

# Procedure: Creep Test at SNL

Version Date:

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## 1 Test Description

**FAILED (7/7/15)**

Parameters	Value
Test Name	UNM-WP-HY-175-02
Salt Provenance (Circle One)	Avery Island / <u>WIPP</u>
Test Type (Circle One)	<u>Hydrostatic</u> / Shear
Salt Can Label	2A+5B *
Water Added to Salt (Circle One)	yes <u>no</u>
Target/Actual Water Added (Percent by Mass [%])	0%
Temperature: <u>(°C)</u> / °F	175
Pressure <u>(MPa)</u> / psi	20
Jacketing Components (Circle All)	<u>Outer Lead</u> - <u>Outer Viton</u> - <u>Inner Lead</u> - <u>Inner Copper</u>
Tested In (Circle One)	<u>Frame 2</u> Frame 3

Table 1: Description of Test

\* 2A: 1.6829 kg  
 5B: 0.1526 kg  
                      
 Total: 1.8355 kg of salt

Target:  $\sim 10^{-19} \text{ m}^2$

## 2 Pre-Test Measurements

### 2.1 Height of components:

Components	Count	Component Label	Recorded Height [mm]
Platens	1	C1	37.27
	2	C2	37.25 12
Chamfer Discs	1	CP 7	8.31
	2	CP 1	12.83
Mesh Discs	1	NA	0.87
	2	NA	1.14
Cumulative Height of Components		97.54	mm

Table 2: Itemized List of Components for Height Measurements (No Salt).

### 2.2 Jacket Dimensions

#### 2.2.1 Jacket Componentets

For all tests, the jacketing materials will be -> one outer lead jacket and two inner copper jackets.

#### 2.2.2 Height of Outer Jacket

This value will vary depending on which platens (steel or aluminium) and chamfer pieces are used, in general:

1. Outer Jacket: 10.125 inches (257.17 mm) to 10.5 inches (266.7 mm);
2. INNER SHELL: 12.0 INCHES (304.8 MM) -> THIS IS FOR BOTH A1 AND A2;
3. Specimen Clearance: 1.875 inches (47.62 mm) to 1.5 inches (38.1 mm);

**NOTE:** the maximum height inside Frame 2 and 3 is 12 inches (304.8 mm) - If the upper internal port of the shell is plugged, the available height is decreased to 11.75 inches (298.45 mm)

Jacket Description	Height	No. of Jackets Used
Outer Lead Jacket (mm)	262	1
Outer Viton Jacket (mm)	—	—
Inner Lead Jacket (mm)	—	—
Inner Copper Jacket (mm)	165	2
Height of Total Sample (mm)	262	NA

Table 3: Height of Jacketing Components (if jacket not used, write "NA")

### 2.2.3 Checklist of Jacketing Materials:

Components	Count	Verification Checkmark (and Component Label is Applicable)
Platens	1	✓
	2	✓
Platen O-rings	1	✓
	2	✓
	3	✓
	4	✓
Platen Screws (0.25 inch 20 rnd)	1	✓
	2	✓
Screw-In Nipples	1	✓
	2	✓
Nipple O-rings	1	✓
	2	✓
	3	✓
	4	✓
Nipple Adapter (HIP HF4 connection)	1	✓
	2	✓
Nipple Plugs (HIP HF4 plugs)	1	✓
	2	✓
Chamfer Discs	1	✓
	2	✓
Mesh Discs	1	✓
	2	✓
Inner Copper Jacket (indicate No. used)	2	Thickness of 1 Sheet of Copper (mm)
Outer Lead Jacket	1	Jacket Thickness (mm)

} comp

Table 4: Itemized List of Components for Mass and Volume Measurements (No Salt).

Measured Value	Values	Units
Prior to Dunk: Water Level Reading on Burette	63.8 *	mL (burette)
After Dunk: Water Level Reading on Burette	57.2 *	mL (burette)
Volume of Components (No Salt)	752.89	mL
Mass of Components (No Salt)	4063.3	kg
Approximate Diameter of Salt	-	mm
Approximate Height of Salt	-	mm
Dunk Tank Volume Factor: 114.4978 mL/Burette Unit		

} Jacket was trimmed post dunk, subtr 2.8 mL (from lead)

} didn't measure

Table 5: Measurements of All Components (No Salt)

## 2.3 Measured Mass of Salt

2.3.1 Date:

Parameters	Value	
Salt Can Label	2A + 5B, see Pg 1	
Before Making Sample: Mass of Salt and Can (with lid)	1.9207	kg
After Sample is Made: Remaining Mass of Salt and Can (with lid)	—	kg
Mass of Salt Used for Sample	1.8355	kg
Cumulative Mass of Components and Salt	5.8988	kg

Table 6: Mass of Salt

## 3 Pre-consolidation Measurements

3.0.2 Date: 6/26/15

3.0.3 Data Sample Rate: 10 sec

Volume Displayed on ISCO Pump	Volume [mL]	Pressure [psi]	Time [hh:mm]
Initial Reading: prior to consolidation	507.	43	16:43
Reading: When at pre-consolidation pressure	62.9	2900	16:49
Final Reading: after pre consolidation	157	10	16:58

Table 7: Pre-consolidation Details

Components	Volume [mL]	Mass [kg]
Preconsolidated Specimen (all components listed above plus salt)	2095.31	3.9021
Preconsolidated Salt (Salt Only)	1342.42	1.8355
Total Height of Speciment (mm)	246 mm	
Approximate Outside Diameter of Salt (mm)	99 mm	

Table 8: Pre-consolidation Measurements

### 3.1 Pre-Creep Test Measurements (After Specimen Has Been Preconsolidated)

3.1.1 Date:

Parameter	Values	Units
Prior to Dunk: Mass of Specimen (with all components)	5.9021	kg
Prior to Dunk: Water Level Reading on Burette	68.1	mL (burette)
After Dunk: Water Level Reading on Burette	49.8	mL (burette)
After Dunk: Mass of Specimen (with all components)	5.9032	kg
<del>Measured Volume Change of Salt Caused by Pre consolidation</del>	<del>2096.31</del>	<del>mL</del>
<del>Measured Volume of Salt Prior to Creep Test</del>	<del></del>	<del>mL</del>

Total volume: 2095.31 mL

Table 9: Measurements Made During Seconds Dunk of Specimen (after pre consolidation).

## 4 Application of Heat to Obtain Test Temperature

Heat will be applied to the specimen until the desired test temperature is obtained, this will be done under quasi-atmospheric pressure.

4.0.2 Date:

7/7/15

4.0.3 Data Sample Rate:

1 min.

1:13 PM

Event	Date	Time	Confining Pressure [psi]	Expelled Silicone Oil Volume (mL)
Start Temperature Increase	7/7/15	12:16	0 3 psi	0
End Temperature Increase	7/7/15	6:00 PM	0	440

- observed fluid in lower vent tubing

Table 10: Dates of Details of Temperature Increase

\* → 7/8/15 @ 09:30

additional 10 mL of Si oil

## 5 Begin Creep Test

heating to 175°C → 5 hrs

∴ 450 mL

bled during heating

5.0.4 Date:

7/8/15

5.0.5 Data Sample Rate:

10 sec

0 psi

10 psi

→ temp.

Event	Value	Comment
ISCO Pump Volume (Pre Pressure Increase)	474.8 / 507.21	read on GUI
ISCO Pump Pressure (Pre Pressure Increase)	0 / 10	will ramp to 10 psi then start
Begin Pressure Increase	Time:	
End Pressure Increase	Time:	
ISCO Pump Volume (Post to Pressure Increase)		
ISCO Pump Pressure (Post Pressure Increase)		
ISCO Pump Flow Rate (Post Pressure Increase)		

Table 11: Details of Test Initiation