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Q200204030003

Scientific Notebook # 431

# LABORATORY NOTEBOOK

CNWRA/SwRI

CNWRA  
CONTROLLED  
COPY 431

NOTEBOOK NO. 431  
ISSUED TO Melissa Hill M. Hill  
ON 9/27/00  
DEPARTMENT CNWRA Div 20  
RETURNED \_\_\_\_\_

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



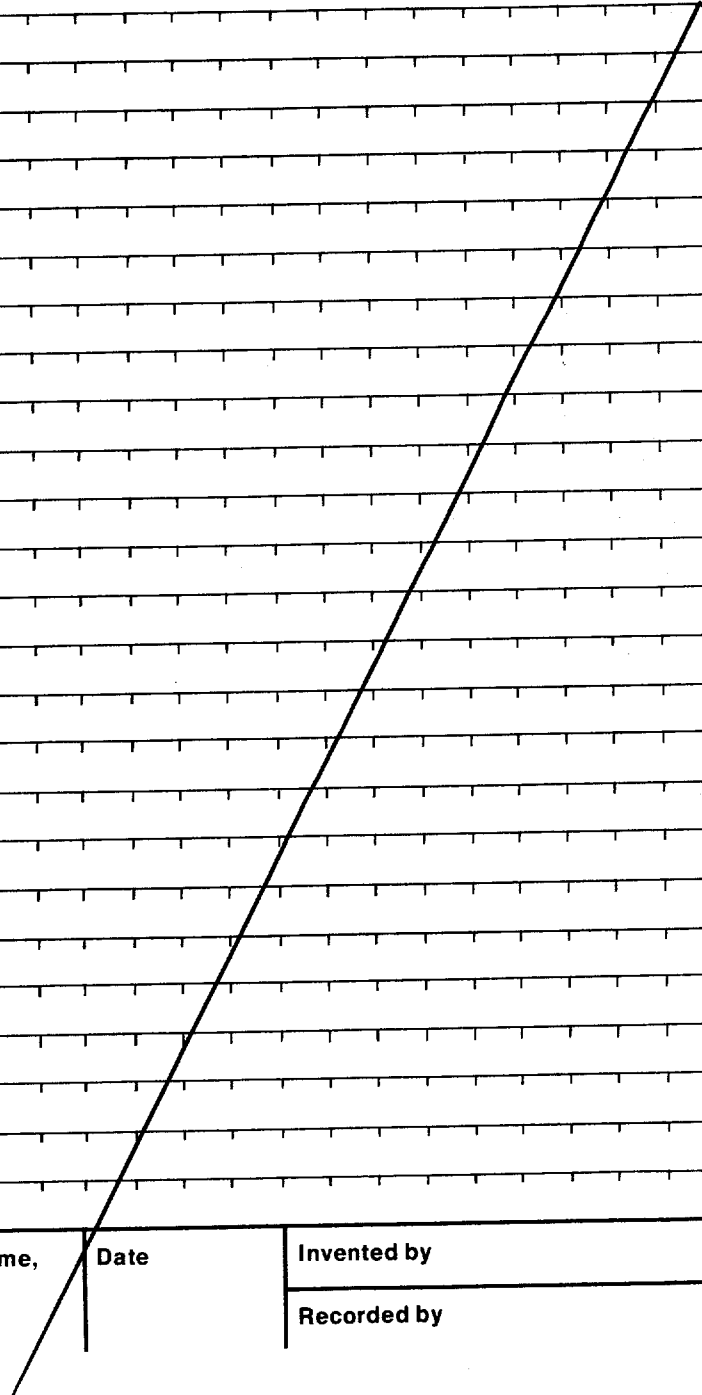
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9/27/00 This scientific Notebook documents work performed for the equation of states on the analog magma study, project # 20.01402.461.

Initial entry 9/27/00 by Melissa Hill.

MH 9/27/00



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Witnessed & Understood by me, \_\_\_\_\_

Date \_\_\_\_\_

Invented by \_\_\_\_\_

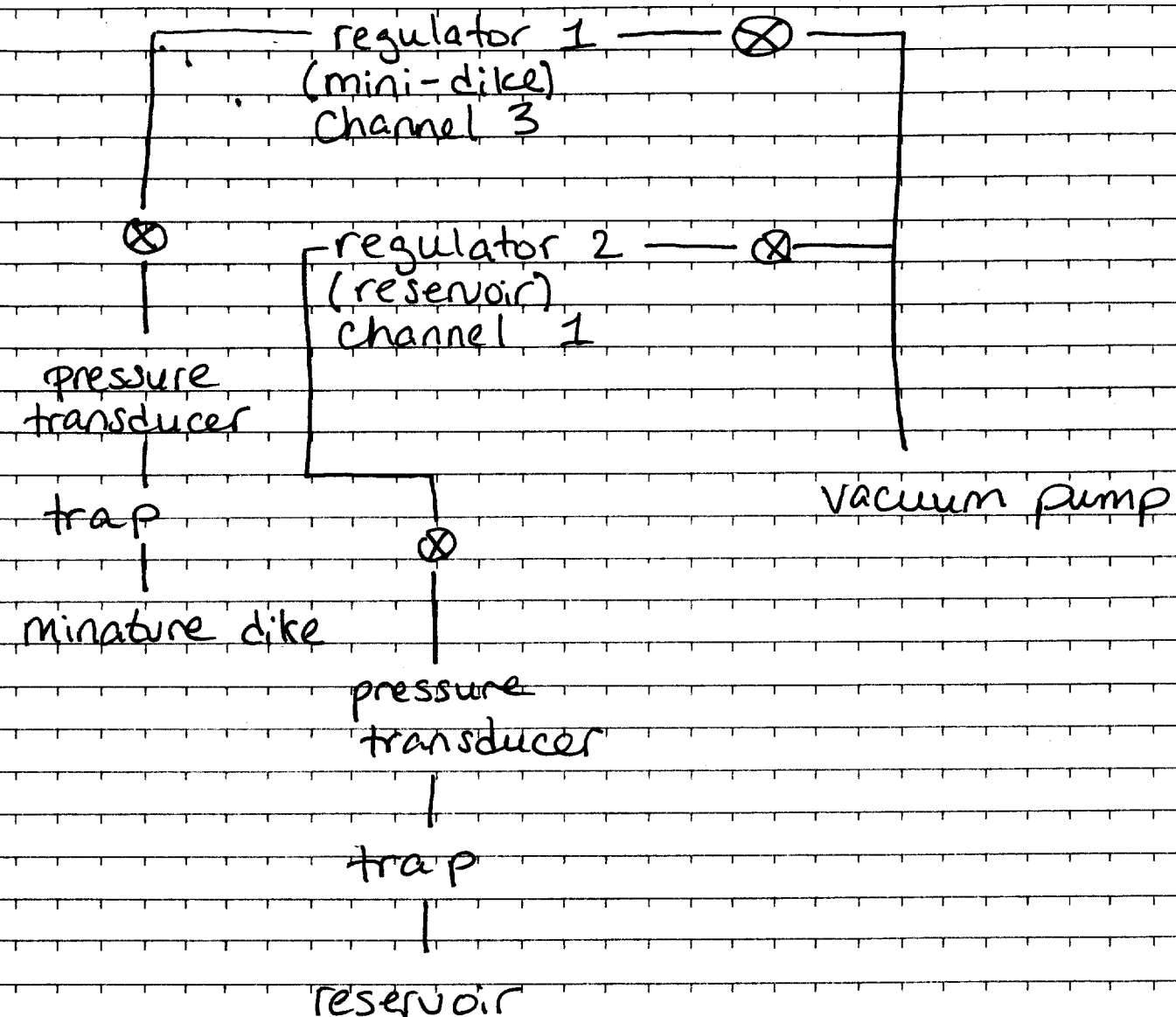
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2/27/00 Sketch of laboratory set-up:



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Witnessed &amp; Understood by me, \_\_\_\_\_

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Connection for CRT:

① R ⊗ ② G ⊗ ③ B ⊗ ④ Ext sync ⊗  
 In Out In Out In Out In Out

Copied the following files to CD's

- Dgs 15-1
- Dgs 15-2
- Dgs 15-3
- Dgs 15-4
- Dgs 15-5
- Dgs 15-6
- Gsw 5-1
- Gsw 5-2
- Gsw 5-3
- Gsw 5-4
- Gsw 5-5
- Gsw 5-6
- gS 2000.chs

Each of the above files, with the exception of Dgs 15-1, contain 2 separate sets of data: i) pressure data & ii) video data

The pressure data required reformatting. This was done using VuPoint software

Input data file → reformat → output file  
 .WRT in directory  
 d:\Anne\text

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Jerry Nixon (Div 18) extension 2349  
can assist with the use of VuPoint  
software & high-speed camera.

A duplicate copy of the CD's saved  
on p 3 of this notebook was prepared.  
One set of CD's will be sent to  
Dr. Anne-Marie Lejeune & the other  
will be kept in the fire-proof cabinet  
in bldg 51.

Reformatted pressure data saved on CD's

Gsw 5-1-1.ad  
Gsw 5-1-2.ad  
Gsw 5-1-3.ad  
Gsw 5-1-4.ad  
Gsw 3-7.ad } CD 1

Gsw 5-1-5.ad  
Gsw 5-1-6.ad  
Gsw 5-1-7.ad  
Gsw 5-1-8.ad  
Gsw 5-2-1.ad } CD 2

Gsw 5-2-2.ad  
Gsw 5-2-3.ad  
Gsw 5-2-4.ad  
Gsw 5-2-5.ad  
Gsw 5-2-6.ad  
Gsw 5-2-7.ad  
Gsw 5-2-8.ad } CD 3

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Gsw 5-3-1.ad  
Gsw 5-3-2.ad  
Gsw 5-3-3.ad  
Gsw 5-3-4.ad  
Gsw 5-3-5.ad  
Gsw 5-3-6.ad  
Gsw 5-3-7.ad  
Gsw 5-3-8.ad  
Gsw 5-4-1.ad  
Gsw 5-4-2.ad } CD 4

Gsw 5-4-3.ad  
Gsw 5-4-4.ad  
Gsw 5-4-5.ad  
Gsw 5-4-6.ad  
Gsw 5-4-7.ad  
Gsw 5-4-8.ad  
Gsw 5-5-1.ad  
Gsw 5-5-2.ad  
Gsw 5-5-3.ad  
Gsw 5-5-4.ad  
Gsw 5-5-5.ad  
Gsw 5-5-6.ad  
Gsw 5-5-7.ad  
Gsw 5-5-8.ad  
Gsw 5-6-1.ad  
Gsw 5-6-2.ad  
Gsw 5-6-3.ad  
Gsw 5-6-4.ad  
Gsw 5-6-5.ad  
Gsw 5-6-6.ad  
Gsw 5-6-7.ad  
Gsw 5-6-8.ad  
P15 2-1.ad  
P15 2-2.ad } CD 5

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P15-2-3.ad  
 P15-2-4.ad  
 P15-2-5.ad  
 P15-2-6.ad  
 P15-2-7.ad  
 P15-2-8.ad  
 P15-3-1.ad  
 P15-3-2.ad  
 P15-3-3.ad  
 P15-3-4.ad  
 P15-3-5.ad  
 P15-3-6.ad  
 P15-3-7.ad  
 P15-3-8.ad  
 P15-4-1.ad  
 P15-4-2.ad  
 P15-4-3.ad  
 P15-4-4.ad  
 P15-4-5.ad  
 P15-4-6.ad  
 P15-4-7.ad

CD 5

GS2000.chs  
 P15-4-8.ad  
 P15-5-1.ad  
 P15-5-2.ad  
 P15-5-3.ad  
 P15-5-4.ad  
 P15-5-5.ad  
 P15-5-6.ad  
 P15-5-7.ad  
 P15-5-8.ad  
 P15-6-1.ad  
 P15-6-2.ad  
 P15-6-3.ad

CD 6

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 P15-6-5.ad  
 P15-6-6.ad  
 P15-6-7.ad  
 P15-6-8.ad

CD 6

Per Ron Green's suggestion, partially submerged reservoir & miniature dike in H<sub>2</sub>O bath. Monitoring temperature of bath at bottom of miniature dike with thermocouple. Also monitoring temperature inside of dike with thermocouple. Monitoring room temperature with mercury thermometer s/n 183305 calibrated on 6/01/00.

\* Note: Thermocouples will be re-calibrated before the acquisition of data. Apparatus is still being tested & experiments are still in the scoping phase.

Used ginger ale, per Chuck Connor's suggestion, as medium. Attached are photographs of scoping experiments. The objective at this point is to capture images of bubbles to test if Optimas system will suffice.

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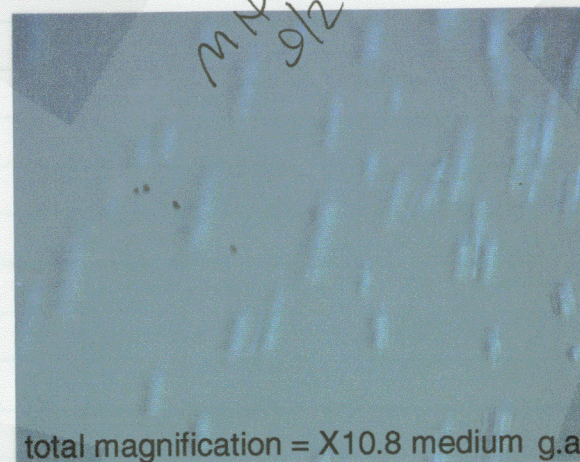
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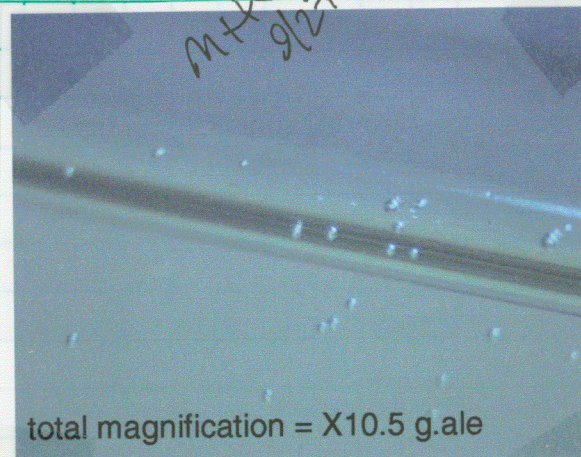


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total magnification = X10.8 medium g.ale

unsatisfactory run  
change in pressure  
=< too abrupt kinetics  
occurred too rapidly  
to capture using  
Optimas



total magnification = X10.5 g.ale

satisfactory run  
bubbling occurred  
=< slower due to  
gradual change in  
pressure information  
on kinetics can be  
obtained in similar  
future runs

M Hill 9/27/00

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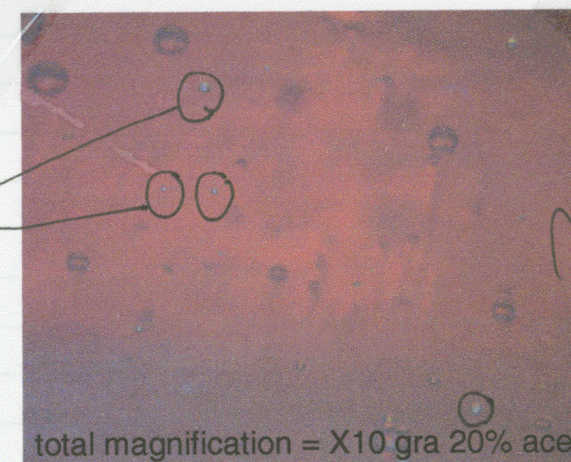
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11/3/00 Measured 200.0 g of acetone  
Sartorius balance s/n 3903006. Slowly  
added 800.0 g of gum rosin. Slowly  
stirred. Image of gum rosin/acetone  
mixture attached below:

total magnification = X10 gra 20% acetone  
+24hr (48hr old gra) leak along gasket,  
possible water bubbles highlightedH<sub>2</sub>O  
bubbles

Need to air dry mini-dike to remove any  
H<sub>2</sub>O particles in future runs.

Recycling gum-rosin as follows: gradually  
increasing heat to cause acetone to  
exsolve (gum-rosin/acetone on hot plate  
in fume hood).

Problems were encountered using the Optimas  
software to measure bubble #'s & diameters.  
B. Hill was able to solve the problem &  
is looking into upgrading Optimas. Here  
are some notes taken from B. Hill's visit:

M Hill 11/3/00

version  
4.10

- Optimas window must be maximized (otherwise

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cursor disappears)

Go to Utilities

↳ select particle population statistics

- set threshold
- mark points
- accumulate set & show
- ROI custom
- remove touching areas
- measure

= remember to calibrate beforehand

\* If the video macro lens is used then calibration will need to be performed prior to saving an image. If the CCD is used then only the 1st image needs to be calibrated (this is not clear to me a follow-up with B. Hill is needed prior to data collection).

MWD 11/3/00

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12/6/00



Southwest Research Institute  
6220 Culebra Road  
San Antonio, TX 78238  
(210) 522-5215  
Department of Quality Assurance  
Calibration Laboratory



Certificate #  
0972-01

## Certificate of Calibration

4 December 2000

Issued to: MELISSA HILL DIV20 B51  
Manufacturer/Model: EDWARDS D35726000  
Description: PRESSURE TRANSDUCER  
Serial Number: 005000333  
Asset Number: 008464

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCCL Z540-1-1994. The results of this calibration relate only to the individual item as described above. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results of this calibration certificate were determined in accordance with the terms of accreditation unless stated otherwise below.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

Ambient Conditions: Temperature: 68.0 Degrees Fahrenheit Humidity: 41 % RH

Calibration Date: 4 Dec 00 Calibration Procedure: CLCP-PI-001, 6/99

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:

*Walt Hill*  
Walt Hill, Supervisor, or Walt Hill, Metrologist  
Certificate # 444041599  
mtdh up Rev date 22 May 00

Measurements performed by:

*Mack Wood*  
Mack Wood, Technician

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M Hill  
12/6/00

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Date \_\_\_\_\_

Invented by \_\_\_\_\_

Date \_\_\_\_\_

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6220 Culebra Road  
San Antonio, TX 78238  
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Department of Quality Assurance  
Calibration Laboratory



Certificate #  
0872-01

## Certificate of Calibration

4 December 2000

Issued to: MELISSA HILL DIV20 B51  
Manufacturer/Model: EDWARDS D35726000  
Description: PRESSURE TRANSDUCER  
Serial Number: 005000334  
Asset Number: 008463

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. The results of this calibration relate only to the individual item as described above. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

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The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

Ambient Conditions: Temperature: 68.0 Degrees Fahrenheit Humidity: 41 % RH

Calibration Date: 4 Dec 00 Calibration Procedure: CLCP-PI-001, 699

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:

Jim Patterson, Supervisor, or Walt Hill, Metrologist  
Certificate # 444041600  
mhill.spt Rev date 22 May 00

Measurements performed by:

Mack Wood, Technician

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Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

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12/7/00



Southwest Research Institute  
6220 Culebra Road  
San Antonio, TX 78238  
(210) 522-5215  
Department of Quality Assurance  
Calibration Laboratory



Certificate #  
0872-01

## Certificate of Calibration

6 December 2000

Issued to: MELISSA HILL DIV20 B51  
Manufacturer/Model: EDWARDS D35726000  
Description: PRESSURE TRANSDUCER  
Serial Number: 005000371  
Asset Number: 008466

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. The results of this calibration relate only to the individual item as described above. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

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Ambient Conditions: Temperature: 68.0 Degrees Fahrenheit Humidity: 41 % RH

Calibration Date: 6 Dec 00 Calibration Procedure: CLCP-PI-001 699

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:

Jim Patterson, Supervisor, or Walt Hill, Metrologist  
Certificate # 444041653  
mhill.spt Rev date 22 May 00

Measurements performed by:

Mack Wood, Technician

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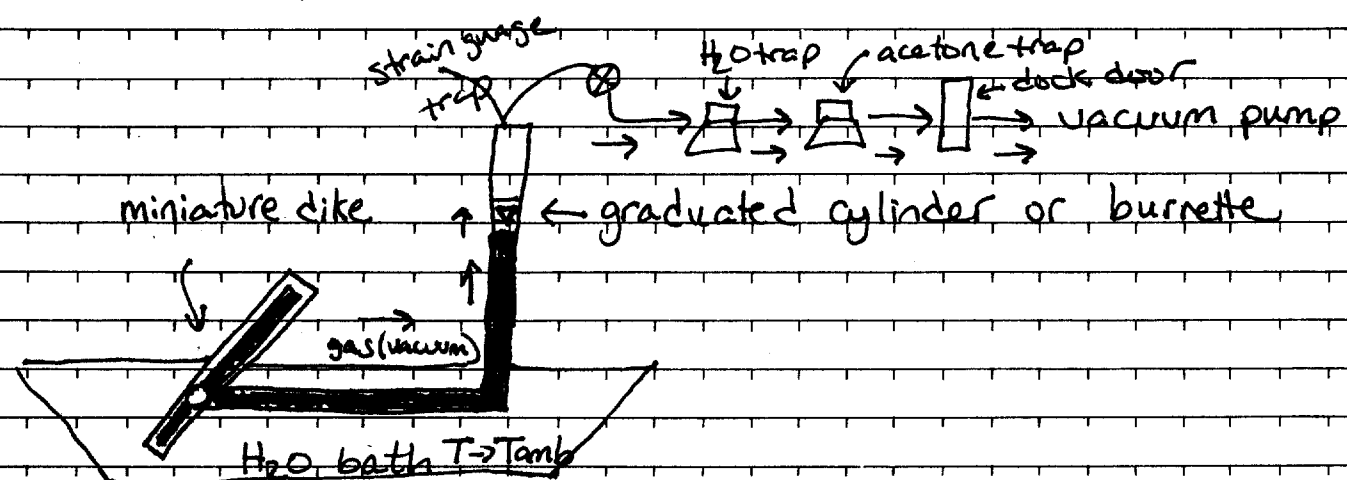
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12/29/00

Backed up remaining files on Div 18 computer that were saved on the hard drive during the Nov-Dec Anne-Marie Lejeune Visit. Files backed up on CD's that will be stored in fire-proof cabinet in bldg 51.

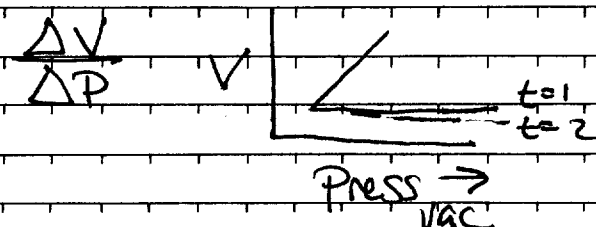
M Hill 12/29/00

2/7/01 Meeting with Chuck Connor, Ron Green & ~~Drenth~~ Bokhove (Univ of Twente, Holland) Suggested modifications to set-up for eq. of states experiments are listed below:



4 variables: pressure, volume, temperature, & time

mH 2/7/01 ~~Drenth~~ needs pressure & volume data for model



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Note: need to be consistent with volume & time (because acetone will outgass with time)

M Hill 2/7/01

11/27/01 Equation of states experiment

The following observations were made during the scoping experiments

- do not use used gum-rosin (recycled from previous experiments)
- ~500ml of gum rosin-acetone mixture is needed
- tubing from reservoir to miniature dike needs to be fairly narrow otherwise it collapses with vacuum
- small leak still detected - will double O-ring & use silicon sealant
- thin glass kept imploding so increased glass thickness to 4.5mm

M Hill 11/27/01

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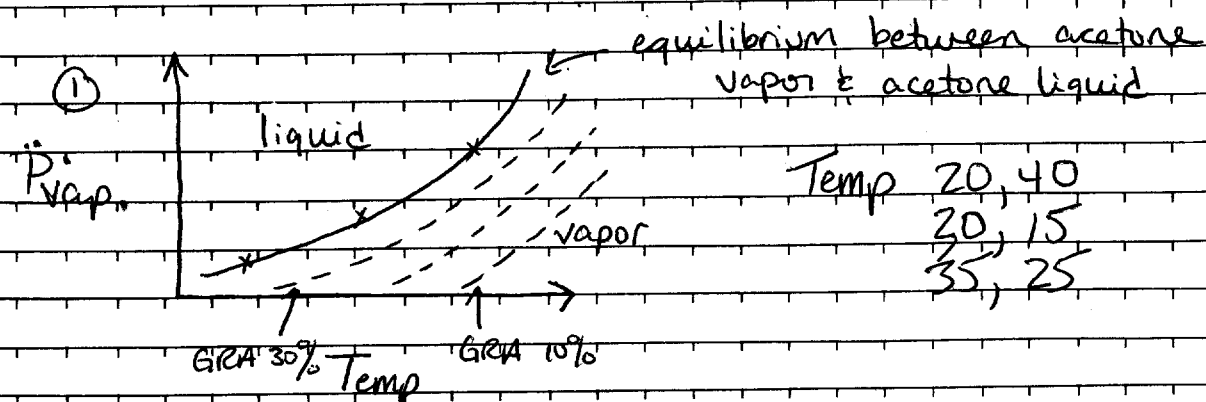
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11/28/01 Eq. of states with Anne-Marie Lejeune

② use H<sub>2</sub>O bath

- hold pressure constant
- hold temperature constant
- change volume over time ( $\frac{dV}{dt}$ )

from the above get data for eq. of states

③ kinetics of bubble growth &amp; nucleation

- pressure
- temp
- volatile content
- viscosity (dependent on volatile content & temp)

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Performed scoping experiment with pure acetone

2 separate regulators/gauges

Pressure in miniature dike	Atmospheric pressure (1)	Atmospheric pressure (2)	Temp (°C)	Notes
S/N 995000 (mBar)	(mBar)	(mBar)		
995.6/5	987.1/2	985.7/6	24.0	↓ Press ↓ Press to 250 mBar
246.0	987.0	985.5	25.1	~12" (sec)
243.7/8	986.9	985.4	25.3	45.3" (sec)

\* acetone condensing in tubing from vacuum effluent \*

241.4/5	986.8/7	985.2/3	25.5	1'35"
<del>223</del> 239.0	986.7	985.3	25.8	2'37"
11/28/01 236.7/8	986.7/8	985.3	25.9	3'37"
234.6/7	986.8	985.3/4	26.2	4'44"
233.7/8	986.8/7	985.3/4	26.3	5'13"
232.7/8	986.8/7	985.3	26.4	5'48"
230.1/0	986.8/9	985.3/4	26.5	6'14"
231.0/1	-	-	26.6	6'47"

\* bubbling stopped @ 239.5

26.6

↑ Press

M L L 11/28/01

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11/29/01 Calibration of thermocouples (J type)

Used thermometer S/N 183304. Boiled deionized H<sub>2</sub>O on hot plate. Thermometer S/N 183304 read 100°C for boiling H<sub>2</sub>O  $\pm$  1°C for ice/H<sub>2</sub>O (t-type)

Thermocouple T<sub>1</sub> (J type thermocouple) mV 4.26/7  
 boiling H<sub>2</sub>O Thermocouple J26 (J type thermocouple) reads 99.9°C  
 ice/H<sub>2</sub>O slurry " " reads 0°C  
 Thermocouple J30 (J type thermocouple) reads 102.1°C  
 boiling H<sub>2</sub>O " " reads 100.2°C  
 ice/H<sub>2</sub>O slurry " " reads -0.2°C  
 Thermocouple J29 (J type thermocouple) reads -0.2°C  
 boiling H<sub>2</sub>O " " reads 100.4°C

Prior to calibrating of thermocouples, it was observed that precipitates must have formed on probes so sandpaper was used to remove the ppt prior to calibration.

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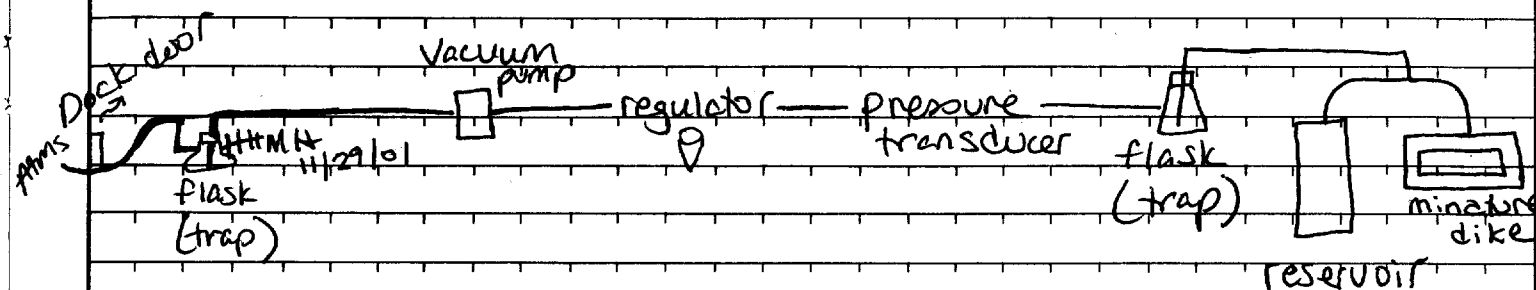
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Sketch of experimental set-up for eq. of states



M Uel 11/29/01

11/30/01

Calibration of K-type thermocouple. Used thermometer S/N 183304 calibrated on June 26, 2001. Boiled deionized H<sub>2</sub>O on hot plate. Thermometer read 100°C for boiling  $\pm$  1°C for ice/H<sub>2</sub>O slurry. Thermocouple K1 reads 99.7°C (boiling H<sub>2</sub>O) 1°C (ice/H<sub>2</sub>O slurry)

M Uel 11/30/01

12/6/01 Equation of States data for pure acetone

Test 1 Pure acetone @ ~28°C (estimate, note temp. measured) 22 mV 12/6/01

Info recorded:

Absolute pressure in mini-dike, 2 gauges to record atmospheric pressure & thermocouples to record temperature, initiation & termination of boiling (specifics are listed for each test)

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**Test: Pure acetone at ~22°C****Date: Nov. 30, 2001**

Ambient room temperature: 22°C

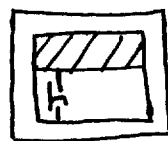
h in reservoir = 210 mm

h in mini-dike = 70 mm

volume = 400 mls



reservoir



mini-dike

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Temperature J26 (°C)	Time	Notes
prior to start of test 985.9	986.8/9	985.3/4	21.5		
750					bubbles forming
256.6/7			21.2	3'13"	condensation observed in effluent tube
258					boiling, bubbles forming rapidly
269			21.7	10'34"	sporadic bubbling; few
266/7			21.7		bubbles start, uniform distribution across mini- dike
269			21.8		bubbles start
266.5			21.8		large bubbles coming from connector to reservoir

*M.H. 12/6/01*

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Invented by \_\_\_\_\_

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TITL **Test: Pure acetone at ~30°C**

Date: Nov. 30, 2001

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Temperature J26 (°C)	Time	Notes
prior to start of test 986.6	987.8/9	986.1	30		
480					bubbling
491			29.9		bubbling
420			30.1		bubbling ceases
416			30.1	5'29"	tiny, sporatic bubbles
396			30.1		many bubbles
403			30.1		bubbles tiny&sporatic
386.8			30.2/3		tiny bubbles
401.9			30.7		many bubbles, large, bubbles formed mostly near connector to reservoir
388.6			30.1		bubbles start
386			29.9		bubbles stop
389.4			30.3		bubbles stop
393.6			30.5		bubbles start
396.3			30.6/7		bubbles stop
396.4			30.7		bubbles start
397.6			30.8/9		bubbles stop
397.5			31.0/30.9		bubbles start
398			31		bubbles stop
397.8			31		bubbles start
400.4			31.2		bubbles stop

*M.H. 12/6/01**continued on MH 12/6/01 on p 22 of this  
notebook.*

To Page No. \_\_\_\_\_

Witnessed &amp; Understood by me, \_\_\_\_\_

Date \_\_\_\_\_

Invented by \_\_\_\_\_

Date \_\_\_\_\_

Recorded by \_\_\_\_\_

From Page No. \_\_\_\_\_

pure acetone @ ~30°C (continued from p 21 of this notebook)

M. Hill  
12/6/01

400.4		31.2	bubbles start
400.6		31.3	bubbles stop
401.5		31.3	bubbles start
404.2		31.4	bubbles stop
403.4		31.4/5	bubbles start
404.2		31.5	bubbles start
403.4		31.5	bubbles stop

To Page No. \_\_\_\_\_

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

TITLE

Test: Pure acetone at ~16°C

Date: Nov. 30, 2001

From

Ambient temperature: 19.0/1 °C mH 12/6/01

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Temperature J26 (°C)	Notes
prior to start of test 989.8/7	990.8	989.2/3	16.1	
230			15.9	bubbles start, more homogenous distribution of bubble formation
233			15.9	bubbles stop
213.4			15.9	bubbles start
220			15.8	bubbles stop
210			15.8	bubbles start
210/211			15.7	bubbles stop
206.5			15.7	bubbles start
206.7			15.7	bubbles stop-tiny bubble
206.4/5			15.7	bubbles start
206.3			15.6/7	bubbles stop
195/6			15.6	bubbles start
201			15.5	bubbles stop
197			15.5	bubbles start
200			15.5	bubbles stop
198			15.5	bubbles start
200			15.5	bubbles stop
196.4			15.5	bubbles start, cannot decrease pressure lower
196			15.5	bubbles stop
195.3			15.5	bubbles start
195.8			15.5	bubbles stop

M. Hill  
12/6/01

197

15.6

bubbles start, stream of large bubbles, do not get rolling boil, homogeneous distribution

Wit

Recorded by

*M Hill  
12/6/01*

From Page

**Test:** Pure acetone at ~18°C**Date:** Dec. 3, 2001

Ambient temperature: 20.1°C

h in reservoir = 210 mm

h in mini-dike = 79 mm

volume = 400 ml

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Temperature J26 (°C)	Notes
prior to start of test 990.7/8	991.6	990.1/2	18	
219			17.7	bubbles stop
227			17.7	bubbles start, homogeneous
269			17.6	bubbles stop
237			17.6	bubbles start
243			17.5	bubbles stop
227			17.5	bubbles start
246			17.4	bubbles stop
226			17.4	bubbles start
246			17.3	bubbles stop
217			17.3	bubbles start
239			17.3	bubbles stop
217			17.3	bubbles start
227			17.3	bubbles stop
218			17.3	bubbles start
227			17.3	bubbles stop
217			17.3	bubbles start
225			17.3	bubbles stop
216			17.3	bubbles start
223			17.3	bubbles stop

*continued on p 25 of this notebook*

Witnessed &amp; Understood by me,

Date

Invented by

Date

Recorded by

From Page No. \_\_\_\_\_

*acetone @ ~18°C continued from p 24  
of this notebook*

214			17.3	bubbles start
217			17	bubbles stop
210			17.1	bubbles start
215			17.1	bubbles stop
209			17.1	bubbles start
215			17	bubbles stop
210			17.1	bubbles start
215			17.1	bubbles stop
209			17.1	bubbles start
214			17.1	bubbles stop
209			17.1	bubbles start
214			17.1	bubbles stop

*M Hill 12/6/01*

To Page No. \_\_\_\_\_

Witnessed &amp; Understood by me,

Date

Invented by

Date

Recorded by

From Page No. \_\_\_\_\_

Test: Pure acetone at ~19°C

Date: Dec. 3, 2001

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Temperature J26 (°C)	Notes
prior to start of test 989.3	990.2/3	988.7	19.8	
251			19.7	bubbles start
241			19.3	bubbles start
245			19.2	bubbles stop
240			19.2/3	bubbles start
244			19.2	bubbles stop
239			19.2	bubbles start
245			19.2	bubbles stop
239			19.2	bubbles start
243			19.2	bubbles stop
240			19.2	bubbles start
233			18.8	bubbles stop
231			18.9	bubbles start
233			18.8	bubbles stop
229			18.9	bubbles start
233			18.8	bubbles stop
230			18.8	bubbles start
232.5			18.8	bubbles stop
230			18.8	bubbles start
232			18.8	bubbles stop
				lowest pressure can achieve is 227mBar

Witnessed &amp; Understood by me, \_\_\_\_\_

Date \_\_\_\_\_

Invented by \_\_\_\_\_

Date \_\_\_\_\_

Recorded by \_\_\_\_\_

12/6/01

To Page No. \_\_\_\_\_

From Page No. \_\_\_\_\_

Test: Pure acetone at ~26°C

Date: Dec. 3, 2001

Ambient temperature: 22.0/1

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Temperature J26 (°C)	Notes
prior to start of test 988.7/8	989.6/7	988.1	26.6	
336			26.7	bubbling start
338			26.8	bubbling stop
336			26.7	bubbling start
337			26.7	bubbling stop
333			26.7	bubbling start
336			26.7	bubbling stop
333			26.7	bubbling start
333			26.6	bubbling stop
332			26.6	bubbling start
335			26.7	bubbling stop
331			26.8	bubbling start
332			26.8	bubbling stop
332			26.8	bubbling start
320			25.8	bubbling stop
322			25.9	bubbling start
325			26.2	bubbling stop
321			25.8	bubbling stop
322			25.9	bubbling start
323			26.2	bubbling stop
323			26.2	bubbling start
323			26.3	bubbling stop

Witnessed by \_\_\_\_\_

Continued on p 27 of this notebook

From Page No. \_\_\_\_\_

acetone @ ~ 26°C continued from p 27  
of this notebook.

323		26.3	bubbling start
324		26.4	bubbling stop
326		26.4	bubbling start
326		26.5/6	bubbling stop
328		26.5	bubbling start
328		26.6	bubbling stop
328		26.6	bubbling start
328		26.7	bubbling stop

mtell  
12/7/01

To Page No. \_\_\_\_\_

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

TITLE Test: Pure acetone at ~34°C

Date: Dec. 3, 2001

Ambient temperature: 22.9/23.0

From I

Absolute Pressure in minature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Temperature J26 (°C)	Notes
prior to start of test 988.5/6	989.5/4	987.9/8	35.2	
444			33.7	bubble start
445			33.8/9	bubble stop
447			33.9	bubble start
446			34	bubble stop
445			34	bubble start
445			34	bubble stop
445			34	bubble start
445			34	bubble stop
445			34	bubble start
445			34	bubble start
443			34	bubble start
444			34	bubble stop
442			34	bubble start
443			34	bubble stop
408			31.7	bubble stop
414			31.8	bubble start
416			32.1	bubble stop
416.5			32.1	bubble start
419.5			32.3	bubble stop
421			32.4	bubble start
422			32.5	bubble stop

Continued on p 30 of this notebook

To Page No. \_\_\_\_\_

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

mtell 12/7/01



From Page No. \_\_\_\_\_

continuation of acetone @ ~34°C p 29 of  
this notebookM. Hill  
12/7/01

423		32.5	bubble start
424		32.7	bubble stop
424		32.7	bubble start
426		32.8	bubble stop
426		32.7	bubble start
426.5		32.9	bubble stop
427.5		32.8	bubble start
427.5		33	bubble stop
428		33	bubble start
428		33	bubble stop
428		33	bubble start
427.5		33.1	bubble stop

M. Hill 12/7/01

To Page No. \_\_\_\_\_

Witnessed &amp; Understood by me, \_\_\_\_\_

Date \_\_\_\_\_

Invented by \_\_\_\_\_

Date \_\_\_\_\_

Recorded by \_\_\_\_\_

From Page No. \_\_\_\_\_

12/17/01

Test: Pure acetone at ~38°C

Date: Dec. 3, 2001

M. Hill  
12/17/01

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Temperature J26 (°C)	Notes
prior to start of test 988.4	989.4/3	987.7/8	38.5	
530 (?)			38.5	bubble stop
532			38.4	bubble start
532			38.5	bubble stop
531			38.5	bubble start
531			38.5	bubble stop
530			38.5	bubble start
531			38.5	bubble stop
531			38.5	bubble start
531.5			38.5	bubble stop
531			38.5	bubble start
532			38.5	bubble stop

To Page No. \_\_\_\_\_

Witnessed &amp; Understood by me, \_\_\_\_\_

Date \_\_\_\_\_

Invented by \_\_\_\_\_

Date \_\_\_\_\_

Recorded by \_\_\_\_\_

From Page No. \_\_\_\_\_

Test: Pure acetone at ~39°C

Date: Dec. 3, 2001

Ambient temperature ~24 °C

Absolute Pressure in minature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Temperature J26 (°C)	Notes
prior to start of test 988.4/5	989.3	987.7	40.3	
557			39.8	bubble start
558			39.8	bubble stop
557			39.8/7	bubble start
556			39.7	bubble stop
555			39.7	bubble start
553			39.5	bubble stop
552			39.5	bubble start
552			39.6	bubble stop
553			39.5	bubble start
552			39.5	bubble stop
552			39.4	bubble start
* let boil for a while*		* let boil for a while*		
499			36.1	bubble stop

To Page No. \_\_\_\_\_

Witnessed &amp; Understood by me,

Date

Invented by

Date

Recorded by

From Page No. \_\_\_\_\_

Test: Pure acetone at ~42°C

Date: Dec. 4, 2001

Ambient temperature ~23/23.5 °C

Absolute Pressure in minature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Temperature J26 (°C)	Thermocouple K-type taped outside cell	Notes
prior to start of test 988.1/0	989.1/0	987.4/5	43.0	40.0	
598 (? already started)			42.4	40.0	bubble start
604			42.3	39.8	bubble stop
604			42.5	39.9	bubble start
604			42.5	40.0	bubble stop
605			42.5	40.0	bubble start
605.5			42.6	40.1	bubble stop
606.5			42.6	40.1	bubble start
606.5			42.6	40.0	bubble stop
606			42.7	40.2	bubble start
608			42.7	40.1	bubble stop
609			42.8	40.3	bubble start
611			42.8	40.1	bubble stop
610			42.9	40.4	bubble start
612			42.9	40.3	bubble stop

To Page No. \_\_\_\_\_

Witnessed &amp; Understood by me,

Date

Invented by

Date

Recorded by

Test: Pure acetone at ~44°C

From Page 1

Date: Dec. 4, 2001

Ambient temperature ~23.1 °C

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Temperature J26 (°C)	Thermocouple K-type taped outside cell	Notes
prior to start of test 987.8/7	988.7	987.1	44.9	42.6	
640			43.9	42.5	bubble start
642			44.0	42.3	bubble stop
643.7			44.2	42.5	bubble start
646.6			44.2	42.6	bubble stop
645.1			44.4	42.8	bubble start
649			44.4	43.1	bubble stop
648.6			44.5	43.1	bubble start
651			44.5	43.0	bubble stop
651.4			44.6	43.1	bubble start
652.7			44.6	43.1	bubble stop
652.8			44.8	43.1	bubble start
654.2			44.7	43.3	bubble stop
653.8			44.7	43.3	bubble start
655.7			44.7	43.4	bubble stop
655.5			44.9	43.6	bubble start
657.8			44.8	43.4	bubble stop
657.7			44.9	43.2	bubble start
658.5			44.9	43.4	bubble stop
659.4			45.1	43.7	bubble start
659.9			45	43.4	bubble stop

continued on p 35 of this notebook

To Page No. 1

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

From Page No. 1

Continuation of pure acetone @ ~44°C p 34 of this notebook

660.5			45	43.7	bubble start
661.5			45	43.7	bubble stop

M. J. J. 12/17/01

M. J. J. 12/17/01

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

From Page No. 213102

Test: Pure acetone at ~48°C  
Date: Dec. 4, 2001  
Ambient temperature ~24.7 °C

Absolute Pressure in* miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Thermocouple J29 above connector tube in bath (°C)	Temperature Thermocouple J26 (°C)	Notes
prior to start of test					
986.5	987.6	985.9			
724			48.4	47.6	bubble stop
723.8			48.4	47.6	bubble start
722			48.3	47.5	bubble stop
718			48.3	47.5	bubble start
716			48.2	47.3	bubble stop
715			48.1	47.3	bubble start
714.9			48.1	47.2	bubble stop
711.9			48.1	47.3	bubble start
712			48.0	47.1	bubble stop
709.4			47.9	47.2	bubble start
708			47.8	47.0	bubble stop
705.8			47.8	47.1	bubble start
705.4			47.8	47.0	bubble stop
702.5			47.6	47.0	bubble start
702.4			47.6	46.9	bubble stop
699			47.6	46.8	bubble start
697			47.5	46.6	bubble stop

Witnessed & Understood by me, M. J. Lee Date 2/13/02

Invented by \_\_\_\_\_ Date \_\_\_\_\_

Recorded by \_\_\_\_\_

From \_\_\_\_\_

Test: Pure acetone at ~50°C  
Date: Dec. 4, 2001  
Ambient temperature ~23.9/25.0 °C

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Thermocouple J29 near connector tube in bath (°C)	Temperature Thermocouple J26 on surface of mini-dike (°C)	Notes
prior to start of test					
987.2/3	988.2	986.5/6		50.4	
774			51.7	49.3	Bubble stop
775.5			51.8	49.6	Bubble start
776.1			51.8	49.5	Bubble stop
776.2			51.8	49.7	Bubble start
777			51.7	49.7	Bubble stop
776.6			51.7	49.7	Bubble start
779			51.8	49.7	Bubble stop
778.5			51.7	49.9	Bubble start
779			51.8	49.8	Bubble stop
778.5			51.7	49.9	Bubble start
780			51.7	49.8	Bubble stop

Witnessed & Understood by me, M. J. Lee Date 2/13/02

Invented by \_\_\_\_\_ Date \_\_\_\_\_

Recorded by \_\_\_\_\_

To Page No. \_\_\_\_\_

From Page No. \_\_\_\_\_

Continuation of pure acetone @ ~ 50°C p  
37 of this notebook.

779.4			51.8	49.9	Bubble start
780			51.7	49.9	Bubble stop
779.8			51.8	49.9	Bubble start
781			51.8	49.9	Bubble stop
780.9			51.8	50	Bubble start
781			51.7	49.9	Bubble stop
781.5			51.7	50	Bubble start
782			51.7	50	Bubble stop

ended  
2/12/02

To Page No. \_\_\_\_\_

Witnessed &amp; Understood by me,

Date

Invented by

Date

Recorded by

TITLE \_\_\_\_\_

From \_\_\_\_\_

Test: Pure acetone at ~51.7°C

Date: Dec. 4, 2001

Ambient temperature ~25.0 °C

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Thermocouple J29 near connector tube in bath (°C)	Temperature Thermocouple J26 on surface of mini-dike (°C)	Notes
prior to start of test 986.9/987	988/987.9	986.2/3			
803			52	50.1	Bubble stop
827			52.4	51.3	Bubble start
824			52.3	51.3	Bubble stop
821			52.3	51.5	Bubble start
822			52.3	51.4	Bubble stop
820.8			52.4	51.5	Bubble start
821.5			52.3	51.5	Bubble stop
821.5			52.4	51.5	Bubble start
822			52.4	51.4	Bubble stop
822.8			52.4	51.5	Bubble start
823.2			52.5	51.5	Bubble stop

Witnessed &amp; Understood by me,

Date

Invented by

Date

Recorded by

To Page No. \_\_\_\_\_

From Page No. \_\_\_\_\_

Continuation of pure acetone @ ~ 51.7 °C  
p 39 of this notebook

823.2			52.4	51.5	Bubble start
823			52.4	51.5	Bubble stop
823.6			52.5	51.6	Bubble start
823.2			52.5	51.5	Bubble stop
824			52.6	51.6	Bubble start
825			52.6	51.5	Bubble stop
826			52.5	51.7	Bubble start
826.5			52.5	51.7	Bubble stop
826.2			52.5	51.7	Bubble start
826.5			52.6	51.8	Bubble stop

M.H. 2/10/02

To Page No. \_\_\_\_\_

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

From Page No. \_\_\_\_\_

Test: Pure acetone at ~26.0 °C  
Date: Dec. 5, 2001  
Ambient temperature ~25.0 °C

1844.0g of gum resin  
1838.5g

M.H. 2/10/02

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Thermocouple J29 near connector tube in bath (°C)	Temperature Thermocouple J26 on surface of mini-dike (°C)	Notes
295				23.9/24	bubble start
306				24.5	Bubble stop
307				24.5	bubble start
310				24.9	Bubble stop
315				25	bubble start
316				25.3	Bubble stop
316				25.2	bubble start
316				25.5	Bubble stop
317				25.5	bubble start
318				25.7	Bubble stop

M.H. 2/10/02

To Page No. \_\_\_\_\_

Witnessed & Understood by me,

Date

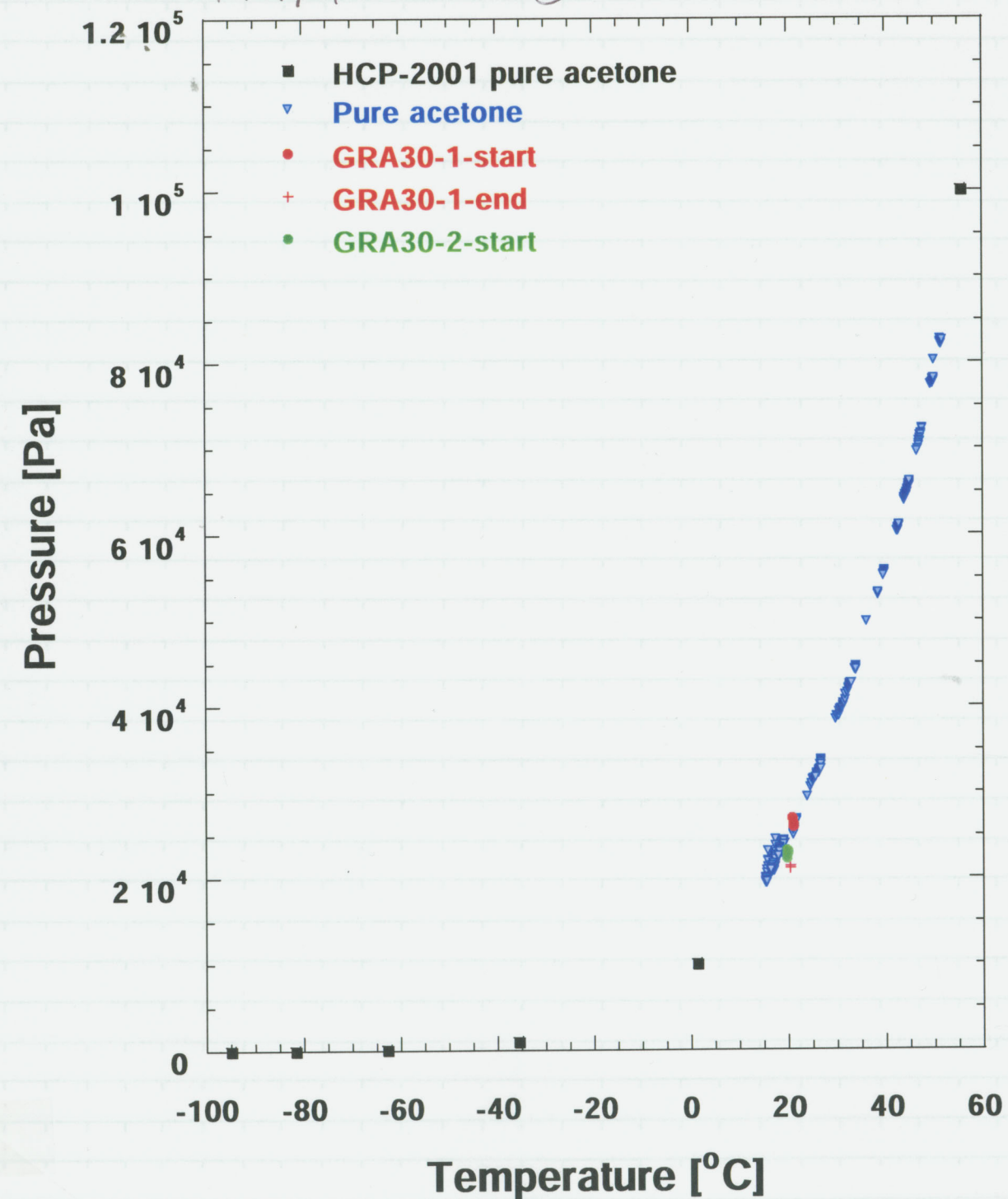
Invented by

Date

Recorded by



## Pure acetone



To Page No. \_\_\_\_\_

Witnessed &amp; Understood by me, \_\_\_\_\_

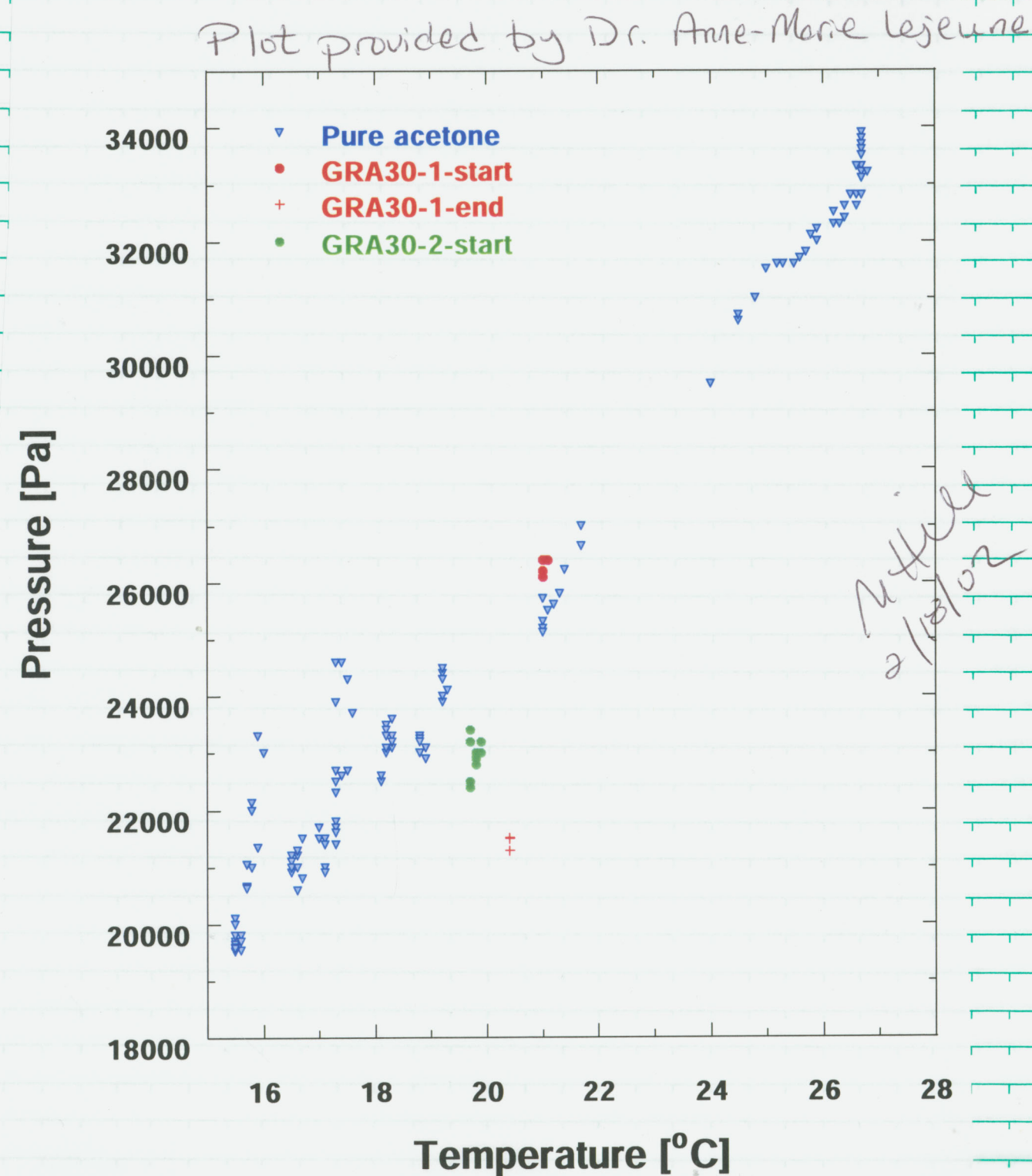
Date \_\_\_\_\_

Invented by \_\_\_\_\_

Date \_\_\_\_\_

Recorded by \_\_\_\_\_

## Pure acetone



To Page No. \_\_\_\_\_

Witnessed &amp; Understood by me, \_\_\_\_\_

Date \_\_\_\_\_

Invented by \_\_\_\_\_

Date \_\_\_\_\_

Recorded by \_\_\_\_\_



From P

Test: GRA-30% ~21.2/3°C

Test 1 M+ 2/19/02

Date: Dec. 5, 2001

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Thermocouple J29 in dike (°C)	Temperature Thermocouple J26 in reservoir (°C)	Notes
989.6	990.7	989.2	20.4	20.2	Acetone remains from cleaning and is floating on top
320			20.1/2		bubble start
300			19.9		Bubble stop
260			19.9		bubble start
230			19.9		Bubble stop
230			19.9		bubble start
232			19.9		bubble start
229			19.8		Bubble stop
228			19.8		bubble start
230			19.8		Bubble stop
230			19.8		bubble start
229.8			19.8		Bubble stop
234			19.7		bubble start
232			19.7		Bubble stop
225			19.7		bubble start
224			19.7		Bubble stop

To Page No. \_\_\_\_\_

Witnessed &amp; Understood by me,

Date

Invented by

Date

Recorded by

From

Test: GRA-30% ~22.5°C

Date: Dec. 5, 2001

Test 2 M+ 2/19/02

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Thermocouple J29 in dike (°C)	Temperature Thermocouple J26 in reservoir (°C)	Notes
988.3/4	989.4		21.2	21.6	
250					
370			21.1	20.7	Bubble start
384			21.1	20.7	Bubble stop
264			21.1	21.2	Bubble stop
264			21.1	20.9	Bubble start
264			21	21.3	Bubble stop
261			21	21.1	Bubble start
262			21	21.2	Bubble stop
271			20.9	20.9	Bubble start
245			20.8	21.1	Bubble stop
253			20.7	20.8	Bubble start
Boiled for 19'13" at 214mbar					

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Continuation of pure acetone @ ~ 22.5°C  
p 45 of this notebook

215.2			20.4	20.7	Bubble stop
213			20.4	20.7	Bubble start
215			20.4	20.7	Bubble stop

filled trap

weight 1316.10g SN 2883  
volume 650 ml + flea  
level in dike = 42.5mm  
ending level in dike = 48.1mm

density measurements SN 2883

cylinder + GRA 140.54 g  
meniscus upp = 24 cm<sup>3</sup>  
low = 23 cm<sup>3</sup>

cylinder + GRA = 150.18 g  
meniscus upp = 33.5  
low = 32.5

cylinder + GRA = 158.52/3 g  
meniscus upp = 40.9  
low = 41.9

cylinder + GRA = 168.33 g  
meniscus upp = 51.7  
low = 50.7

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cylinder of GRA = 179.16 g  
meniscus upp = 62.5  
low = 61.5

cylinder + GRA = 189.79 g  
meniscus upp = 73  
low = 72

cylinder + GRA = 199.22 g  
meniscus upp = 82.8  
low = 81.8

cylinder + GRA = 209.75 g  
meniscus upp = 93  
low = 92

cylinder + GRA = 216.50 g  
meniscus upp = 99.9  
low = 98.9

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Test: GRA-25% ~22.0°C

Date: Dec. 7, 2001

Test 1 2/19/02 MJA

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Thermocouple J29 in dike (°C)	Temperature Thermocouple J26 in reservoir (°C)	Notes
983.9	984.8/9	983.3	22.0	21.6	
233					original minimum pressure achievable
232			21.3		
234			21.4		
225			21.4		Minimum pressure achievable
233			21.4		
224			21.6		Lowest pressure achievable

MJA 2/19/02

Density measurements

cylinder + GRA = 127.52 g

meniscus vpp = 10.5 cm<sup>3</sup>low = 9.6 cm<sup>3</sup>

cylinder + GRA = 137.25 g

meniscus vpp = 20

low = 19

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cylinder + GRA = 147.36 g

meniscus vpp = 30

low = 29

cylinder + GRA = 162.49 g

meniscus vpp = 45

low = 44

cylinder + GRA = 171.21 g

meniscus vpp = 53.5

low = 52.5

cylinder + GRA = 178.37 g

meniscus vpp = 60.7

low = 59.7

cylinder + GRA = 187.57 g

meniscus vpp = 69.9

low = 68.9

cylinder + GRA = 198.94 g

meniscus vpp = 81

low = 80

cylinder + GRA = 209.12 g

meniscus vpp = 91

low = 90

cylinder + GRA = 216.77 g

meniscus vpp = 98.5

low = 97.5

MJA 2/19/02

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2/20/02

Test: GRA-25% ~21.7 °C

Date: Dec. 7, 2001

Mixed 2/20/02  
Test 2 2/20/02  
MA

Absolute Pressure in miniature dike S/N 995000176 (mBar)	Absolute Pressure atmosphere gauge 1 S/N 005000055 (mBar)	Absolute Pressure atmosphere gauge 2 S/N 005000333 (mBar)	Thermocouple J29 mini-dike (°C)	Temperature Thermocouple J26 reservoir (°C)	Notes
983.4	985.0	983.4	22.0	22.8	
703			22.0		Bubbles from bottom max 1 1/2mm diameter
545			22.0		
528					
391			22.0		
313			22.2		
360			22.3	21.8	Bubble stop
259					Bubble start
300			22.5		Bubble stop
227			22.5		Bubble start
230					
227					
225			22.2		
223			22.2		
225			22.2	23.3	

Witness

Recorded by

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Density measurements of pure solid GR (gum rosin)

used air pycnometer (nitrogen gas) Air pycnometer

S/N = 11498060801

used calibration sphere S/N 6270 for calibration of air pycnometer

$$V_R = 89.8237 \text{ cm}^3$$

$$V_C = 148.3708 \text{ cm}^3$$

Gum Rosin from white container (aged)

$$\#1 P_1 = 18.100$$

$$P_2 = 6.897$$

$$V = 2.4675 \text{ cm}^3$$

$$*M = 2.587 \text{ g}$$

$$\rho = \text{density} = \frac{\text{mass}}{\text{volume}} \frac{\text{g}}{\text{cm}^3}$$

$$\#1 \rho = 1.048 \text{ g/cm}^3$$

$$\#2 P_1 = 18.227$$

$$P_2 = 6.922$$

$$V = 1.6709 \text{ cm}^3$$

$$*M = 1.625 \text{ g}$$

$$\#2 \rho = 0.9725 \text{ g/cm}^3$$

$$\#3 P_1 = 18.158$$

$$P_2 = 6.920$$

$$V = 2.4981 \text{ cm}^3$$

$$*M = 2.476 \text{ g}$$

$$\#3 \rho = 0.99115 \text{ g/cm}^3$$

$$\#4 P_1 = 18.248$$

$$P_2 = 6.938$$

$$V = 1.944445 \text{ cm}^3$$

$$*M = 1.859 \text{ g}$$

$$\#4 \rho = 0.95619 \text{ g/cm}^3$$

$$\#5 P_1 = 18.444$$

$$P_2 = 7.027$$

$$V = 2.43125 \text{ cm}^3$$

$$*M = 2.364 \text{ g}$$

$$\#5 \rho = 0.97239 \text{ g/cm}^3$$

\* Mass measured using scale S/N 2883 ambient temp 26 °C for pycnometer measurements. ambient temperature for mass (separate bldg) 24.8 °C.

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Density measurements continued from p 51 of this notebook

Gum Rosin (from drum lot # 10K0912)

#1  $P_1 = 18.458$   $V = 12.1596 \text{ cm}^3$  #1  $\rho = 1.045 \text{ g/cm}^3$   
 $P_2 = 7.335$  \*  $m = 12.705 \text{ g}$

#2  $P_1 = 18.404$   $V = 9.64267 \text{ cm}^3$  #2  $\rho = 1.0419 \text{ g/cm}^3$   
 $P_2 = 7.233$  \*  $m = 10.047 \text{ g}$

#3  $P_1 = 18.450$   $V = 9.6087 \text{ cm}^3$  #3  $\rho = 1.043 \text{ g/cm}^3$   
 $P_2 = 7.250$  \*  $m = 10.022 \text{ g}$

#4  $P_1 = 18.961$   $V = 11.712 \text{ cm}^3$  #4  $\rho = 1.044 \text{ g/cm}^3$   
 $P_2 = 7.520$  \*  $m = 12.232 \text{ g}$

#5  $P_1 = 18.325$   $V = 4.5177 \text{ cm}^3$  #5  $\rho = 1.005 \text{ g/cm}^3$   
 $P_2 = 7.044$  \*  $m = 4.541 \text{ g}$

Gum Rosin (from drum lot # 10K0912) heated up to  $90^\circ\text{C}$

#1  $P_1 = 18.525$   $V = 14.6909 \text{ cm}^3$  #1  $\rho = 1.047 \text{ g/cm}^3$   
 $P_2 = 7.445$  \*  $m = 15.385 \text{ g}$

#2  $P_1 = 18.347$   $V = 12.812 \text{ cm}^3$  #2  $\rho = 1.041 \text{ g/cm}^3$   
 $P_2 = 7.312$  \*  $m = 13.343 \text{ g}$

\* mass measured using scale S/N 2883 ambient temperature  $26^\circ\text{C}$  for pycnometer measurements. ambient temperature for mass (operate bldg)  $24.8^\circ\text{C}$

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Mass of gum rosin used in equation of States (EOS) experiments following exsolution of acetone

Date 12/19/01 Temp 21.3C

Sample # Weight(g)

1 7.316  
 2 18.716  
 3 16.010/1  
 4 16.485  
 5 11.445  
 6 16.752  
 7 6.918/9  
 8 23.900/1  
 9 5.842  
 10 19.65  
 11 17.123  
 12 3.803  
 13 16.748  
 14 12.057  
 15 7.268  
 16 12.656  
 17 12.553  
 18 17.653/4  
 19 12.232  
 20 5.924  
 21 14.728/9  
 22 14.428/9  
 23 8.216/7  
 24 16.177/8  
 25 7.455  
 26 10.203  
 12' 13.74  
 13' 17.809  
 14' 13.974  
 16' 6.426/7  
 17' 17.075  
 18' 15.042/3  
 19' 10.359  
 20' 15.214  
 21' 14.74  
 22' 16.258/9  
 24' 15.143/4  
 26' 10.7  
 4' 18.43

Date 12/28/01 Temp 22C

Sample # Weight(g)

1 7.298  
 2 18.626  
 3 15.492  
 4 16.415  
 5 11.369  
 6 16.621  
 7 6.886  
 8 23.692/3  
 9 5.818  
 10 19.478  
 11 16.972/3  
 12 3.794/5  
 13 16.596  
 14 11.965  
 15 7.224  
 16 12.554/5  
 17 12.432  
 18 17.475/6  
 19 12.118  
 20 5.823  
 21 14.374  
 22 13.97  
 23 7.978  
 24 15.598/9  
 25 7.166  
 26 9.815  
 12' 13.643  
 13' 11.661/2  
 14' 13.860/1  
 16' 6.383  
 17' 16.881/2  
 18' 14.891/2  
 19' 10.274/5  
 20' 14.874  
 21' 14.39  
 22' 15.739  
 24' 14.162  
 26' 10.315  
 4' 18.43

out in

13:20  
15:50

M Hill  
2/20/02

Note: measurements of gum rosin mass listed above are slightly off as cover/lid ~~ensemble~~ <sup>MT</sup> ensemble was missing. Corrected values are listed on p 54 of this notebook. Corrected <sup>MT</sup> 2/20/02

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values measured on different dates with cover lid  
ensemble on balance. New previous measurements  
were off as Anne-Marie Lejeune had prior  
measurements to compare with.

Date	Temp	out	Date	Temp	out
1/4/02	20.2C	13:10	1/25/02	21.0C	9:55
		in 15:15			14:18
Sample #	Weight(g)		Sample #	Weight(g)	
1	8.877/8		1	8.858/9	
2	20.178		2	20.110/1	
3	17.496/7		3	17.428/9	
4	17.969		4	17.91	
5	12.929		5	12.877/8	
6	18.163		6	18.077/8	
7	8.457		7	8.429/30	
8	25.192		8	25.045/6	
9	7.394		9	7.370/1	
10	21.010/1		10	20.878/9	
11	18.505		11	18.421	
12	5.377		12	5.365/6	
13	18.133		13	18.05	
14	13.519		14	13.462/3	
15	8.796		15	8.768/9	
16	14.091		16	14.02	
17	13.977		17	13.914/5	
18	19.018		18	18.918/9	
19	13.665		19	13.614/5	
20	7.392		20	7.366	
21	15.889		21	15.775	
22	15.488		22	15.392	
23	9.532/3		23	9.485/6	
24	17.104/5		24	16.974/5	
25	8.723		25	8.686/7	
26	11.366		26	11.313	
12'	15.185		12'	15.113	
13'	19.192		13'	19.084	
14'	15.41		14'	15.344/5	
16'	7.954		16'	7.929	
17'	18.411/2		17'	18.317	
18'	16.440/1		18'	16.368	
19'	11.834		19'	11.78	
20'	16.387		20'	16.281/2	
21'	15.899/900		21'	15.805/6	
22'	17.228		22'	17.119/20	
24'	16.117		24'	16.011/2	
26'	11.841		26'	11.773	
4'	19.896		4'	19.837	

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Date \_\_\_\_\_

Invented by \_\_\_\_\_

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Final Entry:

I have reviewed this scientific notebook and find it in agreement with QAP-001.  
There is sufficient information regarding methods used for conducting tests,  
acquiring and analyzing data so that another qualified individual could repeat  
the activity.

E.C. 4/2/2002

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Witnessed &amp; Understood by me, \_\_\_\_\_

Date \_\_\_\_\_

Invented by \_\_\_\_\_

Date \_\_\_\_\_

Recorded by \_\_\_\_\_