

Procedure: Creep Test at SNL

Version Date:

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Form Completed By: Laxmi

1 Test Description

Parameters	Value
Test Name	UNM-WP-HY-175-03
Salt Provenance (Circle One)	Avery Island / <u>WIPP</u>
Test Type (Circle One)	<u>Hydrostatic</u> / Shear
Salt Can Label	3D
Water Added to Salt (Circle One)	yes / <u>no</u>
Target/Actual Water Added (Percent by Mass [%])	Dry
Temperature: [°C / °F]	175°C
Pressure [MPa / psi]	20 MPa
Jacketing Components (Circle All)	<u>Outer Lead</u> - Outer Viton - Inner Lead - <u>Inner Copper</u>
Tested In (Circle One)	<u>Frame 2</u> / Frame 3
Test Target (<u>permeability</u> / fractional density / etc)	10^{-18} m ²

Table 1: Description of Test

2 Pre-Test Measurements

2.1 Height of components:

Components	Count	Component Label	Recorded Height [mm]
Platens	1	C3	37.03
	2	C5	37.67
Chamfer Discs	1	CP4	8.48
	2	CP6	8.35
Mesh Discs	1	NA	0.59
	2	NA	0.64
Cumulative Height of Components		42.76	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)	238 216	1
Outer Viton Jacket (mm)		
Inner Lead Jacket (mm)		
Inner Copper Jacket (mm)	134.8 152.1 148	2
Height of Total Sample (mm)	216	NA

123.29

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

2.2.3 Checklist of Jacketing Materials:

Ht of Sample = 216 mm

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 rpd)	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)		Thickness of 1 Sheet of Copper (mm)
Outer Lead Jacket	1	Jacket Thickness (mm)

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

Measured Value	Values	Units	Comments
Prior to Dunk: Water Level Reading on Burette	69.4	mL (burette)	
After Dunk: Water Level Reading on Burette	60.1	mL (burette)	
Volume of Components (No Salt)	1045.5	mL	
Mass of Components (No Salt)	3.862 - 0.190	kg	
Approximate Diameter of Salt		mm	
Approximate Height of Salt		mm	
Dunk Tank Volume Factor: 114.4978 mL/Burette Unit			

1931

Table 5: Measurements of All Components (No Salt)

** 19.3 ml of volume of trimmed Lead and Copper to be deducted from the dunked volume.*

Deduction for trimmed lead and copper

→ $20.4 - 14 = 6.4$

$16.3 - 6.7 = 9.6$

$18 - 14.7 = 3.3$

19.3

2.3 Measured Mass of Salt

2.3.1 Date:

Parameters	Value	
Salt Can Label	3D	
Before Making Sample: Mass of Salt and Can (with lid)	1.927	kg
After Sample is Made: Remaining Mass of Salt and Can (with lid)	0.397	kg
Mass of Salt Used for Sample	1.53	kg
Cumulative Mass of Components and Salt	5.2032	kg

Table 6: Mass of Salt

3 Pre-consolidation Measurements

3.0.2 Date: 7/14/15

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	507.64	58 ⁵⁵ psi	1:59
Reading: When at pre-consolidation pressure	170.11	2901	2:04
Final Reading: after pre consolidation	317.92	15 psi	2:11

Table 7: Pre-consolidation Details

Parameter	Values	Units
Prior to Dunk: Mass of Specimen (with all components)	5.2062	kg
Prior to Dunk: Water Level Reading on Burette	70.0	mL (burette)
After Dunk: Water Level Reading on Burette	54.1	mL (burette)
Preconsolidated Specimen (all components listed above plus salt)	1820.515	mL
After Dunk: Mass of Specimen (with all components)	5.2093	kg
Total Height of Specimen	207	mm
Approximate Outside Diameter of Specimen	102	mm
Preconsolidated Salt (Salt Only) - Volume and Mass	774.99	mL
		kg
Dunk Tank Volume Factor: 114.4978 mL/Burette Unit		

Table 8: Measurements Made After Preconsolidation of Specimen.

4 Application of Heat to Obtain Test Temperature

4.0.4 Data Sample Rate: 5 min

Event	Date	Time	Confining Pressure [psi]	Expelled Silicone Oil Volume (mL)
Start Temperature Increase	7/15/15	13:30	~ 8 psi (dila)	"Temp exceeded: 195°C"
End Temperature Increase	" "	15:55	0.9	540 540 mL

Table 9: Dates of Details of Temperature Increase

* ~ 100 mL more than prev. 175°C test

5 Creep Test

5.0.5 Date (Start Test): 7/15/15 ~ ~~16:00~~ 16:03

5.0.6 Data Sample Rate: 10 sec

Event	Value	Comment
ISCO Pump Volume (Pre Pressure Increase)	304.44 400.0	inj. ~ 100 mL of oil from ISCO while bleeding air from shell
ISCO Pump Pressure (Pre Pressure Increase)	0.9	
Begin Pressure Increase	Time: 16:03	- fluid from salt
End Pressure Increase	Time: 16:08	appeared in down stem li
ISCO Pump Volume (Post to Pressure Increase)	124 m	
ISCO Pump Pressure (Post Pressure Increase)	2885	
ISCO Pump Flow Rate (Post Pressure Increase)	3.5 3.5 mL/min	+ droppings

Table 10: Details of Test Initiation

- Bled pressure @ 175°C via dilatometer

5.0.7 Date (End Test): 7/17/15 @ 12:00

Parameters	Values	Units
Final Mass of Specimen	5.2176	kg
Initial Dunk Tank Values	72.0	mL (burette)
Final Dunk Tank Values	57.4	mL (burette)
Volume of Specimen	1671.67	mL
Specimen Diameter	95.5	mm
Specimen Height	199	mm
Density of Salt only		kg/m ³
Dunk Tank Volume Factor: 114.4978 mL/Burette Unit		

Table 11: Post Test Measurements

height
199 mm

Diameter
95.5 mm

Pre dunk

Post dunk
5.2163

14.6