration sphere; Note: Helium used as permeate

~~Run~~ BP 7/13/98

Using following eqn.

$$V_{R\ large} = \frac{V_{cal\ large}}{\left[\left(\frac{P_1'}{P_2'}\right) - 1\right] - \left[\left(\frac{P_1}{P_2}\right) - 1\right]}$$

Where $V_{cal\ large} = 56.559$

Run 1: $P_1 = 18.113$
$P_2 = 8.953$

$P_1' = 18.519$
$P_2' = 6.976$

To Page No.____

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No._____
Book No._____ TITLE_____

From Page No.____

$$V_{R\,large} = \frac{56.559\ cm^3}{\left[\left(\frac{18.519}{6.970}\right)-1\right]-\left[\left(\frac{18.113}{8.953}\right)-1\right]}$$

$$V_{R\,large} = \frac{56.559\ cm^3}{[1.654673165 - 1.023120742]}$$

Run 1: $V_{R\,large} = 89.556$

Run 2: $P_1 = 18.186$
$P_2 = 8.990$

$P_1' = 17.863$
$P_2' = 6.729$

$$V_{R\,large} = \frac{56.559\ cm^3}{\left[\left(\frac{17.863}{6.729}\right)-1\right]-\left[\left(\frac{18.186}{8.990}\right)-1\right]}$$

$$= \frac{56.559}{1.654629217 - 1.022914349}$$

Run 2: $V_{R\,large} = 89.532$

Run 3: $P_1 = 18.263$
$P_2 = 9.027$

$P_1' = 17.856$
$P_2' = 6.725$

$$V_{R\,large} = \frac{56.599\ cm^3}{\left[\left(\frac{17.856}{6.725}\right)-1\right]-\left[\left(\frac{18.263}{9.027}\right)-1\right]}$$

To Page No.____

Witnessed & Understood by me,	Date	Invented by / Recorded by	Date

TITLE_____
Project No._____
Book No._____

From Page No.____

$$= \frac{56.599\ cm^3}{1.655167286 - 1.023152764}$$

Run 3: $V_{R\,large} = 89.553$

	$V_{R\,large}$
Run 1	89.556
Run 2	89.532
Run 3	89.553

Average = 89.547 = V_R used in calc. for this study ✱

$$V_{c\,large} = V_{cal\,large} + V_{R\,large}\left[\left(\frac{P_1}{P_2}\right)-1\right]$$

Run 1: $V_{c\,large}$ = ~~148.226~~ BP 7/13/98 ~~146.146~~ BP 7/13/98 148.216391 BP

Run 2: $V_{c\,large} = 148.198$

Run 3: $V_{c\,large} = 148.219$

	$V_{c\,large}$
Run 1	148.216
Run 2	148.198
Run 3	148.219

Average = 148.211 = $V_{c\,large}$ used in calc. for this study ✱

To Page No.____

Witnessed & Understood by me,	Date	Invented by / Recorded by	Date

From Page No.____

Non-Porous Ceramic Cylinder

Run 1: $P_1 = 17.747$ $V_p = 3.122$
$P_2 = 6.773$

Run 2: $P_1 = 17.673$ $V_p = 3.130$
$P_2 = 6.745$

Run 3: $P_1 = 18.152$ $V_p = 3.137$
$P_2 = 6.928$

	V_p
Run 1	3.122
Run 2	3.130
Run 3	3.137

Average = ~~3.12~~ BP 7/13/98 3.130

Geometric Volume as found on page 15 = 3.142

error % = .38%

Sample # SCS-98-6A

Run 1: $P_1 = 18.012$ $V_p = 19.353$
$P_2 = 7.385$

Run 2: $P_1 = 18.157$ $V_p = 19.340$
$P_2 = 7.444$

Run 3: $P_1 = 18.026$ $V_p = 19.361$
$P_2 = 7.391$

To Page No.____

Witnessed & Understood by me, | Date | Invented by | Date
Recorded by

From Page No.____

	V_p
Run 1	19.353
Run 2	19.340
Run 3	19.361

Average = 19.351

Dimensions of sample taken with vernier calipers
$h = 4.09$ cm
$d = 2.5$ cm, $r = 1.25$ cm

Geom. Vol. = 20.077 cm^3

Porosity (ϕ)

$$\phi = \left[\frac{\text{Geom. Vol.} - \text{Vol. of skeletal Material}}{\text{Geom. Vol.}}\right] \times 100\%$$

$$\phi = \left[\frac{20.077 - 19.351}{20.077}\right] \times 100\%$$

$\phi = 3.6\%$

To Page No.____

Witnessed & Understood by me, | Date | Invented by | Date
Recorded by

From Page No. | Sample # SCS-98-6B

RUN 1: $P_1 = 18.022$ $V_p = 18.638$
$P_2 = 7.365$

RUN 2: $P_1 = 17.815$ $V_p = 18.656$
$P_2 = 7.281$

RUN 3: $P_1 = 18.070$ $V_p = 18.650$
$P_2 = 7.385$

	V_p
RUN 1	18.638
RUN 2	18.656
RUN 3	18.650

Average = 18.648

Dimensions of sample taken with vernier calipers
h = 4 cm
d = 2.5 cm , r = 1.25 cm

Geom. Vol. = 19.635 cm^3

Porosity ($\emptyset$)

$$\emptyset = \left[\frac{19.635 - 18.648}{19.635}\right] \times 100\%$$

$\emptyset = 5.0\%$

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

From Page No. | Sample # SCS-98-3A1

RUN 1: $P_1 = \cancel{17.947}$ BP 7/13/98 17.691 $V_p = 5.270$
$P_2 = 6.814$

RUN 2 $P_1 = \cancel{17.43}$ BP 7/13/98 17.972 $V_p = 5.228$
$P_2 = 6.921$

RUN 3 $P_1 = 18.239$ $V_p = 5.201$
$P_2 = 7.023$

	V_p
RUN 1	5.270
RUN 2	5.228
RUN 3	5.201

Average = 5.233

Dimensions of sample taken with vernier calipers.
h = 1.1 cm
d = 2.5 cm , r = 1.25 cm

Geom. Vol. = 5.400 cm^3

Porosity ($\emptyset$)

$$\emptyset = \left[\frac{5.400 - 5.233}{5.400}\right] \times 100\%$$

$\emptyset = 3.1\%$

Samples were placed back in the oven.
7/13/98

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

From Page No.____ 7-14-98

Samples have been taken out of the oven & allowed to cool for 1 hour in a jar of drierite.

Will first run through a sample of non-porous ceramic cylinder with known volume to check if pycnometer needs to be calibrated.

Non-Porous Ceramic Cylinder

Run 1: $P_1 = 17.987$ $V_p = 3.238$
$P_2 = 6.868$

Will be using this eqn.

$$V_p = V_c - V_R\left[\left(\frac{P_1}{P_2}\right) - 1\right]$$

Where $V_c = 148.211$
and $V_R = 89.547$
These values were found during recalibration on p. 17.

Run 2: $P_1 = 17.825$ $V_p = 3.233$
$P_2 = 6.806$

Run 3: $P_1 = 17.834$ $V_p = 3.218$
$P_2 = 6.809$

	V_p
Run 1	3.238
Run 2	3.233
Run 3	3.218

Average = ~~3.22~~ BP 7/14/98 ~~3.230~~ BP 7/14/98 3.230

error % = -2.8%

Note: Geometric volume for this sample was calc. on p. 9 and found to be $3.142\ cm^3$

To Page No.____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.____

Pycnometer has to be recalibrated. Melissa checked and informed that the temperature in the lab changed by 6 degrees Celsius.

Calibration of Multipycnometer using large calibration sphere.
Note: Helium used as permeate.

Will be using following eqn.

$$V_{R\,large} = \frac{V_{cal\,large}}{\left[\left(\frac{P_1'}{P_2'}\right) - 1\right] - \left[\left(\frac{P_1}{P_2}\right) - 1\right]}$$

Where $V_{cal\,large} = 56.559$

Run 1: $P_1 = 18.075$ $P_1' = 18.080$
$P_2 = 8.936$ $P_2' = 6.811$

$$V_{R\,large} = \frac{56.559}{\left[\left(\frac{18.080}{6.811}\right) - 1\right] - \left[\left(\frac{18.075}{8.936}\right) - 1\right]}$$

$$= \frac{56.559}{1.654529438 - 1.022717099}$$

$$= \frac{56.559}{.631812339}$$

Run 1: $V_{R\,large} = 89.519$

To Page No.____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.____

Run 2: $P_1 = 18.425$ $P_1' = \cancel{17.944}$ BP 7/14/98 17.938
$P_2 = 9.108$ $P_2' = 6.759$

$$V_{R\,large} = \frac{56.559}{\left[\left(\frac{17.938}{6.759}\right)-1\right]-\left[\left(\frac{18.425}{9.108}\right)-1\right]}$$

$$V_{R\,large} = \frac{56.559}{1.653942891 - 1.622946\,86}$$

Run 2: $V_{R\,large} = 89.634$

Run 3: $P_1 = 18.168$ $P_1' = 17.940$
$P_2 = 8.981$ $P_2' = 6.758$

$$V_{R\,large} = \frac{56.559}{\left[\left(\frac{17.940}{6.758}\right)-1\right]-\left[\left(\frac{18.168}{8.981}\right)-1\right]}$$

$$= \frac{56.559}{1.654631548 - 1.022937312}$$

Run 3 $V_{R\,large} = 89.535\,cm^3$

	$V_{R\,large}$
Run 1	89.519
Run 2	89.634
Run 3	89.535

Average = $89.563\,cm^3$ = V_R used in calc for this study

To Page No.____

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

From Page No.____

$$V_{c\,large} = V_{cal\,large} + V_{R\,large}\left[\left(\frac{P_1}{P_2}\right)-1\right]$$

Run 1: $V_{c\,large} = 148.157$
Run 2: $V_{c\,large} = 148.177$
Run 3: $V_{c\,large} = 148.176$

	V_c
Run 1	148.157
Run 2	148.177
Run 3	148.176

Average = 148.170 = V_c used in calc for this study

Non ~~Porous~~ BP 7/14/98 Porous Ceramic Cylinder with Known Volume

Run 1: $P_1 = 17.970$ $V_p = 3.086$
$P_2 = 6.859$

$V_p = V_c - V_R\left[\left(\frac{P_1}{P_2}\right)-1\right]$
where $V_c = 148.170$ and $V_R = 89.563$

Run 2: $P_1 = 17.919$ $V_p = 3.102$
$P_2 = 6.840$

Run 3: $P_1 = 17.813$ $V_p = 3.083$
$P_2 = 6.799$

	V_p
Run 1	3.086
Run 2	3.102
Run 3	3.083

Average = 3.090
Geometric volume from p. 9 is $3.142\,cm^3$

error % = 1.65 %

To Page No.____

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No._____
Book No._____ TITLE_____

From Page No.___

Sample # SC5-98-~~3B1~~ 6B1 BP 7/14/98

Run 1: P_1 = 18.086 V_p = 5.165
P_2 = 6.965

Run 2: P_1 = 17.879 V_p = 5.155
P_2 = 6.885

Run 3: P_1 = 18.072 V_p = 5.145
P_2 = 6.959

	V_p
Run 1	5.165
Run 2	5.155
Run 3	5.145

Average = 5.155 cm^3

Dimensions of sample taken with vernier calipers.
h = 1.1 cm
d = 2.5 cm , r = 1.25 cm

Geom. Vol. = 5.400 cm^3

Porosity (ϕ)

$$\phi = \left[\frac{5.400 - 5.155}{5.4}\right] \times 100\%$$

ϕ = 4.5%

To Page No._____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No._____
TITLE_____ Book No._____

From Page No.___

Sample # SC5-98-3C1

Run 1: P_1 = 17.836 V_p = 4.869
P_2 = 6.860

Run 2: P_1 = 17.748 V_p = 4.830
P_2 = 6.825

Run 3: P_1 = ~~18.2~~ BP 7/14/98 18.197 V_p = 4.841
P_2 = 6.998

	V_p
Run 1	4.869
Run 2	4.830
Run 3	4.841

Average = 4.847 cm^3

Dimensions of sample taken with vernier calipers
h = 1.05 cm
d = 2.5 cm , r = 1.25 cm

Geom. Vol. = 5.154 cm^3

Porosity (ϕ)

$$\phi = \left[\frac{5.154 - 4.847}{5.154}\right] \times 100\%$$

ϕ = 6.0%

To Page No._____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No._____
Book No._____ TITLE _____

From Page No.___

Sample # SC5-98-5A1

BP 7/14/98

Run 1: $P_1 = 18.009$ $V_p = \cancel{4.852}$ 4.851
$P_2 = 6.926$

Run 2: $P_1 = 17.909$ $V_p = 4.731$
$P_2 = 6.884$

Run 3: $P_1 = 18.159$ $V_p = 4.728$
$P_2 = 6.980$

	V_p
Run 1	4.851
Run 2	4.731
Run 3	4.728

Average = 4.770

Dimensions of Sample measured with vernier calipers
h = 1.05cm
d = 2.5cm , r = 1.25cm

Geom. Vol. = 5.154 cm^3

Porosity ($\emptyset$)

$$\emptyset = \left[\frac{5.154 - 4.770}{5.154}\right] X100\%$$

$\emptyset = 7.5\%$

To Page No.____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

TITLE _____
Project No._____
Book No._____

From Page No.___

~~Sample # SC5-98-6A1~~ BP 7/14/98 ,
~~3B1~~ BP 7/14/98

~~Run~~ BP 7/14/98

Sample # SC5-98-6A1

Run 1: $P_1 = 17.929$ $V_p = 4.978$
$P_2 = 6.899$

Run 2: $P_1 = 17.886$ $V_p = 4.929$
$P_2 = 6.881$

Run 3 $P_1 = 17.844$ $V_p = 4.901$
$P_2 = 6.864$

	V_p
Run 1	4.978
Run 2	4.929
Run 3	4.901

Average = 4.936

Dimensions of sample were measured with vernier calipers
h = ~~3~~ BP 7/14/98 1.07cm
d = 2.5cm , r = 1.25cm

Geom. Vol. = 5.252 cm^3

Porosity ($\emptyset$)

$$\emptyset = \left[\frac{5.252 - 4.936}{5.252}\right] X\ 100\%$$

$\emptyset = 6.0\%$

To Page No.____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.____

Sample # SCS-98-3B1

RUN1: P_1 = 17.935 Vp = 4.867
P_2 = 6.898

RUN2 P_1 = 18.010 Vp = 4.838
P_2 = 6.926

RUN3 P_1 = 18.296 Vp = 4.872
P_2 = 7.037

	Vp
RUN1	4.867
RUN2	4.838
RUN3	4.872

Average = 4.859

Dimensions of sample taken with vernier calipers
h = ~~1.40 cm~~ BP 8-13-98 1.02
d = 2.5 cm r = d/2 = 1.25 cm
Geometric Volume = ~~6.872 cm³~~ BP 8-13-98 5.007 cm³

~~Porosity (Ø)~~ BP 7/14/98

$$\emptyset = \left[\frac{\text{Geom. Vol} - \text{Vol. of skeletal material}}{\text{Geom. Vol}}\right] \times 100\%$$

$$= \left(\frac{5.007\ (\text{~~6.872~~ BP 8-13-98}) - 4.859}{5.007\ (\text{~~6.872~~ BP 8-13-98})}\right) \times 100\%$$

Ø = ~~29.3%~~ BP 8-13-98
3.0%

To Page No.____

Witnessed & Understood by me, | Date | Invented by | Date | Recorded by

From Page No.____

Pulled out the remaining samples from the oven.
Samples SCS-98-2A SCS-98-4A
" " 2A1 " " 4A1
" " 2B
" " 2B1
" " 2C
" " 2C1

To Page No.____

Witnessed & Understood by me, | Date | Invented by | Date | Recorded by

Project No._____
Book No._____ TITLE_____

From Page No.____

Sample # SC5-98-2A

RUN 1: $P_1 = 17.823$ $V_p = 18.644$
$P_2 = \cancel{7.29}$ BP 7.286 7/14/98

RUN 2: $P_1 = \cancel{17.905}$ BP 7/14/98 18.113 $V_p = 18.509$
$P_2 = \cancel{7.}$ BP 7/14/98 7.400

RUN 3: $P_1 = 17.853$ $V_p = 18.546$
$P_2 = 7.295$

	V_p
RUN 1	18.644
RUN 2	18.509
RUN 3	18.546

Average = 18.566

Dimensions of sample measured with vernier calipers.
h = 4 cm
d = 2.5 cm , r = d/2 = 1.25 cm

Geometric Volume = 19.635 cm^3

Porosity (Ø)

$$\text{Ø} = \left[\frac{\text{Geom. Vol.} - \text{Vol. of skeletal material}}{\text{Geom. Vol}}\right] \times 100\%$$

$$= \left(\frac{19.635 - 18.566}{19.635}\right) \times 100\%$$

Ø = 5.45 BP 7/14/98 5.44 % ≈ 5.4%

To Page No.____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

TITLE_____
Project No._____
Book No._____

From Page No.____

Sample # SC5-98-2B

RUN 1: $P_1 = 17.781$ $V_p = 18.378$
$P_2 = 7.260$

RUN 2: $P_1 = 17.927$ $V_p = 18.329$
$P_2 = 7.318$

RUN 3: $P_1 = 17.669$ $V_p = 18.248$
$P_2 = 7.210$

	V_p
RUN 1	18.378
RUN 2	18.329
RUN 3	18.248

Average = 18.318

Dimensions of sample measured with vernier calipers.
h = 3.975 cm
d = 2.5 cm , r = d/2 = 1.25 cm

Geom. Vol. = 19.512 cm^3

Porosity (Ø)

$$\text{Ø} = \left[\frac{(19.512 - 18.318)}{19.512}\right] \times 100\%$$

Ø = 6.12% ≈ 6.1%

To Page No.____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No.
Book No. TITLE

From Page No.

Sample # SC5-98-2C

Run 1: P_1 = 17.613 Vp = 18.761
P_2 = 7.204

Run 2: P_1 = 17.675 Vp = 18.690
P_2 = 7.227

Run 3: P_1 = 17.931 Vp = 18.729
P_2 = 7.333

	Vp
Run 1	18.761
Run 2	18.690
Run 3	18.729

Average = 18.727

Dimensions of sample taken with vernier calipers.
h = 4.075 cm
d = 2.5 cm , r = d/2 = 1.25 cm

Geom. Vol. = ~~20.003~~ BP 7/14/98 ~~20.0 cm~~ BP 7/14/98 20.003 cm^3

Porosity (ϕ)

$$\phi = \left[\frac{20.003 - 18.727}{20.003}\right] \times 100\%$$

ϕ = 6.37% ≈ 6.4%

To Page No.

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No.
TITLE Book No.

From Page No.

Sample # SC5-98-4A

Run 1: P_1 = 17.776 Vp = 19.432
P_2 = 7.293

Run 2: P_1 = 17.898 Vp = 19.430
P_2 = 7.343

Run 3 P_1 = 17.856 Vp = 19.407
P_2 = 7.325

	Vp
Run 1	19.432
Run 2	19.430
Run 3	19.407

Average = 19.423

Dimensions of sample taken with vernier calipers.
h = 4.1 cm
d = 2.5 cm , r = d/2 = 1.25 cm

Geom. Vol. = 20.126 cm^3

Porosity (ϕ)

$$\phi = \left[\frac{20.126 - 19.423}{20.126}\right] \times 100\%$$

ϕ = 3.5%

To Page No.

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No.____
Book No.____ TITLE____

From Page No.___

Sample # SCS-98-2A1

Run 1: $P_1 = 17.842$ $V_p = 4.587$
$P_2 = 6.854$

Run 2 $P_1 = 18.116$ $V_p = 4.444$
$P_2 = 6.955$

Run 3 $P_1 = 18.112$ $V_p = 4.328$
$P_2 = 6.950$

	V_p
Run 1	4.587
Run 2	4.444
Run 3	4.328

Average = 4.453

Dimensions were taken with vernier calipers.
$h = 0.975 cm$
$d = 2.5 cm$, $r = d/2 = 1.25 cm$

Geom. Vol. $= 4.786 cm^3$

Porosity (ϕ)

$$\phi = \left[\frac{4.786 - 4.453}{4.786}\right] \times 100\%$$

$\phi = 6.95\% \approx 7\%$

To Page No.___

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

TITLE____
Project No.____
Book No.____

From Page No.___

Sample # SCS-98-2B1

Run 1: $P_1 = 18.058$ $V_p = 4.554$
$P_2 = 6.936$

Run 2: $P_1 = 18.262$ $V_p = 4.542$
$P_2 = 7.014$

Run 3 $P_1 = 18.050$ $V_p = 4.489$
$P_2 = 6.931$

	V_p
Run 1	4.554
Run 2	4.542
Run 3	4.489

Average = 4.528

Dimensions were taken with vernier calipers.
$h = 1 cm$
$d = 2.5 cm$, $r = d/2 = 1.25 cm$

Geom. Vol. $= 4.909 cm^3$

Porosity (ϕ)

$$\phi = \left[\frac{4.909 - 4.528}{4.909}\right] \times 100\%$$

$\phi = 7.8\%$

To Page No.___

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No.
Book No. TITLE

From Page No. Sample #SC5-98-2C1

Run 1: P_1 = 17.785 V_p = 4.447
P_2 = 6.828

Run 2: P_1 = 18.048 V_p = 4.481
P_2 = 6.930

Run 3 P_1 = 18.064 V_p = 4.443
P_2 = 6.935

	V_p
Run 1	4.447
Run 2	4.481
Run 3	4.443

Average = 4.457

Dimensions were taken with vernier calipers.
h = 1cm
d = 2.5cm , r = d/2 = 1.25cm

Geom. Vol. = 4.909

Porosity (Ø)

$$Ø = \left[\frac{4.909 - 4.457}{4.909}\right] \times 100\%$$

Ø = 9.2%

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No.
TITLE Book No.

From Page No. Sample #SC5-98-4A1

Run 1: P_1 = 17.932 V_p = 5.108
P_2 = 6.904

Run 2: P_1 = 18.065 V_p = 5.101
P_2 = 6.955

Run 3 P_1 = 17.939 V_p = 5.084
P_2 = 6.906

	V_p
Run 1	5.108
Run 2	5.101
Run 3	5.084

Average = ~~5.098~~ BP 7/14/98 5.098

Dimensions were taken with vernier calipers.
h = 1.08cm
d = 2.5cm , r = d/2 = 1.25cm

Geom. Vol. = 5.301 cm^3

Porosity (Ø)

$$Ø = \left[\frac{5.301 - 5.098}{5.301}\right] \times 100\%$$

Ø = 3.8%

Put samples back in oven B.P. 7/14/98

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

From Page No.____ 7-16-98

Data Collected so far.

Sample	2A	2A1	2B	2B1	2C	2C1
Porosity (%)	5.4	7	6.1	7.8	6.4	9.2
Geom. Vol.	19.635	4.786	19.512	4.909	20.003	4.909
Run 1 *	18.644	4.587	18.378	4.554	18.761	4.447
Run 2	18.509	4.444	18.329	4.542	18.69	4.481
Run 3	18.546	4.328	18.248	4.489	18.729	4.443
Average	18.566	4.453	18.318	4.528	18.727	4.457
stdev	0.069759	0.129734	0.065653	0.034588	0.035557	0.020881
CV	0.375736	2.913414	0.358408	0.76387	0.189873	0.46849

Sample	3A	3A1	3B	3B1	3C	3C1
Porosity (%)	5.4	3.1	9.2	~~29.3~~ 30% BP 7-13-98	3.9	6
Geom. Vol.	19.88	5.4	19.635	5.007	20.077	5.154
Run 1 *	18.734	5.27	18.773	4.867	19.243	4.869
Run 2	18.836	5.228	18.817	4.838	19.326	4.83
Run 3	18.849	5.201	18.829	4.872	19.343	4.841
Average	18.806	5.233	18.806	4.859	19.304	4.847
stdev	0.062979	0.034771	0.029484	0.018358	0.053507	0.020108
CV	0.334887	0.66445	0.156782	0.377805	0.277181	0.414855

Sample	4A	4A1	5A	5A1	6A	6A1	6B	6B1
Porosity (%)	3.5	3.8	4.8	7.5	3.6	6	5	4.5
Geom. Vol.	20.126	5.301	18.751	5.154	20.077	5.252	19.635	5.4
Run 1 *	19.432	5.108	17.889	4.851	19.353	4.978	18.638	5.165
Run 2	19.43	5.101	17.803	4.731	19.34	4.929	18.656	5.155
Run 3	19.407	5.084	17.866	4.728	19.361	4.901	18.65	5.145
Average	19.423	5.098	17.853	4.77	19.351	4.936	18.648	5.155
stdev	0.013892	0.012342	0.044523	0.070164	0.010599	0.038974	0.009165	0.01
CV	0.071526	0.242102	0.249389	1.470945	0.054771	0.789594	0.049148	0.193986

* refers to skeletal volume

B.P. 7/16/98

To Page No.____

Witnessed & Understood by me, | Date | Invented by | Date

Recorded by

From Page No.____ 7-28-98

~~Pulledout Sample # SCS 98-2B~~ BP 7/28/98

Pulled out sample # SCS-98-2B and placed in sealed jar of drierite. Left sample in for 1 hr.

Will take porosity measurements using the Multipycnometer.

Note: Using helium as the permeate.

Will be using V_c & V_R values found on 7/27/98 during recalibration. $V_c = 148.151$, $V_R = 89.566$.

Determination of these values can be found on p. 72 & 73 of lab notebook # 279.

Will be using this eqn:

$$V_p = V_c - V_R\left[\left(\frac{P_1}{P_2}\right) - 1\right]$$

Will first run through a sample of non porous ceramic cylinder with know volume to check if pycnometer needs to be recalibrated.

Non-Porous Ceramic Cylinder

RUN 1: $P_1 = 17.761$, $P_2 = 6.783$ — $V_p = 3.192$

RUN 2: $P_1 = 17.799$, $P_2 = 6.797$ — $V_p = 3.175$

RUN 3: $P_1 = 17.827$, $P_2 = 6.807$ — $V_p = 3.151$

RUN 4: $P_1 = 17.862$, $P_2 = 6.820$ — $V_p = 3.138$

RUN 5: $P_1 = 17.981$, $P_2 = 6.865$ — $V_p = 3.123$

RUN 6: $P_1 = 17.728$, $P_2 = \sim\!\!6.77$ BP 7/28/98 6.768 — $V_p = 3.109$

To Page No.____

Witnessed & Understood by me, | Date | Invented by | Date

Recorded by

From Page No.

Average V_p = 3.148

Geom. Vol. of non-porous ceramic cylinder = 3.142
Note: dimensions can be found on p. 15

$$\text{error \%} = \left[\frac{\text{Geom. Vol.} - \text{meas. vol.}}{\text{Geom. Vol.}}\right] \times 100\%$$

$$\text{error \%} = \left[\frac{3.142 - 3.148}{3.142}\right] \times 100\%$$

error % = -.19%

Note: Permeate used was helium.

Sample ~~98~~ BP 7/28/98 SCS-98-2B

RUN 1: P_1 = 18.083 V_p = 18.434
P_2 = ~~7.4~~ BP 7/28/98 7.386

RUN 2: P_1 = 18.032 V_p = 18.399
P_2 = 7.364

RUN 3: P_1 = 17.442 V_p = 18.557
P_2 = 7.120

RUN 4: P_1 = 18.037 V_p = 18.279
P_2 = 7.362

RUN 5: P_1 = 17.865 V_p = 18.225
P_2 = 7.290

To Page No.

Witnessed & Understood by me,	Date	Invented by / Recorded by	Date

From Page No.

RUN 6: P_1 = 17.807 V_p = 18.215
P_2 = 7.266

Average V_p = ~~18.375~~ BP 7/28/98 18.352

Porosity (Ø)

$$Ø = \left[\frac{19.512 - 18.352}{19.512}\right] \times 100\%$$

Ø = 5.95%

Note Geom. vol. measurements can be found on p. 33.

Placed sample back in oven.
BP 7/28/98

~~7~~ BP 8/4/98
8-4-98

Note: Porosity values for these samples is suspiciously low. After speaking to R. J. Onuter, Regional Manager for Quantachrome Corporation, in person, we now realize that samples with tight ~~Rock~~ BP 8-4-98 matrix formations require a longer interval between readings of P_1 and P_2. The reason for this is that it takes longer for the helium to permeate through the tight matrix.

Will run through a non-~~poro~~ BP 8-4-98 porous ceramic cylinder of known vol. first to check for accuracy.

Non-~~Porous~~ BP 8-4-98 Porous Ceramic Cylinder

RUN 1: P_1 = 18.014 V_p = 3.103
P_2 = 6.877

To Page No.

Witnessed & Understood by me,	Date	Invented by / Recorded by	Date

Project No.
Book No. TITLE

From Page No.

Note: Using this eqn.

$$V_p = V_c - V_R\left[\left(\frac{P_1}{P_2}\right) - 1\right]$$

Where $V_c = 148.151$ & $V_p = 89.566$.
Determination of these values can be found on p. 72 & 73 of lab notebook #279.

Run 2: $P_1 = 17.626$, $P_2 = 6.729$ $V_p = \cancel{3.102}$ BP 8-4-98 $\cancel{3.103}$ BP 8-4-98 3.107

Run 3: $P_1 = 17.689$, $P_2 = 6.753$ $V_p = 3.105$

Run 4: $P_1 = 18.013$, $P_2 = 6.877$ $V_p = 3.116$

Run 5: $P_1 = 17.705$, $P_2 = 6.759$ $V_p = 3.102$

Average $V_p = 3.107$

Geom. Vol. = 3.142 $\cancel{cm}$ BP 8-4-98 cm^3
Note dimensions can be found on p. 15

$$\text{error\%} = \left[\frac{\cancel{\text{Geom. Vol}} - \text{meas. vol.}}{\text{Geom. Vol.}}\right] \times 100\%$$

$$= \left[\frac{3.142 - 3.107}{3.142}\right] \times 100\%$$

error% = 1.11%

B.P. 8-4-98

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No.
TITLE Book No.

From Page No. 8-5-98

Removed all samples from over and placed them in dessicator.

Since samples were not run yesterday and it is possible accuracy of pycnometer changed, will run through sample of non porous ceramic cylinder with known volume again to check accuracy.

Will be using eqn shown at top of p. 44. with same values for V_c and V_R.

Non-Porous Ceramic Cylinder

Run 1: $P_1 = 17.833$, $P_2 = 6.810$ $V_p = 3.175$

Run 2: $P_1 = 17.957$, $P_2 = 6.857$ $V_p = 3.163$

Run 3: $P_1 = 17.446$, $P_2 = 6.661$ $V_p = 3.132$

Run 4: $P_1 = 18.016$, $P_2 = 6.879$ $V_p = 3.145$

Run 5: $P_1 = 17.754$, $P_2 = 6.778$ $V_p = 3.112$

Average $V_p = \cancel{3.1454}$ BP 8-5-98 3.145

Geom. Vol = 3.142 cm^3
Note: Dimensions can be found on p. 15

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

From Page No.____

$$\text{error } \% = \left[\frac{\text{Gveom. Vol.} - \text{meas. Vol.}}{\text{Gveom. Vol.}}\right] \times 100\%$$

$$= \left[\frac{3.142 - 3.145}{3.142}\right] \times 100\%$$

error % = −.10%

Sample SC5-98-2A

Run 1: P_1 = ~~17.885~~ BP 8/5/98 ~~17.890~~ 17.777 BP V_p = ~~18.491~~ BP 8-5-98
P_2 = ~~7.307~~ ~~7.298~~ 7.223 BP 8-5-98 ~~18.159~~ 17.280

Run 2: P_1 = 18.050 V_p = 17.493
P_2 = 7.341

Run 3: P_1 = 17.675 V_p = 17.508
P_2 = ~~7.18~~ BP 8-5-98 7.189

Run 4: P_1 = 17.958 V_p = 17.505
P_2 = 7.304

Run 5: P_1 = 17.613 V_p = 17.546
P_2 = 7.165

Average V_p = 17.466

Geom. Vol. for this sample can be found on p. 32 along with its dimensions

Geom Vol = 19.635 cm^3

Porosity (Ø)

$$\emptyset = \left[\frac{\text{Geom. Vol.} - \text{meas. skel. Vol.}}{\text{Geom. Vol.}}\right] \times 100\%$$

To Page No.____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.____

$$\emptyset = \left[\frac{19.635 - 17.466}{19.635}\right] \times 100\%$$

Ø = ~~11.05%~~ BP 8-5-98 11.1%

~~Sample SC5-98-2B~~ BP 8-5-98

Note: We are now taking readings for P_1 & P_2 when the reading on display stabilizes. This procedure is in agreement with that given in the operation manual for the multi pycnometer on p. 7 #11 & #13. This procedure will be used for all runs on these samples.

To Page No.____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No._____
Book No._____ TITLE_____

From Page No.___ SC5-98-2B

RUN 1: P_1 = 18.066 P_2 = 7.355 V_p = 17.717

RUN 2: P_1 = 17.774 P_2 = 7.228 V_p = ~~17.46~~ BP 8-5-98 17.470

RUN 3: P_1 = 17.424 BP 8-5-98 P_2 = 7.0865 V_p = 17.449

RUN 4: P_1 = 17.901 P_2 = 7.276 V_p = 17.360

RUN 5: P_1 = 18.033 P_2 = 7.330 V_p = ~~17.36~~ BP 8-5-98 17.370

Average V_p = 17.473

Geom. Vol. = 19.512

*Note: All Geom. Vol. for these samples can be found ON P.40.

Porosity Ø

$$Ø = \left[\frac{19.512 - 17.473}{19.512}\right] X100\%$$

Ø = 10.4%

To Page No.___

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

TITLE_____
Project No._____
Book No._____

From Page No.___ SC5-98-2C

RUN 1: P_1 = 17.970 P_2 = 7.310 V_p = 17.539

RUN 2: P_1 = 18.036 P_2 = 7.348 V_p = 17.873

RUN 3: P_1 = 17.403 P_2 = 7.089 V_p = 17.839

RUN 4: P_1 = 18.855 BP 8-5-98 P_2 = ~~7.676~~ 7.675 V_p = ~~17.711~~ BP. 8-5-98 17.682

RUN 5: P_1 = 18.135 P_2 = 7.380 V_p = ~~17.~~ BP 8-5-98 ~~17.653~~ BP 8-5-98 17.625

Avg. V_p = 17.712

Geom. Vol. = 20.003

Porosity (Ø)

$$Ø = \left[\frac{20.003 - 17.712}{20.003}\right] X100\%$$

Ø = 11.5%

To Page No.___

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

From Page No. SCS-98-3A

RUN 1: P_1 = 17.778 BP 8-5-98 ~~7.242~~ ~~7.240~~ 7.239 V_p = 17.755
P_2 =

RUN 2: P_1 = 17.738 V_p = 18.341
P_2 = 7.242

RUN 3: P_1 = 18.028 V_p = 18.299
P_2 = ~~7.360~~ BP 8-5-98 7.359

RUN 4: P_1 = 17.624 V_p = 18.266
P_2 = 7.193

RUN 5: P_1 = 18.049 V_p = ~~18.222~~ BP 8-5-98 18.223
P_2 = 7.365

Average V_p = 18.177

Geom. Vol = 19.88

Porosity (Ø)

$$Ø = \left[\frac{19.88 - 18.177}{19.88}\right] X100\%$$

Ø = ~~8.5~~ BP 8-5-98 8.6%

To Page No.

Witnessed & Understood by me,	Date	Invented by / Recorded by	Date

From Page No. SCS-98-3B

RUN 1: P_1 = 18.372 BP 8-5-98 ~~7.480~~ ~~7.476~~ 7.472 V_p = 17.494
P_2 =

RUN 2: P_1 = 17.918 V_p = 18.206
P_2 = 7.311

RUN 3: P_1 = 17.808 V_p = 17.961
P_2 = 7.258

RUN 4: P_1 = 17.918 V_p = 18.116
P_2 = 7.308

RUN 5: P_1 = 17.865 V_p = 17.984
P_2 = 7.282

Average V_p = 17.952

Geom. Vol. = 19.635

~~Porosity (Ø)~~ BP 8-5-98
Porosity (Ø)

$$Ø = \left[\frac{19.635 - 17.952}{19.635}\right] X100\%$$

Ø = ~~8.57~~ BP 8-5-98 8.6%

To Page No.

Witnessed & Understood by me,	Date	Invented by / Recorded by	Date

From Page No.____ SCS-98-3C

Run 1: $P_1 = 17.743$ $V_p = 18.036$
$P_2 = 7.234$

Run 2: $P_1 = 17.822$ $V_p = 18.302$
$P_2 = 7.275$

Run 3: $P_1 = 17.883$ $V_p = 18.994$
$P_2 = 7.323$

Run 4: $P_1 = 17.238$ BP 8-5-98 $V_p = 18.874$
$P_2 = 7.056$ 5

Run 5: $P_1 = 17.729$ BP 8-5-98 $V_p = \cancel{18.694}$ BP 8-5-98
$P_2 = 7.250$ 49 18.664

Avg. $V_p = 18.574$

Geom. Volume = 20.077

Porosity ($\emptyset$)

$$\emptyset = \left[\frac{20.077 - 18.574}{20.077}\right] X\ 100\%$$

$\emptyset = 7.5\%$

To Page No.____

Witnessed & Understood by me,	Date	Invented by / Recorded by	Date

From Page No.____ SCS-98-4A

Run 1: $P_1 = 17.699$ $V_p = 19.185$
$P_2 = 7.254$

Run 2: $P_1 = 18.024$ $V_p = 19.239$
$P_2 = 7.389$

Run 3 $P_1 = 18.118$ $V_p = 19.428$
$P_2 = 7.434$

Run 4: $P_1 = 17.916$ $V_p = 19.187$
$P_2 = 7.343$

Run 5: $P_1 = 17.656$ $V_p = 19.339$
$P_2 = 7.239$

Average $V_p = 19.276$

Geom. Vol. = 20.126

Porosity ($\emptyset$)

$$\emptyset = \left[\frac{20.126 - 19.276}{20.126}\right] X\ 100\%$$

$\emptyset = 4.2\%$

BP 8-5-98

To Page No.____

Witnessed & Understood by me,	Date	Invented by / Recorded by	Date

Project No._____
Book No._____ TITLE_____

From Page No.___

8-10-98

Will continue porosity measurements.
First will measure NON-~~porous~~ BP 8-10-98 porous ceramic cylinder with known volume to check accuracy of Multipycnometer.

Non-Porous Ceramic Cylinder

Will be using eqn at top of p.44 with same values for V_c & V_R.

Run 1: $P_1 = 17.690$ $V_p = $ ~~3.022~~ BP 8-10-98 3.023
$P_2 = 6.751$

Run 2: $P_1 = 17.312$ $V_p = 3.032$
$P_2 = 6.607$

Run 3: $P_1 = 17.795$ $V_p = 3.055$
$P_2 = 6.792$

Run 4: $P_1 = 17.480$ $V_p = 3.027$
$P_2 = 6.671$

Run 5: $P_1 = 17.441$ $V_p = 3.023$
$P_2 = 6.656$

Average $V_p = 3.032$

Geom vol. = 3.142 cm³
Note: dimensions can be found on p. 15

$$\text{error}\% = \left[\frac{\text{Geom. vol.} - \text{meas. vol.}}{\text{Geom. Vol.}}\right] \times 100\%$$

$$= \left[\frac{3.142 - 3.032}{3.142}\right] \times 100\%$$

$= 3.5\%$

To Page No._____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No._____
TITLE_____ Book No._____

From Page No.___

Will go ahead and do sample SCS-98-4A again

SCS-98-4A

Run 1: $P_1 = 17.747$ $V_p = 19.225$
$P_2 = $ ~~7.281~~ BP 8-10-98 ~~7.276~~ BP 8-10-98 7.275

Run 2: $P_1 = 17.844$ $V_p = 19.352$
$P_2 = 7.319$

Run 3: $P_1 = 17.633$ $V_p = $ ~~19.337~~ BP 8-10-98 19.338
$P_2 = 7.232$

Run 4: $P_1 = 17.960$ $V_p = 19.305$
$P_2 = 7.365$

Run 5: $P_1 = 17.793$ $V_p = 19.325$
$P_2 = 7.298$

Average $V_p = 19.309$

Geom Vol. = 20.126 cm³ can be found on p. 40.

Porosity ($\emptyset$)

$$\emptyset = \left[\frac{\text{Geom. vol.} - \text{measured skeletal vol.}}{\text{Geom. Vol.}}\right] \times 100\%$$

$$\emptyset = \left[\frac{20.126 - 19.309}{20.126}\right] \times 100\%$$

$\emptyset =$ ~~4.06%~~ BP 8-10-98 4.1%
UNcorrected porosity

Corrected = ~~4.1% + (4.1 x .035) = 4.2%~~ BP 8-10-98
4.1% + (4.1 x .035) = 4.2%

To Page No._____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.____ SCS-98-5A

RUN 1: $P_1 = 17.702$ $V_p = 17.448$
$P_2 = 7.198$

RUN 2: $P_1 = 17.724$ $V_p = 17.266$
$P_2 = 7.201$

RUN 3: $P_1 = 17.837$ $V_p = 17.360$
$P_2 = 7.250$

RUN 4: $P_1 = 17.302$ $V_p = 17.249$
$P_2 = 7.029$

RUN 5: $P_1 = 17.538$ $V_p = 17.222$
$P_2 = 7.124$

Average $V_p = 17.309$

Geom. Vol. = $18.751\ cm^3$

Porosity (ϕ)

$\phi = \left[\frac{18.751 - 17.309}{18.751}\right] \times 100\%$

$\phi = \cancel{7.690}$ BPS-10-98 $\cancel{7.69\%}$ BPS-10-98
7.7%

Uncorrected porosity.

Corrected porosity = $\cancel{7.7\% \times (7.7\%}$ BPS-10-98
$7.7\% + (7.7 \times .035) = \cancel{8.0\%}$ BPS-10-98
$= \cancel{8\%}$ BPS-10-98 8.0%

To Page No.____

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

From Page No.____ SCS-98-6A

RUN 1: $P_1 = 17.790$ $V_p = 19.296$
$P_2 = 7.295$

RUN 2: $P_1 = 17.679$ $V_p = 19.282$
$P_2 = 7.249$

RUN 3: $P_1 = 17.753$ $V_p = 19.271$
$P_2 = 7.279$

RUN 4: $P_1 = 17.761$ $V_p = 19.293$
$P_2 = 7.283$

RUN 5: $P_1 = 17.517$ $V_p = 19.295$
$P_2 = 7.183$

Average $V_p = 19.287$

Geom. Vol. = $20.077\ cm^3$

Porosity (ϕ)

$\phi = \left[\frac{20.077 - 19.287}{20.077}\right] \times 100\%$

$\phi = 3.9\%$
Uncorrected ~~BPS~~ BPS-10-98 porosity

Corrected porosity = $3.9\% + (3.9 \times .035) = 4.0\%$

To Page No.____

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No._____
Book No._____ TITLE_____

From Page No.___ | SCS-98-6B

RUN 1: P_1 = 17.904 V_p = 18.617
P_2 = 7.319

RUN 2: P_1 = 17.781 V_p = ~~7.~~ 18.596
P_2 = 7.268

RUN 3: P_1 = 17.741 V_p = 18.606
P_2 = 7.252

RUN 4: P_1 = 17.868 V_p = 18.609
P_2 = 7.304

RUN 5: P_1 = 17.784 V_p = ~~18.589~~ BP 8-10-98 18.559
P_2 = 7.268

Average V_p = 18.597

Geom. Vol = 19.635

Porosity (ϕ)

$$\phi = \left[\frac{19.635 - 18.597}{19.635}\right] \times 100\%$$

ϕ = ~~5.29%~~ 8-10-98 5.3%

Uncorrected porosity

Corrected porosity = 5.3% + (5.3 x .035) = 5.5%

BP 8-10-98

To Page No._____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No._____
TITLE_____ Book No._____

From Page No.___ | 8-12-98

Continuing porosity measurements.
First will measure NON-POROUS ceramic cylinder with KNOWN volume to check accuracy of multipycnometer.

Will be using eqn ON p. 44 with same values for V_c & V_R.

~~NON-POROUS Ceramic Cylinder~~
RUN 1: P_1 = ~~18.126~~ BP 8-12-98 17.976 V_p = ~~2.~~ BP 8-12-98 3.188
P_2 = ~~6.922~~ BP 8-12-98 6.865

RUN 2: P_1 = 17.605 V_p = 3.143
P_2 = 6.722

RUN 3: P_1 = 17.786 V_p = 3.104
P_2 = 6.790

RUN 4: P_1 = 17.807 V_p = 3.138
P_2 = ~~6.8~~ BP 8-12-98 6.799

RUN 5: P_1 = 17.582 V_p = 3.135
P_2 = 6.713

Average V_p = 3.142

Geom. Vol = 3.142 cm^3 Note: dimensions can be found ON p. 15.

~~Porosity (ϕ)~~ BP 8-12-98

error % ϕ = BP 8-12-98 $\left[\frac{\text{Geom. Vol.} - \text{measured Skeletal Vol.}}{\text{Geom. Vol}}\right] \times 100\%$

error % ϕ = BP 8-12-98 $\left[\frac{3.142 - 3.142}{3.142}\right] \times 100\%$

error % ϕ = BP 8-12-98 0 %

Note: Samples have been pulled out of the over for 1hr in dessicant.

To Page No._____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No._____
Book No._____ TITLE _____

From Page No.___ SCS-98-2A1

RUN 1: $P_1 = 17.732$ $V_p = 4.298$
$P_2 = 6.804$

RUN 2: $P_1 = 17.770$ $V_p = 4.278$
$P_2 = 6.818$

RUN 3: $P_1 = 17.711$ $V_p = 4.265$
$P_2 = 6.795$

RUN 4: $P_1 = 17.795$ $V_p = 4.223$
$P_2 = 6.826$

RUN 5: $P_1 = 17.857$ $V_p = 4.231$
$P_2 = 6.850$

Average $V_p = 4.259$

Geom. Vol = $4.786\ cm^3$ Volumes can be found on p. 40

Porosity (ϕ)

$$\phi = \left[\frac{\text{Geom. Vol} - \text{meas. Skeletal Vol}}{\text{Geom Vol}}\right] \times 100\%$$

$$\phi = \left[\frac{4.786 - 4.259}{4.786}\right] \times 100\%$$

$\phi = \cancel{11.01\%}$ BP 8-R-98
11.0%

To Page No._____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

TITLE _____ Project No._____
Book No._____

From Page No.___ SCS-98-2B1

RUN 1: $P_1 = 17.675$ $V_p = 4.397$
$P_2 = 6.785$

RUN 2: $P_1 = 17.535$ $V_p = 4.388$
$P_2 = 6.731$

RUN 3: $P_1 = 17.968$ $V_p = 4.414$
$P_2 = 6.898$

RUN 4: $P_1 = 17.993$ $V_p = 4.394$
$P_2 = 6.907$

RUN 5: $P_1 = 18.058$ $V_p = 4.396$
$P_2 = 6.932$

Average $V_p = 4.398$

Geom. Vol = $4.909\ cm^3$

Porosity (ϕ)

$$\phi = \left[\frac{4.909 - 4.398}{4.909}\right] \times 100\%$$

$\phi = \cancel{10.41\%}$ BP 8-12-28
10.4%

To Page No._____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No.
Book No.
TITLE

From Page No. SCS-98-2C1

RUN 1: $P_1 = 17.634$, $P_2 = 6.773$, $V_p = 4.525$

RUN 2: $P_1 = 17.971$, $P_2 = 6.898$, $V_p = 4.375$

RUN 3: $P_1 = 17.786$, $P_2 = ~~6.7~~$ BP 8-12-98 6.827, $V_p = 4.376$

RUN 4: $P_1 = 17.703$, $P_2 = 6.794$, $V_p = 4.337$

RUN 5: $P_1 = ~~17.459~~$ BP 8-12-98 17.769, $P_2 = 6.819$, $V_p = 4.325$

Average $V_p = 4.388$

Geom. Vol $= 4.909\ cm^3$

Porosity (ϕ)

$$\phi = \left[\frac{4.909 - 4.388}{4.909}\right] \times 100\%$$

$\phi = ~~10.61\%~~$ BP 8-12-98 10.6%

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No.
Book No.
TITLE

From Page No. SCS-98-3A1

RUN 1: $P_1 = 18.015$, $P_2 = 6.934$, $V_p = 5.018$

RUN 2: $P_1 = 17.794$, $P_2 = 6.850$, $V_p = 5.055$

RUN 3: $P_1 = 17.820$, $P_2 = 6.858$, $V_p = 4.987$

RUN 4: $P_1 = 17.713$ BP 8-12-98, $P_2 = ~~6.817~~$ 6.816, $V_p = 4.958$

RUN 5: $P_1 = 17.575$ BP 8-12-98, $P_2 = ~~6.765~~$ 6.764, $V_p = 4.996$

Average $V_p = 5.003$

Geom. Vol. $= 5.40\ cm^3$

Porosity (ϕ)

$$\phi = \left[\frac{5.40 - 5.003}{5.40}\right] \times 100\%$$

$\phi = ~~7.35\%~~$ BP 8-12-98 7.4%

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No.
Book No.
TITLE

From Page No. SCS-98-3B1

RUN 1: P_1 = 17.584 V_p = 4.705
P_2 = 6.759

RUN 2: P_1 = 17.563 V_p = 4.742
P_2 = 6.752

RUN 3: P_1 = 17.656 V_p = 4.647
P_2 = ~~6.8~~ BP 8-12-98 6.785

RUN 4: P_1 = 17.807 BP 8-12-98 6 V_p = 4.694
P_2 = 6.844

RUN 5: P_1 = 17.631 BP 8-12-98 V_p = ~~4.668~~ BP 8-12-98 4.634
P_2 = 6.776 BP 8-12-98 5

Average V_p = 4.684

Geom. Vol. = 5.007 cm^3

Porosity (ϕ)

$$\phi = \left[\frac{5.007 - 4.684}{5.007}\right] \times 100\%$$

ϕ = ~~6.45%~~ BP 8-12-98 6.5%

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No.
Book No.
TITLE

From Page No. SCS-98-3C1

RUN 1: P_1 = 18.131 V_p = ~~4.696~~ BP 8-12-98 4.663
P_2 = ~~6.969~~ BP 8-12-98 6.968

RUN 2: P_1 = 17.683 V_p = 4.635
P_2 = 6.795

RUN 3: P_1 = 18.727 BP 8-12-98 V_p = ~~4.694~~ BP 8-12-98 4.661
P_2 = 7.198 BP 8-12-98 7

RUN 4: P_1 = 17.960 BP 8-12-98 V_p = ~~4.586~~ BP 8-12-98 4.552
P_2 = ~~6.900~~ BP 8-12-98 6.899

RUN 5: P_1 = 17.627 V_p = 4.584
P_2 = 6.772

Average V_p = 4.619

Geom. Vol. = 5.154 cm^3

Porosity (ϕ)

$$\phi = \left[\frac{5.154 - 4.619}{5.154}\right] \times 100\%$$

ϕ = ~~10.38%~~ BP 8-12-98 10.4%

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No.
Book No.
TITLE

From Page No. SCS-98-4A1

RUN 1: $P_1 = 17.585$ $V_p = 5.036$
$P_2 = 6.769$

RUN 2: $P_1 = 17.595$ $V_p = 5.007$
$P_2 = 6.772$

RUN 3: $P_1 = 17.668$ BP 8-12-98 $V_p = 5.003$
$P_2 = \cancel{6.7}$ BP 8-12-98 6.800

RUN 4: $P_1 = \cancel{17.750}$ BP 8-12-98 749 $V_p = 4.997$
$P_2 = 6.831$

RUN 5: $P_1 = 17.857$ $V_p = 5.012$
$P_2 = 6.873$

Average $V_p = 5.011$

~~Poro~~ BP 8-12-98

Geom. Vol = $5.301\ cm^3$

Porosity (ϕ)

$$\phi = \left[\frac{5.301 - 5.011}{5.301}\right] \times 100\%$$

$\phi = \cancel{5.47\%}$ BP 8-12-98 5.5%

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No.
Book No.
TITLE

From Page No. SCS-98-5A1

RUN 1: $P_1 = 17.719$ $V_p = 4.777$
$P_2 = 6.813$

RUN 2: $P_1 = 17.428$ BP 8-12-98 $V_p = 4.669$
$P_2 = \cancel{6.7}$ BP 8-12-98 6.698

RUN 3: $P_1 = 17.\cancel{760}$ BP 8-12-98 59 $V_p = 4.662$
$P_2 = 6.825$

RUN 4: $P_1 = 17.969$ $V_p = 4.672$
$P_2 = 6.906$

RUN 5: $P_1 = 17.316$ $V_p = 4.635$
$P_2 = 6.654$

Average $V_p = 4.683$

Geom. Vol = $5.154\ cm^3$

Porosity (ϕ)

$$\phi = \left[\frac{5.154 - 4.683}{5.154}\right] \times 100\%$$

$\phi = \cancel{9.14\%}$ BP 8-12-98 9.1%

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

From Page No. SC5-98-6A1

RUN 1: P_1 = 17,886 P_2 = 6.881 Vp = 4.905

RUN 2: P_1 = 17,526 P_2 = 6.742 Vp = 4.888

RUN 3: P_1 = 17,884 P_2 = 6.879 Vp = ~~4.864~~ 4.884 BP 8-12-98

RUN 4: P_1 = 17,735 P_2 = 6.822 Vp = 4.874

RUN 5: P_1 = 17,685 P_2 = 6.803 Vp = 4.882

Average Vp = 4.883

Geom. Vol = 5.252 cm^3

Porosity (Ø)

$$Ø = \left[\frac{5.252 - 4.883}{5.252}\right]$$

Ø = ~~7.03%~~ BP 8-12-98 7.0%

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

From Page No. SC5-98-6B1

RUN 1: P_1 = 17,603 P_2 = 6.779 Vp = 5.141

RUN 2: P_1 = 17,587 P_2 = 6.773 Vp = 5.147

RUN 3: P_1 = 18,022 P_2 = 6.939 Vp = 5.511

RUN 4: P_1 = 17,833 P_2 = 6.866 Vp = 5.088

RUN 5: P_1 = 18.013 P_2 = 6.936 Vp = 5.111

Average Vp = 5.200

Geom. Vol = 5.400 cm^3

Porosity (Ø)

$$Ø = \left[\frac{5.400 - 5.200}{5.400}\right] X\ 100\%$$

Ø = 3.7%

Samples were placed back in oven.
BP 8-12-98

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

From Page No. 8-13-98

Data Collected using Corrected method.

Sample	2A	2A1	2B	2B1	2C	2C1
Porosity (%)	11.1	11	10.4	10.4	11.5	10.6
Geom. Vol.	19.635	4.786	19.512	4.909	20.003	4.909
Run 1 *	17.28	4.298	17.717	4.397	17.539	4.525
Run 2	17.493	4.278	17.47	4.388	17.873	4.375
Run 3	17.508	4.265	17.449	4.414	17.839	4.376
Run 4	17.505	4.223	17.36	4.394	17.682	4.337
Run 5	17.546	4.231	17.37	4.396	17.625	4.325
Average	17.466	4.259	17.473	4.398	17.712	4.388
stdev	0.106077	0.031615	0.144481	0.009706	0.141816	0.08008
CV	0.60732	0.742307	0.826871	0.220694	0.800696	1.825143

Avg Porosity	10.83333
stdev	0.44121

Sample	3A	3A1	3B	3B1	3C	3C1
Porosity (%)	8.6	7.4	8.6	6.5	7.5	10.4
Geom. Vol.	19.88	5.4	19.635	5.007	20.077	5.154
Run 1 *	17.755	5.018	17.494	4.705	18.036	4.663
Run 2	18.341	5.055	18.206	4.742	18.302	4.635
Run 3	18.299	4.987	17.961	4.647	18.994	4.661
Run 4	18.266	4.958	18.116	4.694	18.874	4.552
Run 5	18.223	4.996	17.984	4.634	18.664	4.584
Average	18.177	5.003	17.952	4.684	18.574	4.619
stdev	0.23974	0.036259	0.2749	0.044083	0.399352	0.049168
CV	1.318933	0.72477	1.531291	0.941057	2.150059	1.064475

Avg Porosity	8.166667
stdev	1.354499

Sample	4A	4A1
Porosity (%)	4.2	5.5
Geom. Vol.	20.126	5.301
Run 1 *	19.185	5.036
Run 2	19.239	5.007
Run 3	19.428	5.003
Run 4	19.187	4.997
Run 5	19.339	5.012
Average	19.276	5.011
stdev	0.105645	0.015017
CV	0.548075	0.299674

Avg Porosity	4.85
stdev	0.919239

* refers to skeletal volume

From Page No.

Sample	5A	5A1
Porosity (%)	8	9.1
Geom. Vol.	18.751	5.154
Run 1 *	17.448	4.777
Run 2	17.266	4.669
Run 3	17.36	4.662
Run 4	17.249	4.672
Run 5	17.222	4.635
Average	17.309	4.683
stdev	0.093461	0.054539
CV	0.539957	1.164616

Avg Porosity	8.55
stdev	0.777817

Sample	6A	6A1	6B	6B1
Porosity (%)	4	7	5.5	3.7
Geom. Vol.	20.077	5.252	19.635	5.4
Run 1 *	19.296	4.905	18.617	5.141
Run 2	19.282	4.888	18.596	5.147
Run 3	19.271	4.864	18.606	5.511
Run 4	19.293	4.874	18.609	5.088
Run 5	19.295	4.882	18.559	5.111
Average	19.287	4.883	18.597	5.200
stdev	0.010738	0.015421	0.022744	0.175695
CV	0.055673	0.315831	0.122298	3.379014

Avg Porosity	5.05
stdev	1.519868

* refers to skeletal volume

BP 8-13-98

Project No.
Book No.
TITLE

From Page No. | 8-17-98

Took samples out of over and placed them in a jar of dessicator for 1 hr to allow them to cool. Then all samples ~~were~~ BP 8-17-98 were ~~then~~ BP 8-17-98 weighed individually using the Mettler PM 480 Delta Range Serial # N4560 scale. Following are the samples and their measured masses:

Sample	Dry Mass (g)
SCS-98-2A	41.019
" " 2A1	9.856
" " 2B	40.626
" " 2B1	10.437
" " 2C	41.302
" " 2C1	10.257
" " 3A	41.697
" " 3A1	11.558
" " 3B	41.665
" " 3B1	10.769
" " 3C	42.766
" " 3C1	10.790
" " 4A	47.645
" " 4A1	12.375
" " 5A	42.832
" " 5A1	11.592
" " 6A	47.390
" " 6A1	11.963
" " 6B	45.690
" " 6B1	12.626

The samples were then put in the vacuum chamber. Vacuum was pulled for 15 ~~secs~~ BP 8-17-98 minutes, then CO_2 was introduced into the chamber. ~~2 cyles will be done.~~ BP 8-17-98 This process was repeated and then vacuum was pulled one last time before introducing 0.01% solution of sodium hypochloride. Samples were left in chamber immersed in solution at ~~2~~ BP 8-17-98 28 inches of Mercury. BP 8-17-98

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

Project No.
Book No.
TITLE

From Page No. | 8-27-98

Pulled samples out of chamber. Placed samples in a beaker filled w/ deaired water. ~~Covered~~ BP 8-27-98 ~~Samples~~ BP 8-27-98

Note: Samples were completely immersed in deaired water when the chamber was opened and the pressure gage was still reading 28 inches of Mercury before chamber was opened.

Once samples placed in beaker of deaired water, parafilm was used to seal beaker from air. Using a towel that was damped with deaired water, the samples were pulled out one by one and their saturated mass ~~was measured.~~ BP 8-27-98 were measured.

Note: Sample 4A fell during handling and has a bad nick on it base. May have to discard from this experiment.

To Page No.

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

From Page No.____

Following is data collected thus far:

Sample #	Geom. Vol. (cm^3)	Dry Mass (g)	Sat. Mass (g)	Mass of H_20 (g)	Vol. of H_20 (cm^3)
2A	19.635	41.019	43.492	2.473	2.474
2A1	4.786	9.856	10.43	0.574	0.574
2B	19.512	40.626	43.141	2.515	2.516
2B1	4.909	10.437	11.101	0.664	0.664
2C	20.003	41.302	43.898	2.596	2.597
2C1	4.909	10.257	10.883	0.626	0.626
3A	19.88	41.697	44.024	2.327	2.328
3A1	5.4	11.558	12.128	0.57	0.570
3B	19.635	41.665	43.83	2.165	2.166
3B1	5.007	10.769	11.303	0.534	0.534
3C	20.007	42.766	44.943	2.177	2.178
3C1	5.154	10.79	11.329	0.539	0.539
4A	20.126	47.645	48.434	0.789	0.789
4A1	5.301	12.375	12.588	0.213	0.213
5A	18.751	42.832	44.672	1.84	1.841
5A1	5.154	11.592	12.082	0.49	0.490
6A	20.077	47.39	47.96	0.57	0.570
6A1	5.252	11.963	12.1	0.137	0.137
6B	19.635	45.69	46.298	0.608	0.608
6B1	5.4	12.626	12.77	0.144	0.144

Sample #	Porosity (%) calc using gravametric method
2A	12.6
2A1	12.0
2B	12.9
2B1	13.5
2C	13.0
2C1	12.8
3A	11.7
3A1	10.6
3B	11.0
3B1	10.7
3C	10.9
3C1	10.5
4A	3.9
4A1	4.0
5A	9.8
5A1	9.5
6A	2.8
6A1	2.6
6B	3.1
6B1	2.7

Used this eqn for gravametric method

$$\% \text{ Porosity} = \frac{\text{Vol. of } H_2O}{\text{Geom Vol.}} \times 100\%$$

BP 8-27-98

To Page No.____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.____

Comparison of ~~Parameters~~ BP 8-27-98 Porosity measurements

Sample #	Porosity (%) calc using gravametric method	Porosity (%) calc using pycnometer
2A	12.6	11.1
2A1	12.0	11
2B	12.9	10.4
2B1	13.5	10.4
2C	13.0	11.5
2C1	12.8	10.6
3A	11.7	8.6
3A1	10.6	7.4
3B	11.0	8.6
3B1	10.7	6.5
3C	10.9	7.5
3C1	10.5	10.4
4A	3.9	4.2
4A1	4.0	5.5
5A	9.8	8
5A1	9.5	9.1
6A	2.8	4
6A1	2.6	7
6B	3.1	5.5
6B1	2.7	3.7

BP 8-27-98

8-28-98

Note: Be sure and measure mass of samples again before starting Van Genuchten experiments to see if samples have taken on any more water.

Excel files: Porosity SC (1st porosity measurements taken) > using Pycnometer
Porosity SC2 (2nd " " ")
~~Porosity~~ BP8-28-98
Gravametric Por (Data on p. 74 & 75) (Sheet 1 & Sheet 2)
CAN be found on my computer.

8-28-98 Ben Pedrozo

To Page No.____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.

12-22-98 Sample # SCS-98-6A

Used steady-state permeameter to determine Ksat values for sample SCS-98-6A. Due to size and high pressure, a few modifications had to be made to the permeameter cell. The cell was initially checked for leaks under high pressure (confining >100psig). A reoccurring leak was detected between the base plate (base pedestal) and the bottom plate. Several attempts were made to correct this problem. In a first attempt, new o-rings with O.H. were put in place between the two plates. This new seal only lasted one hour before a new leak was found in the same place. After disassembling, a layer of vaccum grease was applied between the two plates. The vaccum grease was applied to the entire bottom surface of the base pedestal. This proved to be a good seal for a little over two and a half hours before a third leak was found again in the same location (between the plates, close to the existing holes for the inflow and outflow lines). On a third attempt, the new o-rings, layer of vaccum grease and a additional latex gasket were used. The latex gasket was cut from a latex membrane in a manner to match the bottom surface of the base pedestal. By placing a gasket of some type between the plates, all leaks have been stopped.

Due to the size of the sample required for this experiment, a smaller diameter latex membrane was needed to assure a good seal along the vertical sidewalls of the samples. In order to gain this smaller diameter, 12inch white latex balloons were used. These balloons were doubled to prevent leaks. The neck parts of the balloons were used to seal the samples and attach the top cap and base pedestal in the same manner as a normal latex membrane. Three runs were performed on sample SCS-98-6A on 12-22-98. The sample has been allow to saturate in deionized deaired water for at least 4 months prior to the experiment. Double filter paper was used on both the top and the bottom of the sample. Pages 77, 78, & 79 show the results of the three runs.

Run 1: $K_{sat} = 8.86 \times 10^{-7}$ (cm/sec)
Run 2: $K_{sat} = 9.03 \times 10^{-7}$ (cm/sec)
Run 3: $K_{sat} = 8.64 \times 10^{-7}$ (cm/sec)

Average $K_{sat} = 8.84 \times 10^{-7}$ (cm/sec)

To Page No.

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.

Sample: SCS-98-6A Test=Ksat Run 1 DH 12/22/98

Width(cm): 2.54	Area(cm^2): 5.07	Height(cm): 4.09

Time

Start time: 2:05pm	Stop time: 2:16
Start date: 12/22/98	Stop date: 12/22/98

Elapsed Time

Time(hrs): 0hr	Time(sec): 630sec

Pressure

Confining Pressure(psig):	66.0
Inflow Pressure(psig):	53.0
Outflow Pressure(psig):	15.0

Differential Pressure (dP)

dP(psig) = Inflow-Outflow	dP(cm H20) = dP(psig)*27.68*2.54
38 [psig]	2671.7 [cm H20]

Fluid Levels

Initial (ml)		Final (ml)	
Confining:	14.0	Confining:	14.0
Inflow:	9.3	Inflow:	11.5
Outflow:	10.0	Outflow:	7.8

Fluid Level Changes

Confining (ml):	0.0
Inflow (ml):	2.2
Outflow (ml):	2.2

Volume change

[Inflow (ml) + Outflow (ml)] / 2
2.2 [ml]

Ksat Calculation

Ksat = (Q / A) * (dL / dH)

Q = Volume change (ml) / Elapsed time (sec)	=	(1) .003	[ml/sec]
A = Area (cm^2)	=	(2) 5.07	[cm^2]
dL = Sample Height (cm)	=	(3) 4.09	[cm]
dH = Differential Pressure (cm H20)	=	(4) 2671.7	[cm H2O]
Ksat = [1 / 2] * [3 / 4] (cm/sec)		8.86×10^{-7}	[cm/sec]

Notes

To Page No.

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.____

Sample: SC5-98-6A Test=Ksat Run 2

Width(cm): 2.54	Area(cm^2): 5.07	Height(cm): 4.09

Time

Start time: 3:40pm	Stop time: 4:11pm
Start date: 12/22/98	Stop date: 12/22/98

Elapsed Time

Time(hrs): 0 hr	Time(sec): 1860 sec

Pressure

Confining Pressure(psig): 90.0
Inflow Pressure(psig): 30.0
Outflow Pressure(psig): 15.0

Differential Pressure (dP)

dP(psig) = Inflow-Outflow	dP(cm H20) = dP(psig)*27.68*2.54
15 [psig]	1054.61 [cm H20]

Fluid Levels

Initial (ml)		Final (ml)	
Confining:	15.0	Confining:	15.0
Inflow:	2.0	Inflow:	4.2
Outflow:	20.0	Outflow:	17.8

Fluid Level Changes

Confining (ml): 0.0
Inflow (ml): 2.2
Outflow (ml): 2.2

Volume change

[Inflow (ml) + Outflow (ml)] / 2
2.2 [ml]

Ksat Calculation

Ksat = (Q / A) * (dL / dH)

Q = Volume change (ml) / Elapsed time (sec)	(1) 1.18×10^{-3}	[ml/sec]
A = Area (cm^2)	(2) 5.07	[cm^2]
dL = Sample Height (cm)	(3) 4.09	[cm]
dH = Differential Pressure (cm H20)	(4) 1054.61	[cm H20]
Ksat = [1 / 2] * [3 / 4] (cm/sec)	9.03×10^{-7}	[cm/sec]

Notes D.H. 12/22/98

To Page No.____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.____

Sample: SC5-98-6A Test=Ksat Run 3

Width(cm): 2.54	Area(cm^2): 5.07	Height(cm): 4.09

Time

Start time: 4:11pm	Stop time: 4:48pm
Start date: 12/22/98	Stop date: 12/22/98

Elapsed Time

Time(hrs): 0 hrs	Time(sec): 2220

Pressure

Confining Pressure(psig): 90
Inflow Pressure(psig): 30
Outflow Pressure(psig): 15

Differential Pressure (dP)

dP(psig) = Inflow-Outflow	dP(cm H20) = dP(psig)*27.68*2.54
15 [psig]	1054.61 [cm H20]

Fluid Levels

Initial (ml)		Final (ml)	
Confining:	15.0	Confining:	15.0
Inflow:	4.2	Inflow:	6.6
Outflow:	17.8	Outflow:	15.2

Fluid Level Changes

Confining (ml): 0.0
Inflow (ml): 2.4
Outflow (ml): 2.6

Volume change

[Inflow (ml) + Outflow (ml)] / 2
2.5 [ml]

Ksat Calculation

Ksat = (Q / A) * (dL / dH)

Q = Volume change (ml) / Elapsed time (sec)	(1) 1.13×10^{-3}	[ml/sec]
A = Area (cm^2)	(2) 5.07	[cm^2]
dL = Sample Height (cm)	(3) 4.09	[cm]
dH = Differential Pressure (cm H20)	(4) 1054.61	[cm H20]
Ksat = [1 / 2] * [3 / 4] (cm/sec)	8.64×10^{-7}	[cm/sec]

Notes D.H. 12/22/98

D.H. 12-22-98

To Page No.____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.____ 1/13/99

Began the drying cycle of the saturation - pressure relationship process in aqua-lab. On 1/11/99, Melissa Hill prepared the salts needed to calibrate the aqualab. The procedures followed for this can be found on page 144 of lab notebook 279. The lab was calibrated to within ±.003 for distilled water and Potassium chloride & to within ±.001 for Sodium chloride. The water activity table used for calibration and the calibration results (initial) are shown below:

Water Activity Table for Selected Saturated Salt Solutions

T°C	Lithium Chloride	Magnesium Chloride	Potassium Carbonate	Magnesium Nitrate
5	.113+/-.005	.336+/-.003	.431+/-.005	.589+/-.004
10	.113+/-.005	.335+/-.003	.431+/-.004	.574+/-.003
15	.113+/-.004	.333+/-.002	.432+/-.003	.559+/-.003
20	.113+/-.003	.331+/-.002	.432+/-.003	.544+/-.002
25	.113+/-.003	.328+/-.002	.432+/-.004	.529+/-.002
30	.113+/-.002	.324+/-.001	.432+/-.005	.514+/-.002
35	.113+/-.002	.321+/-.001		.499+/-.003
40	.112+/-.002	.316+/-.001		.484+/-.004

D.H. 1/13/99

T°C	[redacted]	[redacted]	Potassium Sulfate	[redacted]
5	.757+/-.003	.877+/-.005	.985+/-.009	1.000+/-.003
10	.757+/-.002	.868+/-.004	.982+/-.008	1.000+/-.003
15	.756+/-.002	.858+/-.003	.979+/-.006	1.000+/-.003
20	.755+/-.001	.851+/-.003	.976+/-.005	1.000+/-.003
25	.753+/-.001	.843+/-.003	.973+/-.005	1.000+/-.003
30	.751+/-.001	.836+/-.003	.970+/-.004	1.000+/-.003
35	.748+/-.001	.830+/-.003	.967+/-.004	1.000+/-.003
40	.747+/-.001	.823+/-.003	.964+/-.004	1.000+/-.003

Adapted from Greenspan (1977). The numbers in this table have been rounded to the nearest thousandth.

Note: Some salts may become toxic if they contaminate the food being sampled. KBr_2, $LiCl_2$, $NaNO_2$, and $K_2Cr_2O_4$ should not be used in humidifying foods that are to be sensory tested. Foods held over K-acetate will take on a vinegar-like flavor and foods held over sodium nitrate absorb nitrous oxide, which catalyzes lipid oxidation. (Labuza et. al. 1984)

time	Aw	Temp (C)
09:32:49,	"1.001",	"23.56"
09:33:44,	"1.001",	"23.73"
09:34:39,	"1.001",	"23.85"
09:35:34,	"1.001",	"23.94"
09:36:28,	"1.002",	"24.03"
09:37:22,	"1.002",	"24.11"
09:38:17,	"1.001",	"24.2"
09:39:11,	"1.002",	"24.25"
09:40:05,	"1.003",	"24.31"
09:40:59,	"1.003",	"24.37"
09:41:53,	"1.003",	"24.41"
09:42:48,	"1.003",	"24.48"
09:43:41,	"1.003",	"24.53"
09:44:35,	"1.003",	"24.58"
09:47:22,	".755",	"24.09"
09:48:07,	".754",	"24.31"
09:49:03,	".755",	"24.45"
09:49:58,	".754",	"24.6"
09:50:54,	".756",	"24.7"
09:51:50,	".755",	"24.8"
09:52:45,	".755",	"24.89"
09:53:41,	".755",	"24.96"
09:54:36,	".755",	"25.04"
09:55:32,	".755",	"25.09"
09:56:27,	".755",	"25.14"
09:57:22,	".756",	"25.19"
09:58:17,	".755",	"25.25"
09:59:12,	".755",	"25.31"
10:00:08,	".755",	"25.34"
10:01:03,	".755",	"25.4"
10:03:57,	".845",	"24.67"
10:04:53,	".845",	"24.99"
10:05:48,	".846",	"25.2"
10:06:43,	".846",	"25.36"
10:07:38,	".846",	"25.5"
10:08:32,	".847",	"25.59"
10:09:27,	".847",	"25.69"
10:10:21,	".847",	"25.75"
10:11:15,	".847",	"25.81"
10:14:17,	".998",	"24.27"
10:15:13,	".998",	"24.78"

Distilled H_2O

NaCl

M. Hill 1/13/99

KCl

distilled H_2O

D.H. 1/13/99

The ten button sized tuft sub-samples (≈1cm in height) were prepared for the aqualab after all calibrations were completed. Due to requirements of the lab's loading chamber, the ten sub-samples had to be trimmed down to a smaller height in order for the door to slide closed. (≈.6cm) With completion

To Page No. 81

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

From Page No. 80 of the trimming, all ten samples were ran for a time period of 5min - 10min each (one at a time). The ten trimmed samples retained the same labeling scheme as previously nominated to each. Each sub-sample was weighed before and after being placed in the aqua lab's chamber. These mass readings will be shown below and on the following pages along with the corresponding saturation (Aw) values for each sub sample. The values shown represent the first set of values found for the samples when at full saturation. The samples were allowed to set in open air at room temperature for ≈5min each after the first's run was completed. The new loss mass for each sample has been recorded.

SC 98 2A1 01/13/99

Time	Aw	Temp (C)	Avg. Aw	Mass (g)	
11:54:29	0.996	25.97	0.999125	7.374	Full Saturation
11:55:26	0.997	26.79		7.363	After time in aqua lab
11:56:22	0.998	27.33		7.340	After open to air for approx. 5min.
11:57:16	1.000	27.72			
11:58:11	1.000	28.01			
11:59:04	1.000	28.20			
11:59:58	1.001	28.36			
12:01:08	1.001	28.48			

D.H. 1/13/99

SC 98 2B1 01/13/99

Time	Aw	Temp (C)	Avg. Aw	Mass (g)	
11:41:38	0.983	26.75	0.995100	7.070	Full Saturation
11:42:35	0.988	27.29		7.056	After time in aqua lab
11:43:30	0.992	27.64		7.042	After open to air for approx. 5min.
11:44:24	0.995	27.90			
11:45:18	0.996	28.08			
11:46:12	0.998	28.23			
11:47:06	0.999	28.33			
11:47:59	0.999	28.41			
11:48:53	1.001	28.46			
11:49:46	1.000	28.52			

D.H. 1/13/99

SC 98 2C1 01/13/99

Time	Aw	Temp (C)	Avg. Aw	Mass (g)	
Data for 2C1 was unsucessfully saved.				7.342	Full Saturation
Full saturation values will be obtained				7.338	After time in aqua lab
at later date.				7.318	After open to air for approx. 5min.

D.H. 1/13/99

Witnessed & Understood by me, | Date | Invented by / Recorded by | Date

From Page No.____

SC 98 3A1 01/13/99

Time	Aw	Temp (C)	Avg. Aw	Mass (g)	
13:42:51	0.989	26.20	0.996750	7.680	Full Saturation
13:43:50	0.993	27.22		7.669	After time in aqua lab
13:44:46	0.996	27.88		7.651	After open to air for approx. 5min.
13:45:41	0.997	28.35			
13:46:36	0.999	28.68			
13:47:31	0.999	28.91			
13:48:25	1.000	29.09			
13:49:19	1.001	29.22			

D.H. 1/13/99

SC 98 3B1 01/13/99

Time	Aw	Temp (C)	Avg. Aw	Mass (g)	
11:29:06	0.995	26.58	0.999000	7.196	Full Saturation
11:30:01	0.997	27.10		7.186	After time in aqua lab
11:30:55	0.999	27.46		7.168	After open to air for approx. 5min.
11:31:49	0.999	27.73			
11:32:42	1.000	27.91			
11:33:35	1.001	28.04			
11:34:28	1.001	28.16			
11:35:21	1.000	28.24			

D.H. 1/13/99

SC 98 3C1 01/13/99

Time	Aw	Temp (C)	Avg. Aw	Mass (g)	
13:55:50	0.980	26.64	0.994200	6.630	Full Saturation
13:56:49	0.987	27.59		6.618	After time in aqua lab
13:57:45	0.991	28.19		6.603	After open to air for approx. 5min.
13:58:40	0.994	28.60			
13:59:35	0.996	28.90			
14:00:30	0.997	29.09			
14:01:24	0.998	29.24			
14:02:18	1.000	29.33			
14:03:12	1.000	29.41			
14:04:06	0.999	29.48			

D.H. 1/13/99

SC 98 4A1 01/13/99

Time	Aw	Temp (C)	Avg. Aw	Mass (g)	
14:09:27	0.991	26.70	0.998400	8.649	Full Saturation
14:10:26	0.994	27.63		8.635	After time in aqua lab
14:11:22	0.997	28.23		8.608	After open to air for approx. 5min.
14:12:18	0.998	28.64			
14:13:13	0.999	28.92			
14:14:08	1.000	29.12			
14:15:03	1.001	29.26			
14:15:57	1.001	29.36			
14:16:51	1.002	29.44			
14:17:45	1.001	29.50			

D.H. 1/13/99

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.____

SC 98 5A1 01/13/99

Time	Aw	Temp (C)	Avg. Aw	Mass (g)	
13:30:40	0.987	26.85	0.995875	7.083	Full Saturation
13:31:37	0.992	27.68		7.067	After time in aqua lab
13:32:32	0.995	28.21		7.048	After open to air for approx. 5min.
13:33:27	0.997	28.58			
13:34:21	0.997	28.83			
13:35:15	0.999	29.00			
13:36:08	1.000	29.13			
13:37:01	1.000	29.23			

D.H. 1/13/99

SC 98 6A1 01/13/99

Time	Aw	Temp (C)	Avg. Aw	Mass (g)	
10:27:45	0.995	24.22	1.001879	8.271	Full Saturation
10:28:42	0.997	25.03		8.268	After time in aqua lab
10:29:37	0.999	25.50		8.240	After open to air for approx. 5min.
10:30:32	0.999	25.88			
10:31:26	1.000	26.11			
10:32:20	1.001	26.28			
10:33:14	1.001	26.43			
10:34:07	1.001	26.54			
10:37:35	1.001	26.03			
10:38:30	1.000	26.33			
10:39:25	1.002	26.54			
10:40:20	1.002	26.69			
10:41:14	1.002	26.80			
10:42:08	1.002	26.92			
10:43:02	1.003	26.98			
10:43:56	1.002	27.05			
10:44:50	1.002	27.11			
10:45:44	1.002	27.16			
10:46:37	1.003	27.20			
10:47:31	1.003	27.25			
10:48:25	1.003	27.29			
10:49:18	1.003	27.33			
10:50:12	1.004	27.35			
10:51:05	1.003	27.39			
10:51:59	1.003	27.43			
10:52:52	1.004	27.45			
10:53:45	1.004	27.49			
10:54:39	1.003	27.53			
10:55:32	1.004	27.54			
10:56:25	1.003	27.58			
10:57:18	1.003	27.61			
10:58:11	1.004	27.62			
10:59:04	1.004	27.66			

D.H. 1/13/99

To Page No._____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.____

SC 98 6B1 01/13/99

Time	Aw	Temp (C)	Avg. Aw	Mass (g)	
11:05:39	0.994	25.68	0.998429	7.623	Full Saturation
11:06:37	0.996	26.38		7.619	After time in aqua lab
11:07:33	0.998	26.83		7.599	After open to air for approx. 5min.
11:08:28	0.999	27.15			
11:09:23	1.000	27.37			
11:10:17	1.000	27.54			
11:11:11	1.002	27.65			

D.H. 1/13/99

D.H. 1/13/99

Time	Aw	Temp (C)	
15:02:20	0.999	28.18	H_2O
15:03:17	0.999	28.58	H_2O
15:04:12	0.999	28.85	H_2O
15:05:07	1	29.05	H_2O
15:06:02	1.001	29.18	H_2O
15:06:56	1.001	29.29	H_2O
15:07:51	1.001	29.37	H_2O
15:08:45	1.001	29.43	H_2O
15:09:39	1.002	29.47	H_2O
15:10:33	1.001	29.52	H_2O
15:11:27	1.002	29.54	H_2O
15:12:21	1.002	29.57	H_2O
15:13:14	1.001	29.6	H_2O
15:19:20	0.752	28.09	NaCl
15:20:18	0.752	28.53	NaCl
15:21:14	0.753	28.84	NaCl
15:22:10	0.753	29.06	NaCl
15:23:06	0.753	29.21	NaCl
15:24:02	0.753	29.33	NaCl
15:24:58	0.755	29.41	NaCl
15:25:53	0.754	29.49	NaCl
15:26:49	0.754	29.53	NaCl
15:33:00	0.838	27.36	KCl
15:33:58	0.839	28.02	KCl
15:34:55	0.841	28.48	KCl
15:35:51	0.841	28.8	KCl
15:36:46	0.843	29.02	KCl
15:37:42	0.843	29.19	KCl
15:38:37	0.843	29.33	KCl
15:39:32	0.844	29.41	KCl
15:40:27	0.843	29.49	KCl
15:41:22	0.844	29.54	KCl
15:42:17	0.844	29.59	KCl
15:43:12	0.844	29.62	KCl

Upon completion of the first set of values found in the drying cycle, the aqua lab was checked for calibration accuracy. These results are shown to the left. Distilled H_2O, NaCl, and HCl were reran as pretormed in the initial calibration procedures found on page 80 of this note book.

D.H. 1/13/99

D.H. 1/13/99

To Page No.____

Witnessed & Understood by me, | Date | Invented by | Date

Recorded by

From Page No.____

1/22/99 Continuation of moisture retention measurements using Aqua Lab

Calibration performed using salts prepared on 1/11/99 (SNB # 279 p 144)

Call-22-99

Time	Aw	Temp (C)	
9:00:49	1	25.1	distilled water
9:01:45	0.999	25.34	
9:02:41	1	25.51	
9:03:37	1.001	25.66	
9:04:32	1.002	25.77	
9:05:27	1.002	25.9	
9:06:22	1.002	25.98	
9:07:17	1.001	26.07	
9:08:11	1.002	26.13	
9:11:06	0.755	25.47	NaCl
9:12:03	0.754	25.73	
9:12:59	0.755	25.93	
9:13:56	0.755	26.09	
9:14:52	0.755	26.22	
9:15:48	0.755	26.33	
9:16:44	0.755	26.43	
9:17:40	0.755	26.5	
9:18:36	0.755	26.56	
9:19:32	0.755	26.64	
9:22:19	0.842	25.93	KCl
9:23:16	0.843	26.22	
9:24:11	0.843	26.43	
9:25:07	0.844	26.6	
9:26:02	0.844	26.74	
9:26:57	0.844	26.85	
9:27:52	0.845	26.94	
9:28:47	0.844	27.02	
9:29:42	0.845	27.09	
9:30:37	0.844	27.15	
9:31:31	0.845	27.19	
9:32:26	0.845	27.26	
9:33:20	0.844	27.3	
9:34:15	0.845	27.34	
9:35:10	0.844	27.39	
9:36:04	0.844	27.44	
9:36:58	0.844	27.48	
9:37:53	0.844	27.52	
9:38:47	0.845	27.56	
9:39:42	0.844	27.6	
9:40:36	0.844	27.64	

M. Field 1/22/99

M. Field 1/22/99

4all-22-99

Time	Aw	Temp (C)
9:44:45	0.887	26.7
9:45:40	0.905	27.09
9:46:34	0.916	27.35
9:47:28	0.924	27.55
9:48:21	0.93	27.68
9:49:15	0.935	27.78
9:50:08	0.939	27.86
9:51:01	0.942	27.94
9:51:54	0.945	28
9:52:46	0.948	28.05
9:53:39	0.95	28.09
9:54:32	0.951	28.14
9:55:25	0.954	28.17
9:56:18	0.955	28.21
9:57:11	0.956	28.25
9:58:04	0.958	28.28
9:58:57	0.958	28.32
9:59:50	0.959	28.35
10:00:43	0.96	28.38
10:01:36	0.962	28.4
10:02:29	0.961	28.45
10:03:22	0.962	28.48
10:04:15	0.963	28.51
10:05:07	0.963	28.54
10:06:00	0.964	28.57
10:06:53	0.964	28.61
10:07:46	0.965	28.62
10:08:38	0.965	28.66
10:09:31	0.966	28.69
10:10:24	0.966	28.71
10:11:17	0.966	28.75
10:12:09	0.967	28.78
10:13:02	0.967	28.8
10:13:55	0.968	28.83
10:14:47	0.967	28.87
10:15:47	0.968	28.88

single contained

M. Field 1/22/99

5all-22-99

Time	Aw	Temp (C)
11:00:37	0.957	27.39
11:01:34	0.966	27.95
11:02:29	0.972	28.33
11:03:24	0.975	28.59
11:04:18	0.978	28.78
11:05:11	0.98	28.91
11:06:05	0.982	29
11:06:59	0.982	29.08
11:07:52	0.983	29.13
11:08:46	0.984	29.17
11:09:39	0.985	29.19
11:10:32	0.985	29.23
11:11:26	0.985	29.25
11:12:19	0.986	29.26
11:13:12	0.987	29.27
11:14:05	0.987	29.29
11:14:59	0.986	29.31
11:15:52	0.987	29.31
11:16:45	0.987	29.33
11:17:38	0.986	29.35
11:18:31	0.987	29.35
11:19:24	0.987	29.37
11:20:17	0.988	29.37
11:21:10	0.988	29.38
11:22:03	0.987	29.4
11:22:56	0.987	29.41
11:23:49	0.988	29.4
11:24:42	0.988	29.4
11:25:35	0.988	29.41
11:26:28	0.988	29.42
11:27:22	0.988	29.42
11:28:14	0.987	29.43
11:29:07	0.988	29.43

Single contained

Mass (g)	
8.568	Initial
8.562	Final
8.559	After 5min

D.H. 1/22/99

Mass (g)	
7.006	Initial
6.999	Final
6.985	After 5min

D.H. 1/22/99

To Page No.____

Witnessed & Understood by me, | Date | Invented by | Date

Recorded by

From Page No._____

3C 11-22-99

Time	Aw	Temp (C)
10:23:50	0.931	27.15
10:24:47	0.943	27.79
10:25:42	0.95	28.19
10:26:37	0.955	28.45
10:27:31	0.957	28.64
10:28:24	0.959	28.78
10:29:18	0.961	28.87
10:30:12	0.962	28.94
10:31:05	0.963	28.99
10:31:59	0.964	29.04
10:32:52	0.965	29.07
10:33:46	0.966	29.09
10:34:39	0.966	29.12
10:35:32	0.966	29.15
10:36:26	0.967	29.16
10:37:19	0.968	29.16
10:38:12	0.968	29.19
10:39:06	0.968	29.2
10:39:59	0.968	29.21
10:40:52	0.968	29.21
10:41:46	0.968	29.22
10:42:39	0.968	29.23
10:43:32	0.968	29.24
10:44:25	0.968	29.24
10:45:19	0.969	29.25
10:46:12	0.969	29.25
10:47:05	0.969	29.25
10:47:58	0.969	29.26
10:48:51	0.969	29.27
10:49:45	0.969	29.28
10:50:38	0.97	29.27
10:51:31	0.97	29.29
10:52:24	0.969	29.3
10:53:17	0.97	29.29
10:54:10	0.97	29.3

M. Hill 1/22/99

2B 11-22-99

Time	Aw	Temp (C)
12:13:36	0.959	27.27
12:14:33	0.964	27.94
12:15:28	0.968	28.39
12:16:23	0.97	28.71
12:17:17	0.972	28.92
12:18:11	0.973	29.09
12:19:05	0.974	29.22
12:19:59	0.975	29.3
12:20:53	0.974	29.37
12:21:46	0.975	29.42
12:22:40	0.975	29.47
12:23:33	0.976	29.49
12:24:27	0.976	29.52
12:25:20	0.976	29.54
12:26:13	0.977	29.57
12:27:06	0.977	29.58
12:28:00	0.977	29.59
12:28:53	0.978	29.6
12:29:47	0.977	29.62
12:30:40	0.977	29.62
12:31:33	0.978	29.63
12:32:27	0.977	29.64
12:33:20	0.977	29.64
12:34:13	0.977	29.64
12:35:06	0.977	29.65
12:35:59	0.978	29.65
12:36:53	0.977	29.66
12:37:46	0.978	29.66
12:38:39	0.978	29.66
12:39:32	0.977	29.68
12:40:26	0.977	29.68
12:41:19	0.977	29.69
12:42:12	0.978	29.69
12:43:05	0.977	29.69
12:43:59	0.978	29.7

M. Hill 1/22/99

3A 11-22-99

Time	Aw	Temp (C)
11:36:00	0.961	27.19
11:36:57	0.969	27.85
11:37:52	0.973	28.3
11:38:47	0.976	28.62
11:39:41	0.978	28.84
11:40:35	0.979	29.01
11:41:29	0.98	29.12
11:42:22	0.98	29.2
11:43:16	0.981	29.26
11:44:10	0.982	29.31
11:45:03	0.981	29.35
11:45:56	0.982	29.37
11:46:49	0.983	29.39
11:47:43	0.983	29.42
11:48:36	0.983	29.44
11:49:29	0.984	29.44
11:50:23	0.984	29.46
11:51:16	0.984	29.48
11:52:09	0.984	29.49
11:53:02	0.984	29.49
11:53:56	0.985	29.5
11:54:49	0.984	29.51
11:55:42	0.985	29.52
11:56:35	0.985	29.53
11:57:28	0.985	29.53
11:58:21	0.985	29.54
11:59:14	0.985	29.54
12:00:08	0.985	29.54
12:01:01	0.985	29.54
12:01:54	0.984	29.55
12:02:47	0.985	29.56
12:03:40	0.985	29.56
12:04:33	0.985	29.56
12:05:26	0.985	29.57
12:06:37	0.985	29.57
12:07:15	0.985	29.58

Single contained

Mass (g)
6.548 Initial
6.534 Final
6.526 After 5min
D.H. 1/22/99

double contained (sewing)

Mass (g)
6.981 Initial
6.973 Final
6.954 After 5min
D.H. 1/22/99

Single contained

Mass (g) Initial DH 01/04/99
7.606 Final
7.595 After 5min
7.576
D.H. 1/22/99

03/04/99

The following results were obtained from the ten tuff sub-samples on 01/18/99, 01/26/99, 01/27/99, and 03/03/99. The values represent data obtained through the aqualab in order to continue moisture retention measurements which began on 01/13/99. Initial & Final calibration results have been recorded for each day the aqualab was in use. The samples were allowed to set for at least 4 days between each of the measurements. ~~and~~ DH 03/04/99 Half of the samples were triple wrapped, one was doubled, and the remaining were left as single. This was done in order to compare moisture loss as a result of wrapping layers. The triple wrapped

To Page No._____

Witnessed & Understood by me, | Date | Invented by | Date | Recorded by

From Page No._____

samples were placed in the aqua lab cups with lids, then in square plastic containers with lids, and finally inside a plastic ziploc bag. The double wrapped sample was placed in a aqualab cup and a seperate rectangular sample container with a different style lid. All lid to container connections were sealed through the aid of parafilm. As described on pg. 81 of this lab book, the samples were allow to dry in ambient conditions for ≅ an additional 5mm each time an experiment was conducted.

SC5 2A1 98 01/22/99

Time	Aw	Temp (C)
12:49:38	0.962	27.26
12:50:35	0.968	27.99
12:51:30	0.971	28.48
12:52:24	0.972	28.81
12:53:18	0.973	29.04
12:54:12	0.974	29.21
12:55:05	0.975	29.33
12:55:58	0.975	29.42
12:56:51	0.975	29.48
12:57:44	0.975	29.53
12:58:37	0.976	29.58
12:59:31	0.976	29.61
13:00:24	0.976	29.63
13:01:16	0.976	29.65
13:02:09	0.976	29.66
13:03:02	0.976	29.67
13:03:55	0.976	29.68
13:04:48	0.976	29.69
13:05:41	0.977	29.69
13:06:34	0.976	29.71
13:07:27	0.976	29.71
13:08:20	0.976	29.72
13:09:12	0.976	29.73
13:10:05	0.976	29.73
13:10:58	0.976	29.73
13:11:51	0.976	29.74
13:12:44	0.977	29.75
13:13:37	0.976	29.76
13:14:30	0.976	29.77
13:15:23	0.976	29.77
13:16:16	0.976	29.77
13:17:09	0.976	29.77
13:18:01	0.976	29.77
13:18:54	0.976	29.78

Mass (g) Triple Contained
7.296 Initial
7.290 Final
7.268 After 5min.

SC5 2C1 98 01/22/99

Time	Aw	Temp (C)
14:35:24	0.960	28.24
14:36:21	0.962	28.77
14:37:17	0.965	29.12
14:38:13	0.966	29.37
14:39:09	0.967	29.55
14:40:04	0.968	29.68
14:40:59	0.968	29.79
14:41:54	0.969	29.85
14:42:49	0.969	29.91
14:43:44	0.969	29.95
14:44:39	0.969	29.99
14:45:33	0.970	30.00
14:46:28	0.970	30.03
14:47:23	0.969	30.06
14:48:17	0.970	30.07
14:49:12	0.969	30.09
14:50:06	0.970	30.10
14:51:01	0.970	30.11
14:51:55	0.970	30.13
14:52:50	0.970	30.14
14:53:44	0.970	30.14
14:54:39	0.970	30.15
14:55:33	0.970	30.18
14:56:28	0.970	30.18
14:57:22	0.970	30.19
14:58:17	0.970	30.20
14:59:11	0.970	30.22
15:00:06	0.970	30.24
15:01:00	0.971	30.24
15:01:55	0.970	30.26
15:02:49	0.970	30.28
15:03:44	0.970	30.29
15:04:38	0.970	30.30
15:05:33	0.970	30.31

D.H. 03/04/99

Mass (g) Triple Contained
7.283 Initial
7.276 Final
7.258 After 5min.

SC5 3B1 98 01/22/99

Time	Aw	Temp (C)
13:25:13	0.952	27.43
13:26:10	0.959	28.11
13:27:05	0.965	28.55
13:27:59	0.968	28.87
13:28:53	0.970	29.10
13:29:47	0.972	29.26
13:30:41	0.973	29.38
13:31:34	0.974	29.47
13:32:27	0.975	29.53
13:33:20	0.975	29.58
13:34:13	0.976	29.62
13:35:06	0.976	29.65
13:35:59	0.977	29.66
13:36:52	0.977	29.68
13:37:45	0.978	29.70
13:38:38	0.978	29.71
13:39:31	0.978	29.73
13:40:24	0.979	29.73
13:41:17	0.978	29.75
13:42:10	0.979	29.75
13:43:03	0.978	29.76
13:43:56	0.978	29.77
13:44:49	0.979	29.78
13:45:42	0.978	29.78
13:46:34	0.978	29.79
13:47:27	0.978	29.80
13:48:20	0.978	29.79
13:49:13	0.979	29.79
13:50:06	0.979	29.79
13:50:59	0.979	29.78
13:51:52	0.979	29.79
13:52:44	0.979	29.79
13:53:37	0.979	29.79
13:54:30	0.979	29.79

Mass (g) Triple Contained
7.130 Initial
7.121 Final
7.113 After 5min.

SC5 6A1 98 01/22/99

Time	Aw	Temp (C)
15:10:57	0.994	28.49
15:11:53	0.995	29.03
15:12:48	0.997	29.39
15:13:42	0.998	29.64
15:14:36	0.998	29.82
15:15:30	0.999	29.95
15:16:24	0.999	30.04
15:17:17	0.999	30.11
15:18:10	0.999	30.17
15:19:03	1.000	30.22
15:19:56	1.000	30.26
15:20:49	1.000	30.28
15:21:42	1.000	30.31
15:22:35	1.000	30.33
15:23:28	1.000	30.35
15:24:21	1.001	30.37
15:25:13	1.001	30.38
15:26:06	1.001	30.40
15:26:59	1.001	30.42
15:27:52	1.001	30.44
15:28:45	1.001	30.45
15:29:37	1.001	30.46
15:30:30	1.001	30.48
15:31:23	1.001	30.49
15:32:16	1.001	30.52
15:33:08	1.001	30.53
15:34:01	1.001	30.54
15:34:53	1.002	30.55
15:35:46	1.001	30.57
15:36:38	1.001	30.58
15:37:31	1.001	30.59
15:38:23	1.001	30.62
15:39:16	1.001	30.63
15:40:08	1.001	30.64

D.H. 03/04/99

Mass (g) Triple Contained
8.194 Initial
8.179 Final
8.170 After 5min.

D.H. 03/04/99

To Page No._____

Witnessed & Understood by me, | Date | Invented by | Date | Recorded by

From Page No.____

SC5 6B1 98 01/22/99

Time	Aw	Temp (C)
13:59:55	0.962	28.17
14:00:52	0.972	28.63
14:01:47	0.977	28.93
14:02:42	0.980	29.14
14:03:36	0.982	29.28
14:04:30	0.983	29.40
14:05:24	0.984	29.47
14:06:18	0.986	29.52
14:07:12	0.986	29.58
14:08:05	0.987	29.60
14:08:59	0.987	29.64
14:09:52	0.988	29.68
14:10:46	0.987	29.68
14:11:39	0.988	29.69
14:12:33	0.988	29.72
14:13:26	0.989	29.73
14:14:20	0.989	29.76
14:15:13	0.989	29.77
14:16:07	0.989	29.78
14:17:00	0.990	29.80
14:17:54	0.989	29.82
14:18:47	0.989	29.84
14:19:40	0.989	29.85
14:20:34	0.990	29.86
14:21:27	0.990	29.87
14:22:21	0.989	29.89
14:23:14	0.990	29.91
14:24:07	0.989	29.93
14:25:01	0.989	29.94
14:25:54	0.990	29.95
14:26:47	0.990	29.98
14:27:40	0.990	29.99
14:28:33	0.990	30.01
14:29:27	0.989	30.02

Mass (g) Triple Contained
7.549 Initial
7.542 Final
7.539 After 5min.

Final Calibration 01/22/99

Time	Aw	Temp (C)
16:25:10	1.002	30.58 H_2O
16:26:02	1.003	30.57 H_2O
16:26:55	1.003	30.60 H_2O
16:27:47	1.003	30.61 H_2O
16:28:40	1.002	30.63 H_2O
16:29:32	1.002	30.64 H_2O
16:30:24	1.003	30.65 H_2O
16:31:17	1.003	30.66 H_2O
16:32:09	1.003	30.67 H_2O
16:33:01	1.003	30.68 H_2O
16:33:53	1.002	30.71 H_2O
16:34:46	1.003	30.71 H_2O
16:35:38	1.003	30.73 H_2O
16:36:30	1.003	30.73 H_2O
17:11:27	0.758	31.16 NaCl
17:12:21	0.757	31.16 NaCl
17:13:15	0.757	31.16 NaCl
17:14:09	0.756	31.17 NaCl
17:15:03	0.756	31.16 NaCl
17:15:57	0.756	31.18 NaCl
17:16:52	0.755	31.17 NaCl
17:17:46	0.755	31.18 NaCl
17:18:40	0.755	31.19 NaCl
17:19:34	0.755	31.19 NaCl
17:20:28	0.754	31.20 NaCl
17:21:22	0.755	31.20 NaCl
17:22:16	0.754	31.21 NaCl
17:23:10	0.754	31.22 NaCl
17:24:04	0.754	31.21 NaCl
17:24:58	0.754	31.22 NaCl
17:25:51	0.754	31.23 NaCl
16:54:18	0.766	31.04 NaCl
16:55:12	0.766	31.04 NaCl
17:29:48	0.839	29.87 KCl
17:30:43	0.839	30.25 KCl
17:31:37	0.839	30.51 KCl
17:32:31	0.840	30.70 KCl
17:33:25	0.840	30.84 KCl
17:34:19	0.841	30.94 KCl
17:35:13	0.841	31.02 KCl
17:36:07	0.841	31.08 KCl
17:37:00	0.841	31.13 KCl
17:37:54	0.841	31.16 KCl
17:38:47	0.841	31.19 KCl
17:39:40	0.841	31.22 KCl
17:40:34	0.841	31.23 KCl
17:41:27	0.841	31.25 KCl
17:42:20	0.841	31.27 KCl
17:43:14	0.841	31.28 KCl
17:44:07	0.841	31.29 KCl
17:45:00	0.841	31.31 KCl

Calibration (Initial) 1/18/99 D.H. 03/04/99

Time	Aw	Temp (C)
9:51:31	1.001	26.04 H_2O
9:52:27	1.002	26.2 H_2O
9:53:23	1.002	26.35 H_2O
9:54:18	1.002	26.46 H_2O
9:55:13	1.003	26.55 H_2O
9:56:08	1.002	26.63 H_2O
9:57:03	1.003	26.69 H_2O
9:57:58	1.003	26.75 H_2O
9:58:53	1.002	26.81 H_2O
9:59:47	1.003	26.86 H_2O
10:00:42	1.003	26.9 H_2O
10:01:36	1.003	26.94 H_2O
10:02:30	1.003	26.99 H_2O
10:03:25	1.004	27.02 H_2O
10:04:19	1.003	27.06 H_2O
10:06:40	0.75	25.22 NaCl
10:07:39	0.75	25.7 NaCl
10:08:36	0.751	26.06 NaCl
10:09:33	0.751	26.35 NaCl
10:10:29	0.752	26.56 NaCl
10:11:26	0.752	26.73 NaCl
10:12:22	0.752	26.89 NaCl
10:13:17	0.753	27 NaCl
10:14:13	0.753	27.1 NaCl
10:15:09	0.753	27.19 NaCl
10:16:05	0.754	27.26 NaCl
10:17:01	0.754	27.31 NaCl
10:17:57	0.754	27.36 NaCl
10:18:52	0.753	27.42 NaCl
10:19:48	0.754	27.47 NaCl
10:20:43	0.754	27.5 NaCl
10:23:47	0.838	25.78 KCl
10:24:45	0.839	26.27 KCl
10:25:42	0.841	26.63 KCl
10:26:38	0.841	26.91 KCl
10:27:34	0.843	27.11 KCl
10:28:30	0.843	27.27 KCl
10:29:25	0.843	27.42 KCl
10:30:21	0.843	27.5 KCl
10:31:16	0.843	27.6 KCl
10:32:11	0.843	27.66 KCl
10:33:06	0.844	27.72 KCl
10:34:01	0.843	27.78 KCl
10:34:56	0.843	27.82 KCl
10:35:51	0.844	27.85 KCl
10:36:46	0.843	27.9 KCl

SC 98 2A1 01/18/99

Time	Aw	Temp (C)
13:48:25	0.991	27.63
13:49:21	0.992	28.20
13:50:16	0.995	28.59
13:51:11	0.996	28.86
13:52:06	0.996	29.05
13:53:00	0.997	29.20
13:53:54	0.997	29.30
13:54:48	0.997	29.39
13:55:41	0.997	29.46
13:56:35	0.998	29.51
13:57:29	0.998	29.54
13:58:22	0.997	29.58
13:59:16	0.998	29.60
14:00:09	0.998	29.61
14:01:02	0.997	29.63
14:01:55	0.998	29.65
14:02:49	0.998	29.66
14:03:42	0.998	29.67
14:04:35	0.998	29.67
14:05:28	0.998	29.69
14:06:21	0.998	29.70
14:07:14	0.998	29.71
14:08:07	0.998	29.72
14:09:00	0.998	29.72
14:09:53	0.998	29.73
14:10:46	0.998	29.73
14:11:39	0.998	29.74
14:12:32	0.998	29.73
14:13:25	0.998	29.73
14:14:18	0.998	29.74
14:15:11	0.999	29.74
14:16:04	0.998	29.75
14:16:57	0.998	29.75
14:17:50	0.998	29.76

Mass (g)
7.331 Initial
7.323 Final
7.307 After 5min.

Final Calibration 01/18/99

Time	Aw	Temp (C)
17:55:57	0.997	29.11 H_2O
17:56:52	0.998	29.52 H_2O
17:57:47	0.999	29.82 H_2O
17:58:41	1.001	30.05 H_2O
17:59:35	1.000	30.23 H_2O
18:00:29	1.001	30.37 H_2O
18:01:22	1.001	30.46 H_2O
18:02:16	1.001	30.55 H_2O
18:03:09	1.002	30.61 H_2O
18:04:02	1.001	30.67 H_2O
18:04:55	1.002	30.71 H_2O
18:05:48	1.002	30.75 H_2O
18:08:34	0.751	28.86 NaCl
18:09:31	0.751	29.34 NaCl
18:10:27	0.751	29.69 NaCl
18:11:22	0.752	29.96 NaCl
18:12:18	0.753	30.16 NaCl
18:13:13	0.753	30.33 NaCl
18:14:08	0.753	30.46 NaCl
18:15:03	0.753	30.57 NaCl
18:17:41	0.834	29.11 KCl
18:18:37	0.835	29.60 KCl
18:19:33	0.836	29.94 KCl
18:20:28	0.837	30.17 KCl
18:21:23	0.837	30.36 KCl
18:22:17	0.838	30.50 KCl

To Page No.____

Witnessed & Understood by me, | Date | Invented by | Date | Recorded by

SC5 98 2C1 01/18/99

Time	Aw	Temp (C)
13:13:08	0.968	27.53
13:14:04	0.969	28.06
13:15:00	0.971	28.42
13:15:55	0.972	28.66
13:16:50	0.972	28.85
13:17:44	0.974	28.99
13:18:38	0.973	29.10
13:19:32	0.974	29.17
13:20:26	0.973	29.25
13:21:20	0.973	29.29
13:22:14	0.973	29.34
13:23:08	0.974	29.37
13:24:01	0.974	29.39
13:24:55	0.974	29.42
13:25:49	0.975	29.43
13:26:42	0.974	29.45
13:27:36	0.975	29.47
13:28:30	0.974	29.48
13:29:24	0.974	29.50
13:30:17	0.974	29.50
13:31:11	0.974	29.53
13:32:04	0.975	29.53
13:32:58	0.974	29.55
13:33:51	0.974	29.56
13:34:45	0.974	29.57
13:35:38	0.974	29.58
13:36:31	0.974	29.57
13:37:25	0.974	29.58
13:38:18	0.975	29.58
13:39:11	0.974	29.60
13:40:05	0.974	29.60
13:40:58	0.974	29.61
13:41:51	0.974	29.62
13:42:45	0.975	29.61
13:43:38	0.974	29.63

Mass (g)
7.310 Initial
7.304 Final
7.287 After 5min.

SC5 3A1 98 01/18/99

Time	Aw	Temp (C)
16:13:35	0.986	27.92
16:14:31	0.988	28.51
16:15:27	0.991	28.89
16:16:22	0.992	29.15
16:17:16	0.992	29.34
16:18:11	0.993	29.48
16:19:05	0.994	29.58
16:19:58	0.995	29.64
16:20:52	0.994	29.71
16:21:46	0.995	29.74
16:22:39	0.995	29.78
16:23:32	0.995	29.80
16:24:26	0.995	29.82
16:25:19	0.995	29.84
16:26:13	0.995	29.86
16:27:06	0.996	29.87
16:27:59	0.996	29.88
16:28:53	0.996	29.88
16:29:46	0.996	29.89
16:30:40	0.996	29.89
16:31:33	0.996	29.89
16:32:26	0.996	29.90
16:33:19	0.996	29.90
16:34:12	0.996	29.91
16:35:05	0.996	29.91
16:35:58	0.996	29.92
16:36:51	0.996	29.92
16:37:45	0.996	29.93
16:38:37	0.996	29.93
16:39:31	0.996	29.93
16:40:24	0.997	29.93
16:41:17	0.997	29.93
16:42:10	0.996	29.93
16:43:04	0.997	29.93

Mass (g)
7.644 Initial
7.632 Final
7.618 After 5min.

SC5 3B1 98 01/18/99 D.H. 03/04/99

Time	Aw	Temp (C)
14:23:48	0.981	27.98
14:24:44	0.985	28.51
14:25:40	0.988	28.85
14:26:35	0.990	29.08
14:27:30	0.991	29.25
14:28:24	0.991	29.38
14:29:18	0.992	29.47
14:30:12	0.993	29.52
14:31:06	0.993	29.59
14:32:00	0.993	29.62
14:32:54	0.994	29.65
14:33:47	0.993	29.68
14:34:41	0.993	29.69
14:35:34	0.994	29.70
14:36:28	0.994	29.72
14:37:21	0.994	29.73
14:38:14	0.995	29.73
14:39:08	0.994	29.76
14:40:01	0.994	29.76
14:40:54	0.995	29.76
14:41:48	0.995	29.78
14:42:41	0.995	29.78
14:43:34	0.994	29.78
14:44:28	0.994	29.79
14:45:21	0.995	29.79
14:46:14	0.995	29.79
14:47:08	0.995	29.79
14:48:01	0.994	29.80
14:48:55	0.994	29.80
14:49:48	0.994	29.81
14:50:41	0.994	29.81
14:51:34	0.994	29.81
14:52:27	0.994	29.82
14:53:21	0.994	29.83

Mass (g)
7.165 Initial
7.157 Final
7.143 After 5min.

SC5 3C1 98 01/18/99

Time	Aw	Temp (C)
16:49:27	0.981	28.14
16:50:23	0.985	28.69
16:51:18	0.988	29.05
16:52:12	0.990	29.29
16:53:06	0.991	29.45
16:53:59	0.992	29.57
16:54:53	0.993	29.66
16:55:46	0.994	29.73
16:56:40	0.994	29.78
16:57:33	0.995	29.81
16:58:26	0.994	29.86
16:59:19	0.995	29.88
17:00:12	0.995	29.91
17:01:05	0.995	29.94
17:01:58	0.995	29.95
17:02:50	0.996	29.97
17:03:43	0.996	30.00
17:04:36	0.995	30.03
17:05:29	0.997	30.03
17:06:21	0.996	30.06
17:07:14	0.996	30.08
17:08:07	0.996	30.09
17:08:59	0.995	30.11
17:09:52	0.996	30.12
17:10:44	0.997	30.14
17:11:37	0.996	30.17
17:12:30	0.997	30.17
17:13:22	0.997	30.19
17:14:15	0.996	30.21
17:15:07	0.997	30.23
17:16:00	0.997	30.24
17:16:52	0.996	30.27

Mass (g)
6.602 Initial
6.591 Final
6.555 After 5min.

SC5 4A1 98 01/18/99

Time	Aw	Temp (C)
15:38:40	0.989	28.31
15:39:37	0.991	28.80
15:40:33	0.993	29.10
15:41:29	0.994	29.31
15:42:24	0.994	29.46
15:43:19	0.996	29.55
15:44:15	0.996	29.62
15:45:10	0.996	29.68
15:46:05	0.997	29.72
15:47:00	0.997	29.74
15:47:54	0.997	29.77
15:48:49	0.996	29.80
15:49:44	0.997	29.80
15:50:38	0.997	29.82
15:51:33	0.997	29.83
15:52:28	0.997	29.85
15:53:22	0.997	29.85
15:54:16	0.998	29.85
15:55:11	0.997	29.85
15:56:05	0.997	29.85
15:57:00	0.998	29.86
15:57:55	0.998	29.85
15:58:49	0.998	29.86
15:59:44	0.998	29.86
16:00:38	0.997	29.87
16:01:33	0.997	29.87
16:02:27	0.998	29.87
16:03:22	0.998	29.88
16:04:16	0.998	29.88
16:05:10	0.998	29.88
16:06:05	0.997	29.89
16:06:59	0.998	29.88
16:07:54	0.998	29.89
16:08:48	0.998	29.88

Mass (g)
8.597 Initial
8.590 Final
8.571 After 5min.

SC5 5A1 98 01/18/99

Time	Aw	Temp (C)
17:21:45	0.979	28.70
17:22:41	0.983	29.21
17:23:36	0.985	29.55
17:24:30	0.987	29.78
17:25:24	0.988	29.94
17:26:17	0.989	30.07
17:27:11	0.990	30.17
17:28:04	0.991	30.24
17:28:57	0.991	30.30
17:29:50	0.991	30.34
17:30:43	0.991	30.39
17:31:36	0.992	30.41
17:32:29	0.992	30.44
17:33:22	0.992	30.47
17:34:15	0.992	30.50
17:35:08	0.992	30.50
17:36:01	0.991	30.53
17:36:53	0.992	30.55
17:37:46	0.992	30.57
17:38:38	0.992	30.58
17:39:31	0.991	30.61
17:40:23	0.992	30.62
17:41:16	0.992	30.64
17:42:09	0.993	30.64
17:43:01	0.992	30.67
17:43:54	0.992	30.69
17:44:47	0.992	30.70
17:45:39	0.992	30.70
17:46:31	0.992	30.72
17:47:24	0.992	30.74
17:48:16	0.992	30.75
17:49:09	0.992	30.77
17:50:01	0.992	30.77
17:50:54	0.992	30.78
17:51:46	0.992	30.79
17:52:39	0.993	30.80

Mass (g)
7.033 Initial
7.023 Final
7.013 After 5min.

SC5 6A1 98 01/18/99 D.H. 03/04/99

Time	Aw	Temp (C)
14:57:59	1.002	28.23
14:58:55	1.001	28.73
14:59:50	1.000	29.03
15:00:44	1.001	29.23
15:01:39	1.002	29.37
15:02:33	1.001	29.47
15:03:27	1.001	29.54
15:04:20	1.002	29.59
15:05:13	1.001	29.63
15:06:07	1.002	29.66
15:06:59	1.002	29.68
15:07:53	1.002	29.70
15:08:46	1.002	29.71
15:09:39	1.002	29.73
15:10:32	1.002	29.73
15:11:25	1.002	29.74
15:12:18	1.002	29.74
15:13:11	1.003	29.75
15:14:03	1.002	29.76
15:14:56	1.003	29.77
15:15:49	1.002	29.77
15:16:42	1.002	29.79
15:17:35	1.003	29.79
15:18:28	1.002	29.79
15:19:21	1.003	29.80
15:20:14	1.003	29.80
15:21:07	1.003	29.80
15:21:59	1.003	29.80
15:22:52	1.003	29.81
15:23:45	1.003	29.81
15:24:38	1.003	29.82
15:25:31	1.003	29.82
15:26:24	1.003	29.84
15:27:17	1.003	29.83

Mass (g)
8.216 Initial
8.210 Final
8.197 After 5min.

SC5 6B1 98 01/18/99

Time	Aw	Temp (C)
11:31:01	0.995	27.24
11:31:58	0.996	27.78
11:32:54	0.997	28.12
11:33:49	0.997	28.36
11:34:43	0.999	28.51
11:35:38	0.999	28.64
11:36:32	0.999	28.73
11:37:26	1.000	28.77
11:38:20	0.999	28.83
11:39:13	0.999	28.88
11:40:07	1.001	28.90
11:41:01	1.000	28.93
11:41:54	1.000	28.96
11:42:47	1.000	28.98
11:43:41	1.000	29.00
11:44:34	1.001	29.02
11:45:28	1.001	29.03
11:46:21	1.000	29.06
11:47:15	1.001	29.06
11:48:08	1.001	29.08
11:49:01	1.001	29.08
11:49:55	1.001	29.09
11:50:48	1.001	29.10
11:51:41	1.001	29.11
11:52:34	1.001	29.11
11:53:28	1.001	29.13
11:54:21	1.001	29.13
11:55:14	1.002	29.13
11:56:07	1.001	29.15
11:57:00	1.001	29.16
11:57:54	1.002	29.17
11:58:47	1.001	29.18
11:59:40	1.001	29.19
12:00:33	1.002	29.19

Mass (g)
7.578 Initial
7.570 Final
7.554 After 5min.

Witnessed & Understood by me, | Date | Recorded by | Date

Initial Calibration 01/26/99

Time	Aw	Temp (C)
9:05:55	0.998	24.72 H_2O
9:06:52	0.998	24.95 H_2O
9:07:48	0.999	25.11 H_2O
9:08:43	1.000	25.25 H_2O
9:09:38	1.000	25.37 H_2O
9:10:32	1.000	25.48 H_2O
9:11:27	1.001	25.54 H_2O
9:12:21	1.001	25.62 H_2O
9:13:16	1.001	25.70 H_2O
9:14:10	1.001	25.76 H_2O
9:15:04	1.002	25.81 H_2O
9:15:58	1.001	25.87 H_2O
9:18:49	0.756	25.09 NaCl
9:19:46	0.755	25.36 NaCl
9:20:43	0.755	25.56 NaCl
9:21:39	0.755	25.74 NaCl
9:22:35	0.755	25.86 NaCl
9:23:31	0.756	25.97 NaCl
9:24:27	0.755	26.08 NaCl
9:25:23	0.755	26.14 NaCl
9:26:19	0.755	26.22 NaCl
9:27:15	0.755	26.28 NaCl
9:28:10	0.756	26.33 NaCl
9:29:06	0.755	26.40 NaCl
9:31:48	0.842	25.58 KCl
9:32:45	0.842	25.86 KCl
9:33:41	0.843	26.09 KCl
9:34:36	0.844	26.25 KCl
9:35:32	0.845	26.38 KCl
9:36:27	0.845	26.50 KCl
9:37:22	0.846	26.58 KCl
9:38:17	0.845	26.67 KCl
9:39:12	0.846	26.72 KCl
9:40:07	0.846	26.79 KCl

Final Calibration 01/26/99

Time	Aw	Temp (C)
15:54:40	0.999	28.30 H_2O
15:55:36	0.999	28.71 H_2O
15:56:30	1.000	29.01 H_2O
15:57:25	1.001	29.22 H_2O
15:58:19	1.001	29.38 H_2O
15:59:13	1.001	29.50 H_2O
16:00:07	1.001	29.60 H_2O
16:01:00	1.001	29.67 H_2O
16:01:54	1.002	29.72 H_2O
16:02:47	1.001	29.76 H_2O
16:03:41	1.002	29.79 H_2O
16:04:34	1.001	29.82 H_2O
16:05:27	1.002	29.84 H_2O
16:06:20	1.002	29.86 H_2O
16:07:13	1.002	29.88 H_2O
16:09:59	0.753	28.08 NaCl
16:10:57	0.752	28.52 NaCl
16:11:53	0.753	28.81 NaCl
16:12:49	0.753	29.05 NaCl
16:13:44	0.753	29.23 NaCl
16:14:40	0.753	29.38 NaCl
16:15:35	0.753	29.48 NaCl
16:16:30	0.754	29.56 NaCl
16:17:26	0.754	29.63 NaCl
16:18:21	0.754	29.69 NaCl
16:19:16	0.754	29.73 NaCl
16:22:25	0.842	28.32 KCl
16:23:21	0.841	28.75 KCl
16:24:16	0.842	29.04 KCl
16:25:11	0.843	29.24 KCl
16:26:05	0.844	29.39 KCl
16:27:00	0.844	29.51 KCl
16:27:54	0.844	29.60 KCl
16:28:48	0.844	29.68 KCl
16:29:42	0.844	29.73 KCl
16:30:36	0.845	29.77 KCl
16:31:31	0.844	29.81 KCl

D.H. 02/04/99

SC 98 2A1 01/26/99

Time	Aw	Temp (C)
15:22:27	0.944	28.18
15:23:23	0.950	28.70
15:24:18	0.953	29.05
15:25:12	0.956	29.30
15:26:06	0.957	29.48
15:27:00	0.958	29.62
15:27:53	0.959	29.72
15:28:47	0.960	29.80
15:29:40	0.961	29.85
15:30:34	0.961	29.89
15:31:27	0.962	29.92
15:32:20	0.962	29.94
15:33:13	0.963	29.96
15:34:06	0.962	29.97
15:35:00	0.963	29.99
15:35:53	0.963	29.99
15:36:46	0.964	30.01
15:37:39	0.964	30.01
15:38:32	0.964	30.02
15:39:25	0.964	30.03
15:40:18	0.964	30.04
15:41:11	0.964	30.05
15:42:04	0.964	30.05
15:42:57	0.964	30.05
15:43:50	0.964	30.05
15:44:43	0.964	30.05
15:45:37	0.964	30.04
15:46:30	0.964	30.04
15:47:23	0.964	30.04
15:48:16	0.965	30.04
15:49:09	0.964	30.04
15:50:02	0.964	30.04
15:50:56	0.965	30.04
15:51:49	0.964	30.04

Mass (g) Triple Contained
7.259 Initial
7.251 Final
7.237 After 5min.

D.H. 02/04/99

SC5 98 2B1 01/26/99

Time	Aw	Temp (C)
12:13:43	0.963	27.97
12:14:40	0.965	28.46
12:15:36	0.967	28.79
12:16:31	0.969	29.00
12:17:26	0.970	29.16
12:18:21	0.971	29.26
12:19:16	0.972	29.35
12:20:11	0.972	29.41
12:21:05	0.972	29.45
12:22:00	0.973	29.48
12:22:54	0.973	29.50
12:23:49	0.973	29.53
12:24:43	0.974	29.53
12:25:38	0.974	29.56
12:26:32	0.974	29.58
12:27:27	0.975	29.58
12:28:21	0.975	29.59
12:29:15	0.975	29.60
12:30:10	0.974	29.62
12:31:04	0.975	29.62
12:31:58	0.975	29.64
12:32:53	0.975	29.65
12:33:47	0.975	29.66
12:34:41	0.975	29.66
12:35:35	0.975	29.66
12:36:29	0.975	29.67
12:37:24	0.975	29.67
12:38:18	0.975	29.67
12:39:12	0.976	29.67
12:40:06	0.976	29.68
12:41:00	0.975	29.68
12:41:55	0.975	29.69
12:42:49	0.975	29.69
12:43:43	0.976	29.69

Mass (g) Double Contained
6.951 Initial
6.942 Final
6.934 After 5min.

SC5 2C1 98 01/26/99

Time	Aw	Temp (C)
13:42:50	0.944	28.31
13:43:47	0.949	28.73
13:44:43	0.954	29.02
13:45:38	0.957	29.22
13:46:33	0.959	29.38
13:47:28	0.961	29.48
13:48:23	0.962	29.58
13:49:18	0.963	29.63
13:50:12	0.965	29.67
13:51:07	0.965	29.71
13:52:01	0.965	29.74
13:52:56	0.965	29.77
13:53:50	0.966	29.79
13:54:45	0.966	29.80
13:55:39	0.966	29.81
13:56:33	0.967	29.81
13:57:27	0.967	29.83
13:58:22	0.967	29.84
13:59:16	0.967	29.84
14:00:10	0.967	29.85
14:01:04	0.967	29.86
14:01:58	0.967	29.87
14:02:53	0.967	29.88
14:03:47	0.968	29.88
14:04:41	0.967	29.89
14:05:35	0.967	29.90
14:06:29	0.968	29.90
14:07:24	0.968	29.90
14:08:18	0.967	29.90
14:09:12	0.967	29.91
14:10:06	0.967	29.91
14:11:00	0.968	29.91
14:11:54	0.968	29.91

Mass (g) Triple Contained
7.249 Initial
7.246 Final
7.239 After 5min.

D.H. 02/04/99

SC5 3A1 98 01/26/99

Time	Aw	Temp (C)
11:37:54	0.950	27.66
11:38:50	0.956	28.16
11:39:45	0.959	28.49
11:40:39	0.961	28.72
11:41:34	0.964	28.88
11:42:28	0.965	29.02
11:43:22	0.966	29.11
11:44:16	0.967	29.18
11:45:09	0.968	29.24
11:46:03	0.969	29.28
11:46:57	0.968	29.34
11:47:51	0.970	29.35
11:48:44	0.970	29.38
11:49:38	0.970	29.40
11:50:31	0.971	29.42
11:51:25	0.971	29.44
11:52:19	0.971	29.46
11:53:12	0.972	29.47
11:54:06	0.972	29.48
11:54:59	0.973	29.48
11:55:53	0.972	29.49
11:56:46	0.973	29.49
11:57:39	0.973	29.51
11:58:33	0.973	29.50
11:59:26	0.974	29.51
12:00:20	0.973	29.52
12:01:13	0.973	29.52
12:02:06	0.974	29.52
12:02:59	0.974	29.53
12:03:53	0.974	29.53
12:04:46	0.973	29.55
12:05:39	0.974	29.54
12:06:32	0.974	29.55
12:07:26	0.974	29.56

Mass (g) Single Contained
7.573 Initial
7.567 Final
7.550 After 5min.

SC5 3B1 98 01/26/99

Time	Aw	Temp (C)
14:49:19	0.938	28.25
14:50:15	0.946	28.75
14:51:10	0.950	29.09
14:52:05	0.954	29.32
14:52:59	0.956	29.48
14:53:53	0.957	29.61
14:54:47	0.959	29.70
14:55:41	0.959	29.78
14:56:35	0.961	29.82
14:57:29	0.962	29.86
14:58:22	0.963	29.90
14:59:16	0.964	29.91
15:00:10	0.964	29.94
15:01:03	0.964	29.95
15:01:56	0.965	29.97
15:02:50	0.965	29.98
15:03:44	0.965	29.98
15:04:37	0.966	29.99
15:05:30	0.966	30.00
15:06:24	0.966	29.99
15:07:17	0.966	30.00
15:08:10	0.966	30.01
15:09:04	0.967	30.01
15:09:57	0.967	30.02
15:10:50	0.967	30.02
15:11:44	0.967	30.03
15:12:37	0.967	30.04
15:13:30	0.968	30.04
15:14:24	0.968	30.05
15:15:17	0.968	30.06
15:16:11	0.967	30.06
15:17:04	0.968	30.06
15:17:57	0.967	30.06

Mass (g) Triple Contained
7.108 Initial
7.102 Final
7.093 After 5min.

D.H. 02/04/99

SC5 3C1 98 01/26/99

Time	Aw	Temp (C)
11:03:43	0.905	27.79
11:04:39	0.915	28.16
11:05:35	0.921	28.40
11:06:30	0.925	28.57
11:07:25	0.929	28.70
11:08:19	0.932	28.78
11:09:14	0.934	28.85
11:10:08	0.935	28.90
11:11:03	0.937	28.93
11:11:57	0.938	28.98
11:12:51	0.939	29.01
11:13:45	0.941	29.03
11:14:40	0.942	29.05
11:15:34	0.943	29.07
11:16:28	0.943	29.08
11:17:23	0.944	29.11
11:18:17	0.945	29.12
11:19:11	0.945	29.13
11:20:05	0.945	29.15
11:20:59	0.946	29.16
11:21:54	0.946	29.17
11:22:48	0.946	29.19
11:23:42	0.948	29.19
11:24:36	0.947	29.21
11:25:31	0.948	29.22
11:26:25	0.948	29.23
11:27:19	0.948	29.24
11:28:13	0.948	29.25
11:29:07	0.949	29.26
11:30:01	0.950	29.27
11:30:55	0.949	29.29
11:31:49	0.949	29.29
11:32:43	0.950	29.30
11:33:37	0.949	29.32

Mass (g) Single Contained
6.521 Initial
6.514 Final
6.508 After 5min.

Witnessed & Understood by me, | Date | Invented by | Date

Recorded by

SC5 4A1 98 01/26/99

Time	Aw	Temp (C)
9:42:58	0.885	26.43
9:43:54	0.874	26.62
9:44:50	0.882	26.77
9:45:45	0.889	26.88
9:46:40	0.894	26.97
9:47:35	0.898	27.05
9:48:30	0.902	27.11
9:49:25	0.906	27.17
9:50:20	0.909	27.22
9:51:14	0.912	27.26
9:52:09	0.914	27.32
9:53:03	0.916	27.35
9:53:57	0.919	27.39
9:54:52	0.921	27.43
9:55:46	0.923	27.46
9:56:40	0.924	27.51
9:57:35	0.925	27.55
9:58:29	0.928	27.58
9:59:23	0.929	27.62
10:00:17	0.930	27.65
10:01:11	0.931	27.69
10:02:06	0.932	27.73
10:03:00	0.933	27.76
10:03:54	0.934	27.80
10:04:48	0.935	27.84
10:05:42	0.936	27.87
10:06:36	0.936	27.91
10:07:31	0.937	27.93
10:08:25	0.937	27.97
10:09:18	0.938	28.01
10:10:12	0.939	28.03
10:11:06	0.940	28.07
10:12:00	0.940	28.10

Mass (g) Single Contained
8.556 Initial
8.553 Final
8.552 After 5min.

D.H. 02/04/99

SC5 5A1 98 01/26/99

Time	Aw	Temp (C)
10:28:14	0.955	27.20
10:29:10	0.964	27.59
10:30:05	0.969	27.86
10:30:59	0.972	28.03
10:31:54	0.974	28.18
10:32:47	0.976	28.27
10:33:41	0.976	28.37
10:34:35	0.978	28.41
10:35:29	0.978	28.46
10:36:22	0.979	28.50
10:37:16	0.979	28.55
10:38:09	0.981	28.56
10:39:03	0.980	28.61
10:39:56	0.981	28.63
10:40:49	0.981	28.65
10:41:43	0.981	28.68
10:42:36	0.982	28.69
10:43:29	0.982	28.72
10:44:23	0.982	28.74
10:45:16	0.983	28.75
10:46:09	0.983	28.78
10:47:03	0.983	28.79
10:47:56	0.984	28.79
10:48:50	0.983	28.82
10:49:43	0.983	28.84
10:50:36	0.983	28.84
10:51:29	0.984	28.87
10:52:22	0.983	28.88
10:53:15	0.984	28.88
10:54:08	0.984	28.91
10:55:02	0.984	28.91
10:55:55	0.984	28.92
10:56:48	0.984	28.93
10:57:41	0.984	28.95

Mass (g) Single Contained
6.982 Initial
6.972 Final
6.967 After 5min.

D.H. 02/04/99

SC5 6A1 98 01/26/99

Time	Aw	Temp (C)
12:47:32	0.983	28.02
12:48:28	0.986	28.51
12:49:23	0.990	28.84
12:50:18	0.992	29.06
12:51:12	0.992	29.22
12:52:07	0.993	29.34
12:53:01	0.994	29.42
12:53:55	0.994	29.48
12:54:48	0.995	29.52
12:55:42	0.995	29.55
12:56:36	0.996	29.58
12:57:30	0.996	29.59
12:58:23	0.996	29.63
12:59:17	0.996	29.63
13:00:10	0.997	29.65
13:01:04	0.996	29.66
13:01:57	0.997	29.67
13:02:51	0.997	29.68
13:03:44	0.997	29.70
13:04:38	0.997	29.71
13:05:31	0.997	29.72
13:06:25	0.997	29.72
13:07:18	0.997	29.73
13:08:11	0.997	29.73
13:09:05	0.997	29.74
13:09:58	0.997	29.74
13:10:51	0.997	29.74
13:11:45	0.997	29.74
13:12:38	0.998	29.75
13:13:31	0.998	29.74
13:14:24	0.997	29.75
13:15:18	0.998	29.76
13:16:11	0.997	29.76
13:17:04	0.998	29.77

Mass (g) Triple Contatined
8.164 Initial
8.147 Final
8.143 After 5min.

D.H. 02/04/99

SC5 6B1 98 01/26/99

Time	Aw	Temp (C)
14:15:39	0.844	28.46
14:16:34	0.855	28.89
14:17:28	0.862	29.17
14:18:22	0.869	29.37
14:19:15	0.874	29.52
14:20:09	0.878	29.62
14:21:02	0.881	29.70
14:21:55	0.884	29.75
14:22:48	0.886	29.79
14:23:40	0.888	29.81
14:24:33	0.889	29.84
14:25:26	0.890	29.86
14:26:19	0.892	29.88
14:27:12	0.893	29.88
14:28:05	0.894	29.89
14:28:57	0.894	29.90
14:29:50	0.894	29.92
14:30:43	0.894	29.92
14:31:36	0.895	29.93
14:32:28	0.895	29.94
14:33:21	0.895	29.95
14:34:14	0.895	29.95
14:35:07	0.895	29.95
14:35:59	0.894	29.95
14:36:52	0.895	29.96
14:37:44	0.894	29.96
14:38:37	0.894	29.95
14:39:30	0.894	29.96
14:40:23	0.893	29.97
14:41:15	0.893	29.96
14:42:08	0.893	29.96
14:43:01	0.893	29.97
14:43:53	0.892	29.98
14:44:46	0.892	29.98

Mass (g) Triple Contained
7.537 Initial
7.533 Final
7.530 After 5min.

D.H. 02/04/99

Initial Calibration 02/02/99

Time	Aw	Temp (C)
8:57:52	0.999	25.39 H_2O
8:58:48	0.999	25.56 H_2O
8:59:44	0.999	25.70 H_2O
9:00:39	0.999	25.83 H_2O
9:01:34	1.000	25.91 H_2O
9:02:29	1.000	26.01 H_2O
9:03:24	1.000	26.08 H_2O
9:04:19	1.001	26.14 H_2O
9:05:13	1.002	26.20 H_2O
9:06:08	1.001	26.27 H_2O
9:28:27	0.755	26.03 NaCl
9:29:24	0.754	26.36 NaCl
9:30:20	0.754	26.61 NaCl
9:31:16	0.755	26.79 NaCl
9:32:12	0.754	26.95 NaCl
9:33:08	0.754	27.06 NaCl
9:34:03	0.755	27.16 NaCl
9:34:59	0.755	27.24 NaCl
9:35:54	0.755	27.30 NaCl
9:18:36	0.842	25.82 KCl
9:19:33	0.842	26.14 KCl
9:20:29	0.844	26.36 KCl
9:21:24	0.844	26.54 KCl
9:22:19	0.844	26.69 KCl
9:23:15	0.844	26.79 KCl
9:24:10	0.845	26.88 KCl
9:25:04	0.845	26.96 KCl
9:25:59	0.845	27.02 KCl

D.H. 02/04/99

SC 98 2A1 02/02/99

Time	Aw	Temp (C)
12:49:58	0.881	27.88
12:50:56	0.898	28.37
12:51:53	0.907	28.69
12:52:48	0.912	28.93
12:53:44	0.917	29.10
12:54:39	0.921	29.22
12:55:34	0.923	29.31
12:56:29	0.926	29.38
12:57:24	0.927	29.43
12:58:19	0.929	29.47
12:59:14	0.931	29.50
13:00:09	0.932	29.52
13:01:03	0.933	29.54
13:01:58	0.934	29.56
13:02:53	0.935	29.58
13:03:47	0.935	29.59
13:04:42	0.936	29.61
13:05:36	0.937	29.62
13:06:31	0.937	29.62
13:07:25	0.938	29.63
13:08:20	0.937	29.64
13:09:15	0.938	29.65
13:10:09	0.938	29.66
13:11:04	0.939	29.66
13:11:58	0.939	29.66
13:12:53	0.940	29.66
13:13:47	0.940	29.66
13:14:42	0.940	29.68
13:15:36	0.940	29.67
13:16:31	0.940	29.68
13:17:25	0.940	29.70
13:18:20	0.941	29.70
13:19:14	0.941	29.70

Mass (g) Triple Contained
7.170 Initial
7.163 Final
7.152 After 5min.

SC5 98 2B1 02/02/99

Time	Aw	Temp (C)
12:09:37	0.948	27.73
12:10:34	0.954	28.23
12:11:30	0.958	28.55
12:12:26	0.960	28.78
12:13:21	0.962	28.95
12:14:16	0.963	29.08
12:15:12	0.965	29.16
12:16:07	0.966	29.24
12:17:02	0.967	29.29
12:17:56	0.967	29.34
12:18:51	0.968	29.37
12:19:46	0.968	29.41
12:20:41	0.968	29.42
12:21:35	0.969	29.43
12:22:30	0.969	29.44
12:23:24	0.970	29.46
12:24:19	0.970	29.47
12:25:13	0.970	29.48
12:26:08	0.971	29.49
12:27:03	0.970	29.50
12:27:57	0.971	29.50
12:28:52	0.971	29.51
12:29:46	0.971	29.53
12:30:41	0.971	29.52
12:31:35	0.971	29.54
12:32:30	0.971	29.54
12:33:24	0.972	29.55
12:34:18	0.971	29.56
12:35:13	0.972	29.57
12:36:07	0.972	29.58
12:37:02	0.972	29.58
12:37:57	0.972	29.59
12:38:51	0.972	29.60

Mass (g) Double Contained
6.928 Initial
6.920 Final
6.904 After 5min.

D.H. 02/04/99

SC5 3A1 98 02/02/99

Time	Aw	Temp (C)
11:35:33	0.898	27.61
11:36:29	0.905	28.09
11:37:25	0.911	28.40
11:38:19	0.916	28.63
11:39:14	0.921	28.81
11:40:08	0.924	28.93
11:41:03	0.928	29.02
11:41:57	0.931	29.08
11:42:51	0.932	29.15
11:43:45	0.934	29.19
11:44:39	0.936	29.23
11:45:32	0.938	29.24
11:46:26	0.938	29.27
11:47:20	0.940	29.29
11:48:14	0.941	29.30
11:49:08	0.942	29.31
11:50:01	0.942	29.34
11:50:55	0.943	29.35
11:51:49	0.944	29.36
11:52:43	0.945	29.37
11:53:36	0.946	29.38
11:54:30	0.946	29.40
11:55:24	0.947	29.40
11:56:17	0.947	29.42
11:57:11	0.948	29.43
11:58:05	0.949	29.43
11:58:58	0.949	29.44
11:59:52	0.949	29.46
12:00:46	0.949	29.47
12:01:39	0.950	29.47
12:02:33	0.951	29.47
12:03:26	0.951	29.47
12:04:20	0.951	29.48

Mass (g) Single Contained
7.549 Initial
7.543 Final
7.533 After 5min.

D.H. 02/04/99

Witnessed & Understood by me, | Date | Invented by | Date

Recorded by

SC5 3B1 98 02/02/99

Time	Aw	Temp (C)
13:24:31	0.901	28.10
13:25:27	0.914	28.53
13:26:22	0.920	28.84
13:27:17	0.925	29.05
13:28:11	0.930	29.19
13:29:05	0.933	29.31
13:29:59	0.936	29.40
13:30:53	0.938	29.46
13:31:47	0.940	29.51
13:32:41	0.942	29.55
13:33:35	0.943	29.58
13:34:28	0.945	29.61
13:35:22	0.946	29.63
13:36:16	0.946	29.65
13:37:09	0.948	29.65
13:38:03	0.949	29.66
13:38:57	0.949	29.67
13:39:50	0.950	29.68
13:40:44	0.950	29.69
13:41:37	0.951	29.70
13:42:31	0.952	29.70
13:43:25	0.952	29.71
13:44:18	0.952	29.72
13:45:12	0.953	29.72
13:46:06	0.953	29.73
13:46:59	0.953	29.74
13:47:53	0.954	29.75
13:48:47	0.954	29.76
13:49:40	0.954	29.76
13:50:34	0.955	29.76
13:51:28	0.955	29.76
13:52:21	0.955	29.76
13:53:15	0.955	29.77

Mass (g) Triple Contained
7.090 Initial
7.084 Final
7.067 After 5min.

D.H. 03/04/99

SC5 3C1 98 02/02/99

Time	Aw	Temp (C)
11:00:53	0.851	27.62
11:01:49	0.859	28.08
11:02:45	0.867	28.36
11:03:40	0.874	28.55
11:04:34	0.880	28.70
11:05:29	0.885	28.80
11:06:23	0.889	28.88
11:07:17	0.893	28.93
11:08:11	0.896	28.98
11:09:05	0.899	29.01
11:09:59	0.902	29.03
11:10:52	0.904	29.07
11:11:46	0.906	29.09
11:12:40	0.908	29.10
11:13:34	0.909	29.12
11:14:27	0.910	29.13
11:15:21	0.911	29.16
11:16:15	0.913	29.17
11:17:08	0.914	29.17
11:18:02	0.914	29.19
11:18:55	0.915	29.20
11:19:49	0.916	29.22
11:20:43	0.917	29.23
11:21:37	0.917	29.24
11:22:30	0.918	29.24
11:23:24	0.919	29.25
11:24:18	0.919	29.25
11:25:11	0.919	29.26
11:26:05	0.920	29.26
11:26:58	0.920	29.27
11:27:52	0.920	29.27
11:28:45	0.921	29.28
11:29:39	0.922	29.28

Mass (g) Single Contained
6.499 Initial
6.493 Final
6.485 After 5min.

D.H. 03/04/99

SC5 4A1 98 02/02/99

Time	Aw	Temp (C)
9:43:44	0.755	27.51
9:44:40	0.786	27.39
9:45:34	0.789	27.51
9:46:28	0.792	27.62
9:47:23	0.794	27.70
9:48:17	0.798	27.76
9:49:11	0.801	27.82
9:50:05	0.805	27.86
9:50:59	0.808	27.90
9:51:52	0.810	27.95
9:52:46	0.814	27.98
9:53:40	0.816	28.01
9:54:33	0.818	28.06
9:55:27	0.820	28.09
9:56:21	0.823	28.10
9:57:15	0.824	28.15
9:58:09	0.826	28.16
9:59:02	0.827	28.19
9:59:56	0.829	28.22
10:00:49	0.831	28.24
10:01:43	0.834	28.27
10:02:37	0.836	28.28
10:03:30	0.838	28.32
10:04:24	0.841	28.33
10:05:17	0.842	28.36
10:06:11	0.844	28.38
10:07:04	0.845	28.40
10:07:58	0.847	28.42
10:08:51	0.849	28.44
10:09:45	0.850	28.46
10:10:38	0.852	28.48
10:11:31	0.853	28.50
10:12:24	0.853	28.53

Mass (g) Single Contained
8.549 Initial
8.547 Final
8.542 After 5min.

D.H. 02/04/99

SC5 2C1 98 01/26/99

Time	Aw	Temp (C)

Output unsuccessfully saved.

Mass (g) Triple Contained
7.238 Initial
7.221 Final
7.173 After 5min.

D.H. 03/04/99

Final Calibration 02/02/99

Time	Aw	Temp (C)
16:02:14	0.997	28.24 H_2O
16:03:10	0.998	28.66 H_2O
16:04:05	0.999	28.97 H_2O
16:04:59	0.999	29.20 H_2O
16:05:53	0.999	29.37 H_2O
16:06:47	0.999	29.50 H_2O
16:07:41	1.000	29.60 H_2O
16:08:35	1.000	29.67 H_2O
16:09:29	1.000	29.72 H_2O
16:10:23	1.001	29.76 H_2O
16:11:16	1.000	29.79 H_2O
16:12:10	1.000	29.81 H_2O
16:13:03	1.001	29.83 H_2O
16:13:56	1.001	29.85 H_2O
16:14:49	1.001	29.85 H_2O
16:15:43	1.001	29.86 H_2O
16:16:36	1.001	29.87 H_2O
16:17:29	1.001	29.87 H_2O
16:18:23	1.002	29.89 H_2O
16:19:16	1.002	29.89 H_2O
16:20:09	1.001	29.90 H_2O
16:22:16	0.754	28.08 NaCl
16:23:13	0.754	28.54 NaCl
16:24:09	0.753	28.87 NaCl
16:25:05	0.753	29.11 NaCl
16:26:01	0.754	29.29 NaCl
16:26:57	0.754	29.42 NaCl
16:27:53	0.754	29.52 NaCl
16:28:48	0.754	29.60 NaCl
16:29:44	0.754	29.65 NaCl
16:32:23	0.841	28.20 KCl
16:33:20	0.841	28.70 KCl
16:34:16	0.842	29.02 KCl
16:35:11	0.843	29.25 KCl
16:36:06	0.843	29.41 KCl
16:37:01	0.843	29.51 KCl
16:37:56	0.844	29.59 KCl
16:38:50	0.844	29.64 KCl
16:39:45	0.844	29.68 KCl
16:40:40	0.844	29.71 KCl

SC5 5A1 98 02/02/99

Time	Aw	Temp (C)
10:18:57	0.934	27.33
10:19:53	0.943	27.70
10:20:48	0.949	27.93
10:21:43	0.953	28.10
10:22:37	0.956	28.23
10:23:31	0.959	28.32
10:24:25	0.961	28.39
10:25:19	0.963	28.45
10:26:13	0.965	28.50
10:27:06	0.967	28.54
10:28:00	0.967	28.58
10:28:54	0.969	28.60
10:29:48	0.970	28.63
10:30:41	0.970	28.67
10:31:35	0.971	28.69
10:32:29	0.972	28.72
10:33:22	0.972	28.73
10:34:16	0.972	28.75
10:35:09	0.973	28.78
10:36:03	0.975	28.79
10:36:57	0.974	28.81
10:37:50	0.974	28.84
10:38:44	0.975	28.85
10:39:37	0.975	28.87
10:40:31	0.976	28.87
10:41:24	0.975	28.89
10:42:18	0.976	28.89
10:43:11	0.976	28.90
10:44:05	0.976	28.91
10:44:58	0.976	28.92
10:45:52	0.977	28.92
10:46:45	0.977	28.93
10:47:38	0.977	28.95

Mass (g) Single Contained
6.960 Initial
6.950 Final
6.940 After 5min.

D.H. 03/04/99

SC5 6A1 98 02/02/99

Time	Aw	Temp (C)
14:52:03	0.923	28.17
14:53:00	0.934	28.71
14:53:55	0.941	29.07
14:54:50	0.946	29.31
14:55:44	0.949	29.49
14:56:37	0.951	29.63
14:57:31	0.952	29.74
14:58:25	0.955	29.81
14:59:18	0.956	29.87
15:00:12	0.956	29.93
15:01:05	0.958	29.97
15:01:58	0.959	30.00
15:02:52	0.960	30.02
15:03:45	0.960	30.04
15:04:39	0.961	30.06
15:05:32	0.961	30.07
15:06:25	0.961	30.08
15:07:18	0.962	30.08
15:08:12	0.962	30.09
15:09:05	0.962	30.09
15:09:58	0.963	30.10
15:10:51	0.963	30.11
15:11:44	0.963	30.12
15:12:38	0.964	30.11
15:13:31	0.963	30.13
15:14:24	0.964	30.13
15:15:17	0.964	30.13
15:16:11	0.964	30.13
15:17:04	0.964	30.13
15:17:57	0.964	30.14
15:18:51	0.964	30.13
15:19:44	0.964	30.13
15:20:38	0.964	30.13

Mass (g) Triple Contatined
8.137 Initial
8.134 Final
8.131 After 5min.

SC5 6B1 98 02/02/99

Time	Aw	Temp (C)
14:01:21	0.633	28.46
14:02:16	0.634	28.84
14:03:09	0.634	29.09
14:04:02	0.634	29.26
14:04:55	0.635	29.39
14:05:48	0.635	29.47
14:06:40	0.634	29.54
14:07:33	0.634	29.59
14:08:25	0.632	29.64
14:09:18	0.629	29.66
14:10:10	0.625	29.69
14:11:02	0.623	29.71
14:11:54	0.620	29.73
14:12:46	0.617	29.75
14:13:38	0.615	29.75
14:14:31	0.612	29.77
14:15:23	0.610	29.77
14:16:15	0.608	29.77
14:17:07	0.606	29.78
14:17:59	0.603	29.79
14:18:51	0.602	29.79
14:19:44	0.599	29.80
14:20:36	0.597	29.81
14:21:28	0.595	29.82
14:22:20	0.593	29.83
14:23:12	0.591	29.84
14:24:05	0.589	29.85
14:24:57	0.587	29.85
14:25:49	0.585	29.87
14:26:41	0.583	29.88
14:27:34	0.581	29.89
14:28:26	0.579	29.89
14:29:18	0.577	29.89

Mass (g) Triple Contained
7.522 Initial
7.520 Final
7.519 After 5min.

D.H. 03/04/99

To Page No.

Witnessed & Understood by me, | Date | Invented by | Date

Recorded by

From Page No. 03/25/99

The following results were obtained for the ten tuff sub-samples on 02/09/99, 02/16/99, and 02/23/99, and 02/25/99. Due to time constraints on 02/23/99, only five samples were completed. The remaining five were performed on 02/25/99. D.H. 03/25/99

Initial Calibration 02/09/99

Time	Aw	Temp (C)
8:30:04	0.999	26.23 H_2O
8:31:00	0.999	26.34 H_2O
8:31:55	1.000	26.43 H_2O
8:32:51	1.000	26.50 H_2O
8:33:46	1.000	26.57 H_2O
8:34:41	1.001	26.63 H_2O
8:35:36	1.001	26.69 H_2O
8:36:31	1.001	26.73 H_2O
8:37:26	1.001	26.79 H_2O
8:38:20	1.001	26.84 H_2O
8:49:11	0.755	26.96 NaCl
8:50:07	0.755	27.07 NaCl
8:51:04	0.755	27.15 NaCl
8:52:00	0.755	27.21 NaCl
8:52:56	0.755	27.30 NaCl
8:53:52	0.755	27.35 NaCl
8:54:48	0.754	27.40 NaCl
8:55:44	0.755	27.44 NaCl
8:56:40	0.755	27.48 NaCl
9:03:05	0.836	26.81 KCl
9:04:02	0.836	27.12 KCl
9:04:58	0.838	27.32 KCl
9:05:54	0.838	27.48 KCl
9:06:50	0.839	27.60 KCl
9:07:46	0.839	27.70 KCl
9:08:41	0.839	27.77 KCl
9:09:37	0.840	27.83 KCl
9:10:32	0.840	27.88 KCl

D.H. 03/25/99

SC 98 2A1 02/09/99

Time	Aw	Temp (C)
14:07:26	0.839	28.65
14:08:24	0.857	29.15
14:09:20	0.869	29.48
14:10:16	0.877	29.70
14:11:11	0.883	29.88
14:12:06	0.889	30.00
14:13:01	0.893	30.09
14:13:55	0.897	30.16
14:14:50	0.900	30.21
14:15:44	0.903	30.24
14:16:39	0.905	30.28
14:17:33	0.907	30.31
14:18:27	0.909	30.33
14:19:21	0.911	30.36
14:20:16	0.912	30.37
14:21:10	0.914	30.39
14:22:04	0.915	30.40
14:22:58	0.916	30.42
14:23:52	0.918	30.42
14:24:47	0.919	30.43
14:25:41	0.919	30.44
14:26:35	0.920	30.45
14:27:29	0.921	30.45
14:28:23	0.921	30.46
14:29:17	0.922	30.46
14:30:11	0.922	30.46
14:31:05	0.923	30.46
14:31:59	0.924	30.46
14:32:54	0.924	30.47
14:33:48	0.925	30.47
14:34:42	0.925	30.47
14:35:36	0.926	30.47
14:36:30	0.926	30.48

Mass (g) Triple Contained
7.144 Initial
7.140 Final
7.113 After 5min.

D.H. 03/25/99

SC5 98 2B1 02/09/99

Time	Aw	Temp (C)
11:47:39	0.943	28.02
11:48:36	0.947	28.55
11:49:31	0.950	28.89
11:50:25	0.954	29.12
11:51:19	0.955	29.31
11:52:14	0.957	29.42
11:53:08	0.958	29.52
11:54:02	0.960	29.59
11:54:56	0.961	29.64
11:55:49	0.962	29.68
11:56:43	0.963	29.72
11:57:37	0.963	29.75
11:58:31	0.964	29.77
11:59:24	0.964	29.79
12:00:18	0.965	29.81
12:01:11	0.965	29.82
12:02:05	0.966	29.82
12:02:58	0.966	29.83
12:03:52	0.966	29.85
12:04:45	0.966	29.85
12:05:39	0.967	29.86
12:06:32	0.967	29.86
12:07:26	0.967	29.87
12:08:19	0.967	29.88
12:09:12	0.967	29.88
12:10:06	0.968	29.88
12:10:59	0.968	29.89
12:11:52	0.968	29.91
12:12:46	0.968	29.91
12:13:40	0.968	29.92
12:14:33	0.969	29.92
12:15:27	0.968	29.94
12:16:20	0.968	29.94

Mass (g) Double Contained
6.894 Initial
6.885 Final
6.841 After 5min.

D.H. 03/25/99

SC5 2C1 98 02/09/99

Time	Aw	Temp (C)
12:55:12	0.899	28.51
12:56:10	0.911	28.94
12:57:06	0.919	29.22
12:58:01	0.924	29.43
12:58:56	0.929	29.58
12:59:51	0.932	29.69
13:00:46	0.936	29.77
13:01:41	0.938	29.83
13:02:36	0.940	29.87
13:03:31	0.941	29.92
13:04:25	0.943	29.94
13:05:20	0.945	29.96
13:06:15	0.946	29.98
13:07:09	0.946	30.00
13:08:04	0.948	30.01
13:08:58	0.949	30.02
13:09:53	0.950	30.03
13:10:47	0.950	30.04
13:11:42	0.951	30.05
13:12:36	0.951	30.07
13:13:30	0.952	30.08
13:14:25	0.952	30.09
13:15:19	0.953	30.10
13:16:13	0.953	30.10
13:17:08	0.954	30.11
13:18:02	0.954	30.12
13:18:57	0.954	30.12
13:19:51	0.955	30.13
13:20:46	0.955	30.13
13:21:40	0.955	30.13
13:22:34	0.956	30.13
13:23:29	0.956	30.13
13:24:23	0.956	30.14

Mass (g) Triple Contained
7.167 Initial
7.161 Final
7.144 After 5min.

D.H. 03/25/99

Final Calibration 02/09/99

Time	Aw	Temp (C)
15:31:57	0.998	29.64 H_2O
15:32:51	0.998	29.79 H_2O
15:33:45	0.999	29.90 H_2O
15:34:39	0.999	29.99 H_2O
15:35:33	0.999	30.06 H_2O
15:36:26	0.999	30.10 H_2O
15:37:20	1.000	30.14 H_2O
15:38:14	1.000	30.17 H_2O
15:39:07	1.000	30.19 H_2O
15:42:56	0.753	28.97 NaCl
15:43:52	0.754	29.27 NaCl
15:44:48	0.753	29.50 NaCl
15:45:43	0.754	29.66 NaCl
15:46:39	0.754	29.79 NaCl
15:47:34	0.754	29.89 NaCl
15:48:29	0.754	29.97 NaCl
15:49:24	0.754	30.02 NaCl
15:50:19	0.754	30.07 NaCl
15:54:32	0.838	28.73 KCl
15:55:29	0.837	29.17 KCl
15:56:24	0.838	29.46 KCl
15:57:19	0.838	29.66 KCl
15:58:14	0.839	29.80 KCl
15:59:09	0.839	29.91 KCl
16:00:04	0.840	29.98 KCl
16:00:58	0.840	30.04 KCl
16:01:53	0.840	30.07 KCl
16:02:47	0.840	30.11 KCl

D.H. 03/25/99

SC5 3A1 98 02/09/99

Time	Aw	Temp (C)
10:40:58	0.861	27.83
10:41:54	0.864	28.27
10:42:50	0.867	28.55
10:43:45	0.870	28.77
10:44:39	0.873	28.94
10:45:34	0.878	29.05
10:46:28	0.881	29.14
10:47:22	0.884	29.21
10:48:17	0.887	29.26
10:49:11	0.890	29.30
10:50:05	0.892	29.34
10:50:59	0.895	29.37
10:51:53	0.898	29.39
10:52:47	0.900	29.41
10:53:41	0.902	29.43
10:54:35	0.904	29.44
10:55:29	0.906	29.47
10:56:23	0.908	29.48
10:57:16	0.908	29.50
10:58:10	0.910	29.51
10:59:04	0.911	29.53
10:59:58	0.913	29.53
11:00:51	0.914	29.55
11:01:45	0.915	29.56
11:02:39	0.916	29.57
11:03:33	0.918	29.58
11:04:26	0.918	29.60
11:05:20	0.919	29.60
11:06:14	0.920	29.61
11:07:08	0.920	29.62
11:08:01	0.921	29.63
11:08:55	0.921	29.63

Mass (g) Single Contained
7.521 Initial
7.514 Final
7.507 After 5min.

D.H. 03/25/99

by me, | Date | Invented by | Date

Recorded by

SC5 3B1 98 02/09/99

Time	Aw	Temp (C)
14:45:41	0.884	28.78
14:46:37	0.891	29.28
14:47:33	0.897	29.59
14:48:27	0.902	29.82
14:49:22	0.906	29.97
14:50:16	0.910	30.09
14:51:10	0.913	30.18
14:52:05	0.915	30.24
14:52:59	0.918	30.29
14:53:52	0.920	30.33
14:54:46	0.921	30.36
14:55:40	0.923	30.38
14:56:34	0.924	30.40
14:57:27	0.926	30.41
14:58:21	0.927	30.43
14:59:15	0.928	30.43
15:00:09	0.929	30.44
15:01:02	0.930	30.44
15:01:56	0.930	30.45
15:02:50	0.931	30.45
15:03:43	0.932	30.46
15:04:37	0.932	30.45
15:05:31	0.933	30.45
15:06:25	0.933	30.45
15:07:18	0.934	30.44
15:08:12	0.934	30.44
15:09:06	0.935	30.44
15:09:59	0.935	30.43
15:10:53	0.936	30.43
15:11:47	0.937	30.43
15:12:40	0.937	30.43
15:13:34	0.937	30.43
15:14:28	0.937	30.43

Mass (g) Triple Contained
7.064 Initial
7.056 Final
7.045 After 5min.

D.H. 03/25/99

SC5 3C1 98 02/09/99

Time	Aw	Temp (C)
11:14:02	0.826	28.28
11:14:59	0.829	28.71
11:15:55	0.833	28.98
11:16:50	0.838	29.16
11:17:46	0.842	29.30
11:18:41	0.847	29.40
11:19:36	0.852	29.46
11:20:31	0.855	29.51
11:21:26	0.860	29.56
11:22:21	0.863	29.59
11:23:16	0.867	29.62
11:24:11	0.869	29.64
11:25:05	0.871	29.66
11:26:00	0.874	29.67
11:26:55	0.876	29.68
11:27:49	0.879	29.69
11:28:44	0.880	29.70
11:29:39	0.882	29.71
11:30:33	0.884	29.72
11:31:27	0.885	29.73
11:32:22	0.886	29.74
11:33:16	0.888	29.74
11:34:11	0.889	29.76
11:35:05	0.891	29.76
11:36:00	0.892	29.77
11:36:54	0.892	29.79
11:37:48	0.893	29.80
11:38:42	0.894	29.80
11:39:37	0.895	29.81
11:40:31	0.895	29.82
11:41:26	0.896	29.82
11:42:20	0.897	29.83
11:43:14	0.898	29.83

Mass (g) Single Contained
6.480 Initial
6.474 Final
6.462 After 5min.

SC5 4A1 98 02/09/99

Time	Aw	Temp (C)
10:06:48	0.814	27.90
10:07:44	0.802	28.25
10:08:39	0.795	28.48
10:09:35	0.791	28.64
10:10:30	0.790	28.76
10:11:26	0.790	28.85
10:12:21	0.791	28.91
10:13:17	0.793	28.97
10:14:12	0.795	29.01
10:15:07	0.798	29.04
10:16:02	0.800	29.08
10:16:57	0.803	29.09
10:17:52	0.805	29.13
10:18:47	0.807	29.14
10:19:42	0.809	29.17
10:20:37	0.811	29.18
10:21:32	0.813	29.20
10:22:27	0.815	29.21
10:23:22	0.817	29.24
10:24:17	0.819	29.24
10:25:12	0.820	29.26
10:26:07	0.822	29.27
10:27:02	0.823	29.29
10:27:57	0.824	29.29
10:28:52	0.826	29.30
10:29:47	0.827	29.32
10:30:41	0.828	29.33
10:31:36	0.829	29.33
10:32:31	0.830	29.34
10:33:25	0.832	29.35
10:34:20	0.832	29.37
10:35:15	0.834	29.38
10:36:09	0.834	29.39

Mass (g) Single Contained
8.539 Initial
8.536 Final
8.533 After 5min.

D.H. 03/25/99

SC5 5A1 98 02/09/99

Time	Aw	Temp (C)
9:33:15	0.902	27.50
9:34:11	0.911	27.79
9:35:06	0.918	27.99
9:36:00	0.924	28.13
9:36:55	0.928	28.24
9:37:49	0.932	28.32
9:38:43	0.935	28.40
9:39:37	0.939	28.44
9:40:31	0.941	28.48
9:41:25	0.943	28.52
9:42:19	0.944	28.56
9:43:13	0.946	28.58
9:44:07	0.948	28.60
9:45:00	0.949	28.63
9:45:54	0.951	28.65
9:46:48	0.952	28.67
9:47:42	0.952	28.71
9:48:35	0.954	28.72
9:49:29	0.955	28.75
9:50:23	0.956	28.75
9:51:16	0.956	28.78
9:52:10	0.957	28.80
9:53:04	0.958	28.82
9:53:58	0.958	28.84
9:54:52	0.958	28.85
9:55:45	0.959	28.87
9:56:39	0.959	28.89
9:57:32	0.960	28.90
9:58:26	0.960	28.92
9:59:19	0.961	28.93
10:00:13	0.961	28.95
10:01:06	0.961	28.97
10:02:00	0.961	28.99

Mass (g) Single Contained
6.925 Initial
6.918 Final
6.901 After 5min.

SC5 6A1 98 02/09/99

Time	Aw	Temp (C)
12:21:21	0.783	28.39
12:22:16	0.769	28.83
12:23:11	0.759	29.12
12:24:05	0.752	29.32
12:24:59	0.747	29.48
12:25:53	0.744	29.58
12:26:47	0.742	29.67
12:27:40	0.743	29.72
12:28:34	0.742	29.78
12:29:28	0.743	29.81
12:30:21	0.744	29.83
12:31:15	0.745	29.86
12:32:08	0.745	29.87
12:33:02	0.746	29.89
12:33:55	0.746	29.91
12:34:49	0.747	29.91
12:35:42	0.747	29.92
12:36:35	0.747	29.93
12:37:29	0.748	29.94
12:38:22	0.749	29.94
12:39:16	0.750	29.94
12:40:09	0.750	29.96
12:41:02	0.750	29.96
12:41:56	0.751	29.97
12:42:49	0.751	29.98
12:43:42	0.751	29.99
12:44:35	0.751	30.00
12:45:28	0.751	30.00
12:46:21	0.751	30.01
12:47:15	0.751	30.02
12:48:08	0.751	30.03
12:49:01	0.751	30.03
12:49:54	0.750	30.03

Mass (g) Triple Contatined
8.128 Initial
8.126 Final
8.123 After 5min.

D.H. 03/25/99

SC5 6B1 98 02/09/99

Time	Aw	Temp (C)
13:31:06	0.733	28.90
13:32:00	0.719	29.29
13:32:54	0.709	29.55
13:33:48	0.700	29.73
13:34:42	0.693	29.84
13:35:36	0.688	29.93
13:36:29	0.683	29.99
13:37:23	0.678	30.03
13:38:16	0.675	30.06
13:39:10	0.672	30.08
13:40:03	0.669	30.10
13:40:57	0.668	30.11
13:41:51	0.666	30.12
13:42:44	0.663	30.14
13:43:38	0.661	30.15
13:44:31	0.659	30.15
13:45:25	0.657	30.17
13:46:18	0.656	30.18
13:47:12	0.653	30.19
13:48:05	0.651	30.20
13:48:58	0.647	30.21
13:49:52	0.644	30.22
13:50:45	0.641	30.23
13:51:38	0.638	30.24
13:52:32	0.636	30.24
13:53:25	0.634	30.25
13:54:19	0.631	30.25
13:55:12	0.629	30.26
13:56:06	0.626	30.26
13:56:59	0.624	30.26
13:57:53	0.622	30.27
13:58:46	0.621	30.28
13:59:40	0.619	30.29

Mass (g) Triple Contained
7.521 Initial
7.520 Final
7.517 After 5min.

Initial Calibration 02/16/99

Time	Aw	Temp (C)
8:23:35	0.997	24.75 H_2O
8:24:32	0.997	24.87 H_2O
8:25:28	0.998	24.96 H_2O
8:26:24	0.998	25.04 H_2O
8:27:19	1	25.11 H_2O
8:28:15	1	25.19 H_2O
8:29:10	1.001	25.24 H_2O
8:30:06	1.001	25.3 H_2O
8:31:01	1.001	25.37 H_2O
8:31:56	1.001	25.41 H_2O
8:34:02	0.757	24.92 NaCl
8:35:00	0.755	25.13 NaCl
8:35:56	0.756	25.28 NaCl
8:36:53	0.755	25.42 NaCl
8:37:50	0.756	25.53 NaCl
8:38:46	0.755	25.64 NaCl
8:39:43	0.755	25.72 NaCl
8:40:39	0.756	25.78 NaCl
8:41:35	0.755	25.86 NaCl
9:02:31	0.843	26.59 KCl
9:03:26	0.843	26.72 KCl
9:04:21	0.843	26.83 KCl
9:05:16	0.844	26.91 KCl
9:06:11	0.844	26.97 KCl
9:07:06	0.844	27.04 KCl
9:08:01	0.844	27.09 KCl
9:08:56	0.845	27.13 KCl
9:09:51	0.844	27.19 KCl

D.H. 03/25/99

SC 98 2A1 02/16/99

Time	Aw	Temp (C)
14:07:51	0.823	28.26
14:08:49	0.826	28.72
14:09:45	0.831	29.03
14:10:41	0.836	29.25
14:11:37	0.842	29.41
14:12:32	0.847	29.54
14:13:28	0.851	29.64
14:14:23	0.855	29.71
14:15:18	0.857	29.76
14:16:13	0.861	29.8
14:17:08	0.863	29.83
14:18:03	0.865	29.86
14:18:58	0.867	29.88
14:19:52	0.869	29.88
14:20:47	0.871	29.9
14:21:42	0.873	29.9
14:22:36	0.874	29.91
14:23:31	0.875	29.92
14:24:26	0.876	29.92
14:25:20	0.878	29.92
14:26:15	0.879	29.93
14:27:09	0.88	29.93
14:28:04	0.881	29.95
14:28:58	0.882	29.94
14:29:53	0.882	29.95
14:30:47	0.883	29.96
14:31:42	0.884	29.97
14:32:36	0.885	29.97
14:33:31	0.886	29.99
14:34:25	0.886	29.99
14:35:20	0.887	29.99
14:36:14	0.887	30
14:37:09	0.888	30

Mass (g) Triple Contained
7.110 Initial
7.104 Final
7.092

Witnessed & Understood by me, | Date | Invented by | Date

Recorded by

SC5 98 2B1 02/16/99

Time	Aw	Temp (C)
12:43:01	0.871	28.47
12:43:58	0.884	28.94
12:44:52	0.895	29.25
12:45:47	0.902	29.46
12:46:41	0.908	29.59
12:47:34	0.913	29.7
12:48:28	0.916	29.77
12:49:21	0.92	29.83
12:50:15	0.922	29.87
12:51:08	0.925	29.9
12:52:01	0.927	29.93
12:52:55	0.929	29.96
12:53:48	0.931	29.97
12:54:41	0.932	29.98
12:55:35	0.934	29.99
12:56:28	0.935	30
12:57:21	0.936	30
12:58:14	0.937	30
12:59:08	0.938	30.01
13:00:01	0.939	30
13:00:54	0.939	30.01
13:01:47	0.94	30.01
13:02:40	0.941	30.01
13:03:33	0.942	30.01
13:04:26	0.942	30.01
13:05:19	0.944	30.01
13:06:13	0.944	30.02
13:07:06	0.944	30.02
13:07:59	0.945	30.03
13:08:52	0.945	30.03
13:09:45	0.945	30.04
13:10:39	0.946	30.04
13:11:32	0.946	30.04

Mass (g) Double Contained
6.810 Initial
6.804 Final
6.778

D.H. 03/25/99

SC5 2C1 98 02/16/99

Time	Aw	Temp (C)
15:17:56	0.86	28.17
15:18:54	0.869	28.73
15:19:51	0.879	29.11
15:20:47	0.886	29.39
15:21:43	0.893	29.59
15:22:38	0.898	29.74
15:23:33	0.903	29.85
15:24:28	0.907	29.94
15:25:23	0.91	30
15:26:18	0.913	30.05
15:27:12	0.916	30.09
15:28:07	0.918	30.11
15:29:01	0.92	30.14
15:29:56	0.922	30.15
15:30:50	0.923	30.17
15:31:45	0.925	30.18
15:32:39	0.927	30.18
15:33:34	0.928	30.19
15:34:28	0.929	30.2
15:35:23	0.93	30.21
15:36:17	0.931	30.21
15:37:12	0.932	30.22
15:38:06	0.933	30.23
15:39:01	0.933	30.24
15:39:55	0.934	30.25
15:40:49	0.935	30.26
15:41:44	0.935	30.26
15:42:38	0.936	30.25
15:43:32	0.936	30.26
15:44:27	0.937	30.26
15:45:21	0.938	30.26
15:46:16	0.938	30.26
15:47:10	0.939	30.26

Mass (g) Triple Contained
7.126 Initial
7.120 Final
7.099

D.H. 03/25/99

SC5 3A1 98 02/16/99

Time	Aw	Temp (C)
9:13:52	0.833	26.5
9:14:49	0.837	26.82
9:15:46	0.842	27.03
9:16:42	0.846	27.19
9:17:38	0.849	27.31
9:18:33	0.852	27.4
9:19:29	0.855	27.49
9:20:24	0.858	27.54
9:21:19	0.86	27.6
9:22:15	0.863	27.66
9:23:10	0.865	27.69
9:24:05	0.866	27.74
9:25:00	0.869	27.77
9:25:55	0.87	27.83
9:26:50	0.872	27.86
9:27:45	0.874	27.9
9:28:40	0.875	27.93
9:29:35	0.877	27.95
9:30:29	0.878	28
9:31:24	0.88	28.02
9:32:19	0.881	28.05
9:33:14	0.882	28.09
9:34:09	0.883	28.12
9:35:03	0.884	28.13
9:35:58	0.885	28.16
9:36:53	0.886	28.19
9:37:47	0.887	28.21
9:38:42	0.888	28.23
9:39:37	0.889	28.25
9:40:31	0.89	28.26
9:41:26	0.891	28.28
9:42:20	0.891	28.31
9:43:15	0.892	28.32

Mass (g) Single Contained
7.496 Initial
7.494 Final
7.476

D.H. 03/25/99

SC5 3B1 98 02/16/99

Time	Aw	Temp (C)
13:21:43	0.837	28.28
13:22:40	0.845	28.77
13:23:35	0.853	29.1
13:24:31	0.86	29.32
13:25:26	0.865	29.48
13:26:20	0.869	29.61
13:27:15	0.874	29.69
13:28:09	0.878	29.76
13:29:03	0.881	29.82
13:29:57	0.885	29.85
13:30:51	0.887	29.89
13:31:45	0.89	29.91
13:32:39	0.892	29.93
13:33:33	0.894	29.96
13:34:27	0.896	29.96
13:35:20	0.897	29.98
13:36:14	0.899	29.99
13:37:08	0.9	29.99
13:38:02	0.901	30
13:38:56	0.902	30
13:39:49	0.903	30
13:40:43	0.905	30
13:41:37	0.906	30
13:42:30	0.906	30
13:43:24	0.907	30.01
13:44:18	0.908	30.01
13:45:11	0.908	30.01
13:46:05	0.909	30.01
13:46:59	0.91	30.01
13:47:53	0.91	30.02
13:48:46	0.911	30.02
13:49:40	0.911	30.02
13:50:34	0.912	30.03

Mass (g) Triple Contained
7.040 Initial
7.034 Final
7.015

D.H. 03/25/99

SC5 3C1 98 02/16/99

Time	Aw	Temp (C)
9:53:36	0.773	27.54
9:54:33	0.769	27.89
9:55:29	0.767	28.1
9:56:24	0.767	28.25
9:57:20	0.769	28.35
9:58:15	0.772	28.43
9:59:11	0.775	28.5
10:00:06	0.778	28.55
10:01:01	0.781	28.6
10:01:56	0.785	28.64
10:02:51	0.788	28.67
10:03:46	0.792	28.71
10:04:41	0.795	28.74
10:05:36	0.798	28.75
10:06:31	0.8	28.79
10:07:26	0.802	28.81
10:08:21	0.804	28.83
10:09:15	0.807	28.85
10:10:10	0.809	28.86
10:11:05	0.811	28.89
10:12:00	0.813	28.9
10:12:55	0.815	28.92
10:13:49	0.817	28.93
10:14:44	0.818	28.96
10:15:38	0.82	28.97
10:16:33	0.821	28.98
10:17:27	0.822	29.01
10:18:22	0.824	29.02
10:19:16	0.825	29.04
10:20:11	0.826	29.06
10:21:06	0.827	29.07
10:22:00	0.828	29.1
10:22:55	0.829	29.1

Mass (g) Single Contained
6.445 Initial
6.441 Final
6.431

D.H. 03/25/99

SC5 4A1 98 02/16/99

Time	Aw	Temp (C)
11:10:45	0.753	28.2
11:11:41	0.753	28.58
11:12:37	0.748	28.84
11:13:34	0.744	29.02
11:14:30	0.74	29.14
11:15:26	0.737	29.25
11:16:22	0.735	29.33
11:17:17	0.735	29.36
11:18:13	0.734	29.42
11:19:08	0.734	29.45
11:20:03	0.734	29.48
11:20:58	0.735	29.49
11:21:53	0.735	29.52
11:22:49	0.735	29.54
11:23:44	0.736	29.56
11:24:39	0.736	29.56
11:25:34	0.737	29.57
11:26:29	0.737	29.58
11:27:24	0.738	29.59
11:28:19	0.738	29.59
11:29:14	0.738	29.61
11:30:09	0.739	29.61
11:31:04	0.74	29.62
11:31:58	0.74	29.62
11:32:53	0.741	29.62
11:33:48	0.742	29.63
11:34:43	0.742	29.64
11:35:38	0.742	29.65
11:36:33	0.743	29.65
11:37:28	0.743	29.66
11:38:23	0.743	29.68
11:39:18	0.743	29.68
11:40:13	0.743	29.69

Mass (g) Single Contained
8.524 Initial
8.522 Final
8.520

D.H. 03/25/99

SC5 5A1 98 02/16/99

Time	Aw	Temp (C)
10:36:36	0.868	27.9
10:37:32	0.881	28.36
10:38:27	0.889	28.65
10:39:21	0.898	28.83
10:40:15	0.904	28.97
10:41:09	0.907	29.08
10:42:03	0.912	29.15
10:42:56	0.916	29.2
10:43:50	0.919	29.25
10:44:43	0.923	29.27
10:45:37	0.925	29.3
10:46:30	0.928	29.32
10:47:23	0.929	29.34
10:48:16	0.931	29.35
10:49:10	0.934	29.36
10:50:03	0.934	29.39
10:50:56	0.936	29.39
10:51:49	0.937	29.41
10:52:43	0.938	29.43
10:53:36	0.939	29.43
10:54:29	0.94	29.45
10:55:22	0.941	29.46
10:56:16	0.942	29.48
10:57:09	0.943	29.48
10:58:02	0.943	29.49
10:58:55	0.944	29.5
10:59:48	0.944	29.52
11:00:41	0.945	29.52
11:01:34	0.945	29.53
11:02:28	0.946	29.53
11:03:21	0.947	29.53
11:04:14	0.947	29.53
11:05:07	0.947	29.54

Mass (g) Single Contained
6.896 Initial
6.892 Final
6.863

D.H. 03/25/99

SC5 6A1 98 02/16/99

Time	Aw	Temp (C)
15:57:23	0.694	28.82
15:58:18	0.682	29.25
15:59:12	0.671	29.51
16:00:06	0.661	29.71
16:01:01	0.653	29.84
16:01:55	0.646	29.94
16:02:49	0.644	30
16:03:43	0.641	30.06
16:04:38	0.639	30.09
16:05:32	0.637	30.11
16:06:26	0.634	30.13
16:07:20	0.629	30.16
16:08:14	0.625	30.16
16:09:08	0.621	30.16
16:10:02	0.617	30.18
16:10:56	0.614	30.19
16:11:51	0.611	30.2
16:12:45	0.608	30.2
16:13:39	0.605	30.21
16:14:33	0.602	30.22
16:15:27	0.6	30.21
16:16:21	0.597	30.22
16:17:16	0.595	30.22
16:18:10	0.593	30.23
16:19:04	0.59	30.23
16:19:59	0.588	30.24
16:20:53	0.586	30.24
16:21:47	0.584	30.24
16:22:41	0.582	30.25
16:23:35	0.58	30.25
16:24:30	0.578	30.27
16:25:24	0.577	30.27
16:26:18	0.575	30.28

Mass (g) Triple Contatined
8.118 Initial
8.120 Final
8.117

Witnessed & Understood by me, | Date | Invented by | Date

Recorded by

Project No._____

Book No._____ TITLE _____

SC5 6B1 98 02/16/99

Time	Aw	Temp (C)
14:41:32	0.628	28.72
14:42:27	0.613	29.08
14:43:21	0.606	29.32
14:44:14	0.601	29.49
14:45:08	0.597	29.62
14:46:01	0.593	29.7
14:46:55	0.586	29.77
14:47:48	0.581	29.81
14:48:42	0.576	29.87
14:49:35	0.572	29.89
14:50:28	0.568	29.92
14:51:22	0.565	29.93
14:52:15	0.562	29.95
14:53:09	0.559	29.97
14:54:02	0.556	29.97
14:54:56	0.553	29.98
14:55:49	0.551	29.98
14:56:43	0.548	29.99
14:57:36	0.546	29.99
14:58:30	0.543	30.01
14:59:24	0.542	30
15:00:17	0.54	30.01
15:01:11	0.538	30.02
15:02:04	0.536	30.03
15:02:58	0.534	30.03
15:03:52	0.532	30.04
15:04:45	0.53	30.05
15:05:39	0.529	30.07
15:06:33	0.527	30.07
15:07:27	0.525	30.09
15:08:20	0.524	30.09
15:09:14	0.522	30.12
15:10:08	0.52	30.11

Mass (g) Triple Contained
7.519 Initial
7.513 Final
7.511

D. H.
03/25/99

Final Calibration 02/16/99

Time	Aw	Temp (C)
16:39:18	0.998	30.08 H_2O
16:40:11	0.999	30.12 H_2O
16:41:04	0.999	30.17 H_2O
16:41:57	0.999	30.19 H_2O
16:42:51	0.999	30.21 H_2O
16:43:44	1	30.23 H_2O
16:44:37	1	30.23 H_2O
16:45:30	1	30.24 H_2O
16:46:23	1	30.24 H_2O
16:48:53	0.758	28.44 NaCl
16:49:50	0.754	28.95 NaCl
16:50:46	0.754	29.29 NaCl
16:51:41	0.754	29.52 NaCl
16:52:37	0.753	29.7 NaCl
16:53:32	0.753	29.83 NaCl
16:54:27	0.753	29.92 NaCl
16:55:22	0.753	30 NaCl
16:56:16	0.754	30.05 NaCl
16:59:07	0.838	28.6 KCl
17:00:04	0.838	29.1 KCl
17:01:00	0.839	29.42 KCl
17:01:55	0.839	29.63 KCl
17:02:50	0.839	29.78 KCl
17:03:45	0.839	29.88 KCl
17:04:40	0.839	29.95 KCl
17:05:34	0.84	30.01 KCl

The remaining data has been continued in Lab Book 289.
D.H. 03/25/99

This Notebook Appears to Comply with QAP-001.
3/1/2000

To Page No._____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	