Regain Conductivity Testing

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BACKGROUND

- Why is regain conductivity important?
  - Finding damaging products
  - Replicating downhole conditions
  - Testing fluid compatibility

PROCEDURE

$$kW_f = 26.78\mu Q/(\Delta P) \quad \text{***}$$

Conductivity:

Permeability:
$$k = 321.4\mu Q/[(\Delta P)W_f] \quad \text{***}$$

|	
k	is the proppant pack permeability, expressed in Darcy
kW_f	is the proppant pack conductivity, expressed in millidarcy-feet
μ	is the viscosity of the test liquid at test temperature, expressed in centipoises
Q	is the flow rate, expressed in cubic centimeters per minute
ΔP	is the differential pressure, expressed in psi
W_f	is proppant pack width, expressed in inches
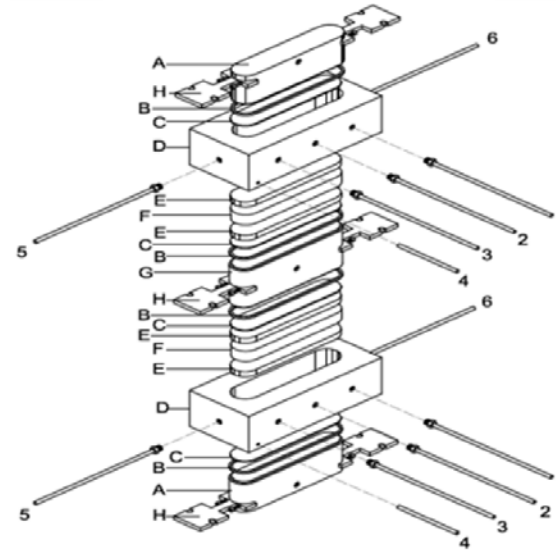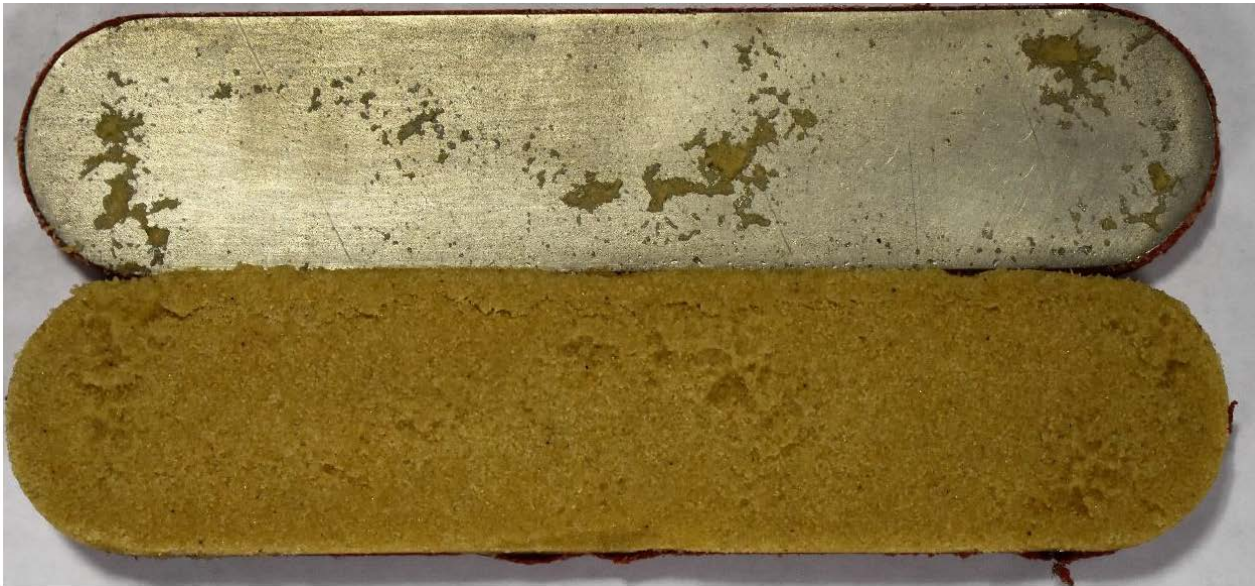
1. Lower pressure port
2. Thermocouple
3. High pressure port
4. Not used
5. Inlet
6. Outlet

A. Upper/lower pistons
B. Tetraseal
C. Metal shim
D. Cell body
E. Steel Cores
F. Proppant
G. Center piston
H. Width slots
I. Set screws
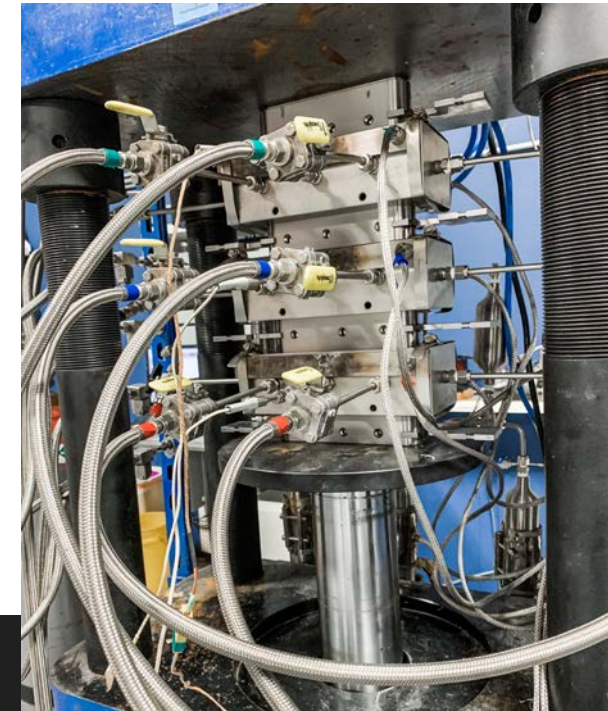
RESULTS

5 - Tabular data for 2.0 gpt LGA-3J sample

Stress, psi	Time @ stress	Time (Total)	Conductivity (md-ft)	Permeability (Darcy)	Width (in)	% Regain
1,000	24 hrs.	24 hrs.	1413	71	0.241	
6,000	0 hrs.	24 hrs.	57	3	0.228	12
6,000	24 hrs.	48 hrs.	40	2	0.227	9
6,000	24 hrs.	72 hrs.	42	2	0.225	11

2lb/ft², 200°F, Steel core wafers, 2% KCL substitute.

5 - Tabular data for FRP-1S (4 gpt) sample

Stress, psi	Time @ stress	Time (Total)	Conductivity (md-ft)	Permeability (Darcy)	Width (in)	% Regain
1,000	24 hrs.	24 hrs.	1695	84	0.242	
6,000	0 hrs.	24 hrs.	575	31	0.224	115
6,000	24 hrs.	48 hrs.	388	21	0.222	84
6,000	24 hrs.	72 hrs.	411	22	0.222	88

2lb/ft², 160°F, Steel core wafers, 2% KCL substitute.

3 - Tabular data for 2.0 gpt LGA-3J sample

Stress, psi	Time @ stress	Time (Total)	Conductivity (md-ft)	Permeability (Darcy)	Width (in)	% Regain
1,000	24 hrs.	24 hrs.	1397	69	0.243	
6,000	0 hrs.	24 hrs.	66	4	0.223	19
6,000	24 hrs.	48 hrs.	83	4	0.222	21
6,000	50 hrs.	98 hrs.	77	4	0.222	22

2lb/ft², 250°F, Steel core wafers, 2% KCL substitute.
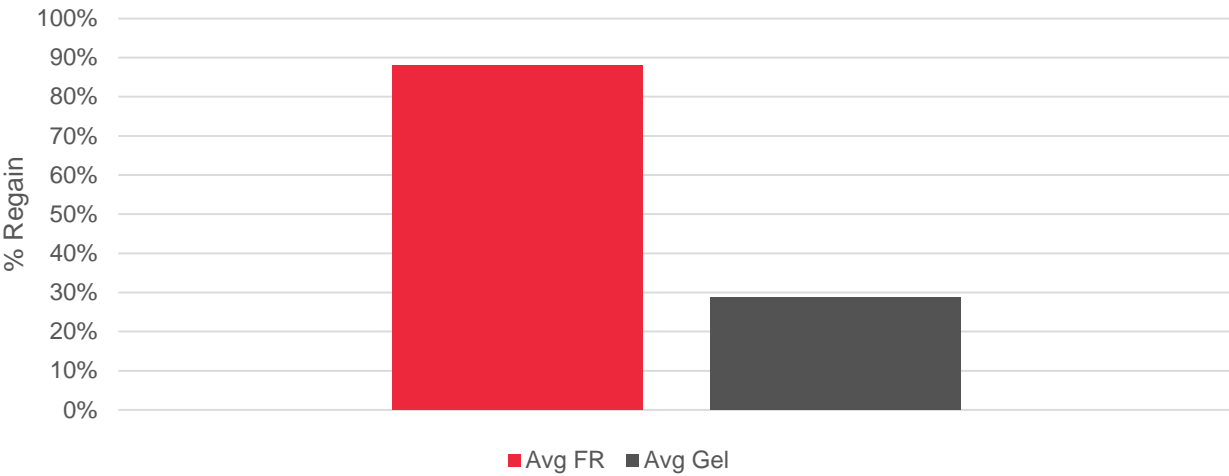
5 - Tabular data for 4.0 gpt FRP-1S sample

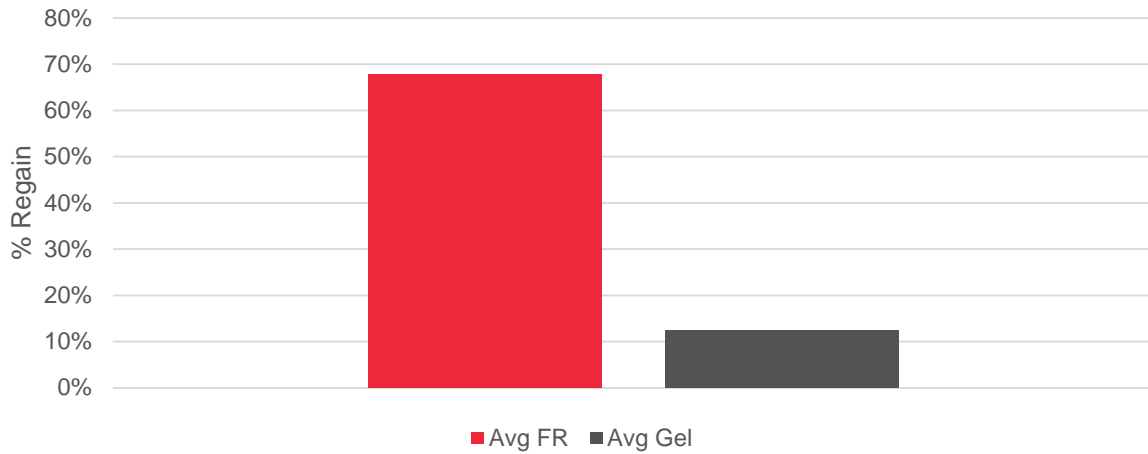| Stress, psi	Time @ stress	Time (Total)	Conductivity (md-ft)	Permeability (Darcy)	Width (in)	% Regain
1,000	24 hrs.	24 hrs.	1454	70	0.248	
6,000	0 hrs.	24 hrs.	462	24	0.232	114
6,000	24 hrs.	48 hrs.	442	23	0.231	121
6,000	50 hrs.	98 hrs.	441	23	0.231	128

2lb/ft², 250°F, Steel core wafers, 2% KCL substitute.
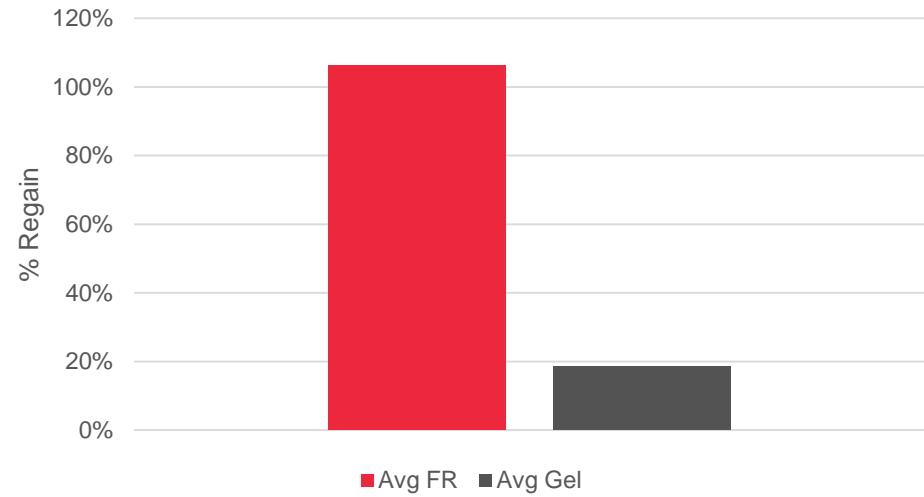
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RESULTS

Average % Regain

Average % Regain @ 160 F

Average % Regain @ 200 F

Average % Regain @ 250 F

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