
API RP 13C (ISO 13501) SHALE SHAKER SCREEN ANALYSIS

FINAL REPORT

Prepared for

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By

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INTRODUCTION

At the request of Shaanxi Aipu Machinery Manufacture Company, LTD, API RP 13C shaker screen sieve and conductance testing was conducted 10 flat shale shaker screen provided by a representative of Shaanxi Aipu Machinery Manufacture Company. The non-blanked area was also estimate for the 10 screens.

EXPERIMENTAL

API RP 13C SHAKER SCREEN SIEVE AND CONDUCTANCE TESTING

API RP 13C Shaker Screen Sieve and Conductance Testing was conducted the 10 shale shale shaker screen submitted.

ESTIMATED NON-BLANKED AREA DETERMINATION

The non-blanked area for the flat shale shaker screens submitted was estimated by measuring the area of each of the rectangles, triangles, and trapezoids contained within the screen using a Fowler Sylvac Euro-cal Mark III digital micrometer.

RESULTS AND DISCUSSION

A summary of the results of the API RP 13C Shaker Screen Sieve and Conductance Testing and non-blanked area determinations is presented in Table 1. The shaker screen sieve test results for the 10 screens submitted are presented in Tables 2-11. The shaker screen conductance test results for the 10 screens submitted are presented in Figures 1-10.

TABLE 2
API RP 13C SHAKER SCREEN SIEVE TEST RESULTS FOR THE SCREEN LABELED 50-MESH-APXC50

Sieve	Sieve	Test 1	Test 2	Test 3	Test Average	Test Average	Average	Cumulative
(#)	(μm)	(g)	(g)	(g)	(g)	(g)	(%)	(%)
35.00	500.00	1.00	1.03	0.74	0.92	0.92	2.30	2.30
40.00	425.00	9.74	9.99	9.73	9.82	10.74	24.50	26.81
50-MESH-APXC50	0.00	1.45	1.20	1.29	1.31	12.06	3.28	30.08
45.00	355.00	8.21	7.75	8.20	8.05	20.11	20.09	50.18
50.00	300.00	9.61	9.80	10.02	9.81	29.92	24.48	74.66
60.00	250.00	9.69	9.70	9.75	9.71	39.63	24.24	98.89
pan	pan	0.50	0.40	0.43	0.44	40.08	1.11	100.00
				Total	40.08			
Sieve	Sieve	Average		Line equation	$y = -0.1338x + 67.612$			
(#)	(μm)	Al_2O_3						
40.00	425.00	10.74						
50-MESH-APXC50	415.21	12.06		50-MESH-APXC50	= API 40			
45.00	355.00	20.11		API 40	> 390 μm > 462.5 μm			

TABLE 3
API RP 13C SHAKER SCREEN SIEVE TEST RESULTS FOR THE SCREEN LABELED 80-MESH-APAXC80

Sieve	Sieve	Test 1	Test 2	Test 3	Test Average	Test Average	Average	Cumulative
(#)	(μm)	(g)	(g)	(g)	(g)	(g)	(%)	(%)
50.00	300.00	0.19	0.23	0.11	0.18	0.18	0.88	0.88
60.00	250.00	5.05	5.09	5.09	5.08	5.25	25.36	26.24
80-MESH-APAXC80	0.00	1.95	1.83	1.65	1.81	7.06	9.04	35.28
70.00	212.00	2.76	3.01	2.81	2.86	9.92	14.29	49.57
80.00	180.00	4.96	4.88	4.77	4.87	14.79	24.33	73.89
100.00	150.00	4.72	4.70	4.60	4.67	19.47	23.34	97.24
pan	pan	0.52	0.59	0.55	0.55	20.02	2.76	100.00
					20.02			
Sieve	Sieve	Average		Line equation	$y = -0.1229x + 35.977$			
(#)	(μm)	Al_2O_3						
60.00	250.00	5.25						
80-MESH-APAXC80	235.26	7.06		80-MESH-APAXC80	= API 60			
70.00	212.00	9.92		API 60	> 231 μm > 275 μm			

TABLE 4
API RP 13C SHAKER SCREEN SIEVE TEST RESULTS FOR THE SCREEN LABELED 100-MESH-APAXC100

Sieve	Sieve	Test 1	Test 2	Test 3	Test Average	Test Average	Average	Cumulative
(#)	(µm)	(g)	(g)	(g)	(g)	(g)	(%)	(%)
60.00	250.00	0.26	0.55	0.31	0.37	0.37	1.85	1.85
70.00	212.00	4.83	4.55	4.79	4.72	5.10	23.46	25.32
100-MESH-APAXC100	0.00	3.60	3.51	3.46	3.52	8.62	17.50	42.82
80.00	180.00	1.46	1.84	1.77	1.69	10.31	8.40	51.22
100.00	150.00	4.48	4.55	4.66	4.56	14.87	22.67	73.89
120.00	125.00	4.91	4.97	5.02	4.97	19.84	24.67	98.56
pan	pan	0.25	0.30	0.32	0.29	20.13	1.44	100.00
					20.13			
Sieve	Sieve	Average Al₂O₃		Line equation	$y = -0.1629x + 39.635$			
(#)	(µm)	(g)						
70.00	212.00	5.10						
100-MESH-APAXC100	190.39	8.62		100-MESH-APAXC100	= API 80			
80.00	180.00	10.31		API 80	> 165 µm < 196 µm			

TABLE 5
API RP 13C SHAKER SCREEN SIEVE TEST RESULTS FOR THE SCREEN LABELED 120-MESH-APAXC120

Sieve	Sieve	Test 1	Test 2	Test 3	Test Average	Test Average	Average	Cumulative
(#)	(μm)	(g)	(g)	(g)	(g)	(g)	(%)	(%)
80.00	180.00	0.15	0.19	0.16	0.17	0.17	2.13	2.13
100.00	150.00	4.86	4.92	4.89	4.89	5.06	23.37	25.51
120-MESH-APAXC120	0.00	4.86	4.84	4.88	4.86	9.92	9.15	34.66
120.00	125.00	0.89	1.10	0.97	0.99	10.90	12.75	47.42
140.00	106.00	4.46	4.36	4.32	4.38	15.28	26.74	74.16
170.00	90.00	4.13	4.14	4.10	4.12	19.41	24.71	98.87
pan	pan	0.57	0.63	0.58	0.59	20.00	1.13	100.00
					20.00			
Sieve	Sieve	Average		Line equation	$y = -0.2339x + 40.137$			
(#)	(μm)	Al_2O_3						
100.00	150.00	5.06						
120-MESH-APAXC120	129.20	9.92		120-MESH-APAXC120	= API 120			
120.00	125.00	10.90		API 120	> 116.5 μm < 137.5 μm			

TABLE 8
API RP 13C SHAKER SCREEN SIEVE TEST RESULTS FOR THE SCREEN LABELED 180-MESH-APAXC180

Sieve	Sieve	Test 1	Test 2	Test 3	Test Average	Test Average	Average	Cumulative
(#)	(μm)	(g)	(g)	(g)	(g)	(g)	(%)	(%)
120.00	125.00	0.91	0.52	0.63	0.69	0.69	3.43	3.43
140.00	106.00	2.70	3.50	3.71	3.30	3.99	16.51	19.95
180-MESH-APAXC180	0.00	0.73	0.27	0.23	0.41	4.40	2.05	22.00
170.00	90.00	3.93	4.34	4.00	4.09	8.49	20.45	42.44
200.00	75.00	6.30	5.72	5.93	5.98	14.47	29.91	72.35
230.00	63.00	4.73	4.41	4.52	4.55	19.03	22.76	95.12
pan	pan	1.13	0.79	1.01	0.98	20.00	4.88	100.00
					20.00			
Sieve	Sieve	Average		Line equation	$y = -0.2813x + 33.803$			
(#)	(μm)	Al_2O_3						
140.00	106.00	3.99						
180-MESH-APAXC180	104.53	4.40		180-MESH-APAXC180	= API 140			
170.00	90.00	8.49		API 140	> 98 μm < 116.5 μm			

TABLE 10
API RP 13C SHAKER SCREEN SIEVE TEST RESULTS FOR THE SCREEN LABELED 230-MESH-APAXC230

Sieve	Sieve	Test 1	Test 2	Test 3	Test Average	Test Average	Average	Cumulative
(#)	(μm)	(g)	(g)	(g)	(g)	(g)	(%)	(%)
170.00	90.00	1.12	1.00	0.95	1.02	1.02	5.10	5.10
200.00	75.00	4.33	4.39	4.43	4.38	5.41	21.85	26.95
230-MESH-APAXC230	0.00	2.02	1.48	1.45	1.65	7.06	8.22	35.17
230.00	63.00	2.93	3.63	3.23	3.26	10.32	16.27	51.44
270.00	53.00	4.36	4.16	4.28	4.27	14.59	21.27	72.70
325.00	45.00	4.47	4.31	4.68	4.49	19.07	22.36	95.07
pan	pan	0.99	0.98	1.00	0.99	20.06	4.93	100.00
					20.06			
Sieve	Sieve	Average		Line equation	$y = -0.4094x + 36.115$			
(#)	(μm)	Al_2O_3						
200.00	75.00	5.41						
230-MESH-APAXC230	70.98	7.06		230-MESH-APAXC230	= API 200			
230.00	63.00	10.32		API 200	> 69 μm < 82.5 μm			

TABLE 11
API RP 13C SHAKER SCREEN SIEVE TEST RESULTS FOR THE SCREEN LABELED 300-MESH-APAXC300

Sieve	Sieve	Test 1	Test 2	Test 3	Test Average	Test Average	Average	Cumulative
(#)	(μm)	(g)	(g)	(g)	(g)	(g)	(%)	(%)
230.00	63.00	0.46	0.59	0.56	0.54	0.54	2.66	2.66
270.00	53.00	4.29	4.20	4.37	4.29	4.82	21.22	23.88
300-MESH-APAXC300	0.00	0.90	0.65	0.69	0.75	5.57	3.70	27.58
325.00	45.00	4.00	4.11	4.13	4.08	9.65	20.20	47.78
400.00	38.00	5.52	5.49	5.57	5.53	15.18	27.36	75.14
500.00	25.00	4.32	4.80	4.48	4.53	19.71	22.45	97.59
pan	pan	0.51	0.36	0.59	0.49	20.20	2.41	100.02
					20.20			
Sieve	Sieve	Average		Line equation	$y = -0.6033x + 36.8$			
(#)	(μm)	Al_2O_3						
270.00	53.00	4.82						
300-MESH-APAXC300	51.77	5.57		300-MESH-APAXC300	= API 270			
325.00	45.00	9.65		API 270	> 49 μm < 58 μm			

FIGURE 1
API RP 13C SHAKER SCREEN CONDUCTANCE TEST RESULTS FOR THE SCREEN LABELED 50-MESH-APAXC50

Manufacturer:	Shaanxi Aipu Machinery Manufacture Co., Ltd	Screen Diameter:	13.64 cm	5.37 inches
Screen ID:	50-MESH-APAXC50	Screen Thickness:	0.067 cm	0.026 inches
LIMS #:	202450	Area of Screen:	146.15 cm²	22.65 in²
Test Date:	9/19/2014			

	Oil Height (inches)	Avg. Temp. (°F)	Oil Density (g/cm ³)	Oil Viscosity (cP)	Pressure Drop (atm)	Mass Flow (kg/min)	Volume Flow Rate (cm ³ /sec)	Screen Conductance (kD/mm)
Run 1	1.00	66.48	0.8572	140.4	0.00210	13.19	256	11.71
Run 2	2.00	69.02	0.8564	129.5	0.00421	22.73	442	9.32
Run 3	3.00	71.30	0.8557	120.6	0.00630	29.80	580	7.60

Average Conductance, kD/mm **9.54**

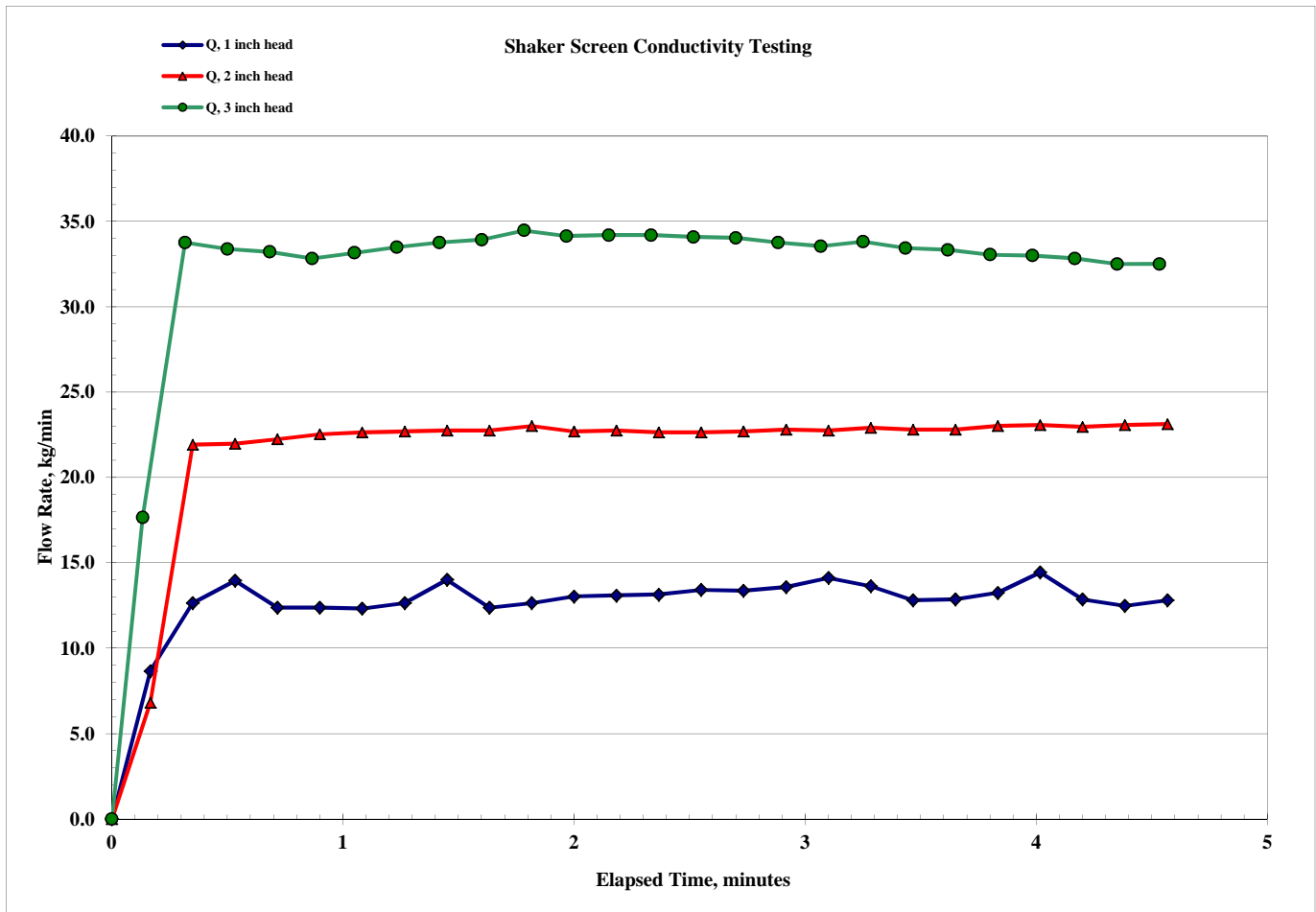


FIGURE 2
API RP 13C SHAKER SCREEN CONDUCTANCE TEST RESULTS FOR THE SCREEN LABELED 80-MESH-APAXC80

Manufacturer:	Shaanxi Aipu Machinery Manufacture Co., Ltd	Screen Diameter:	13.60 cm	5.36 inches
Screen ID:	80-MESH-APAXC80	Screen Thickness:	0.065 cm	0.026 inches
LIMS #:	202452	Area of Screen:	145.30 cm ²	22.52 in ²
Test Date:	9/19/2014			

	Oil Height (inches)	Avg. Temp. (°F)	Oil Density (g/cm ³)	Oil Viscosity (cP)	Pressure Drop (atm)	Mass Flow (kg/min)	Volume Flow Rate (cm ³ /sec)	Screen Conductance (kD/mm)
Run 1	1.00	73.30	0.8551	113.4	0.00210	9.49	185	6.88
Run 2	2.00	74.59	0.8547	109.1	0.00420	17.05	332	5.95
Run 3	3.00	75.83	0.8544	105.2	0.00629	23.24	453	5.22

Average Conductance, kD/mm **6.01**

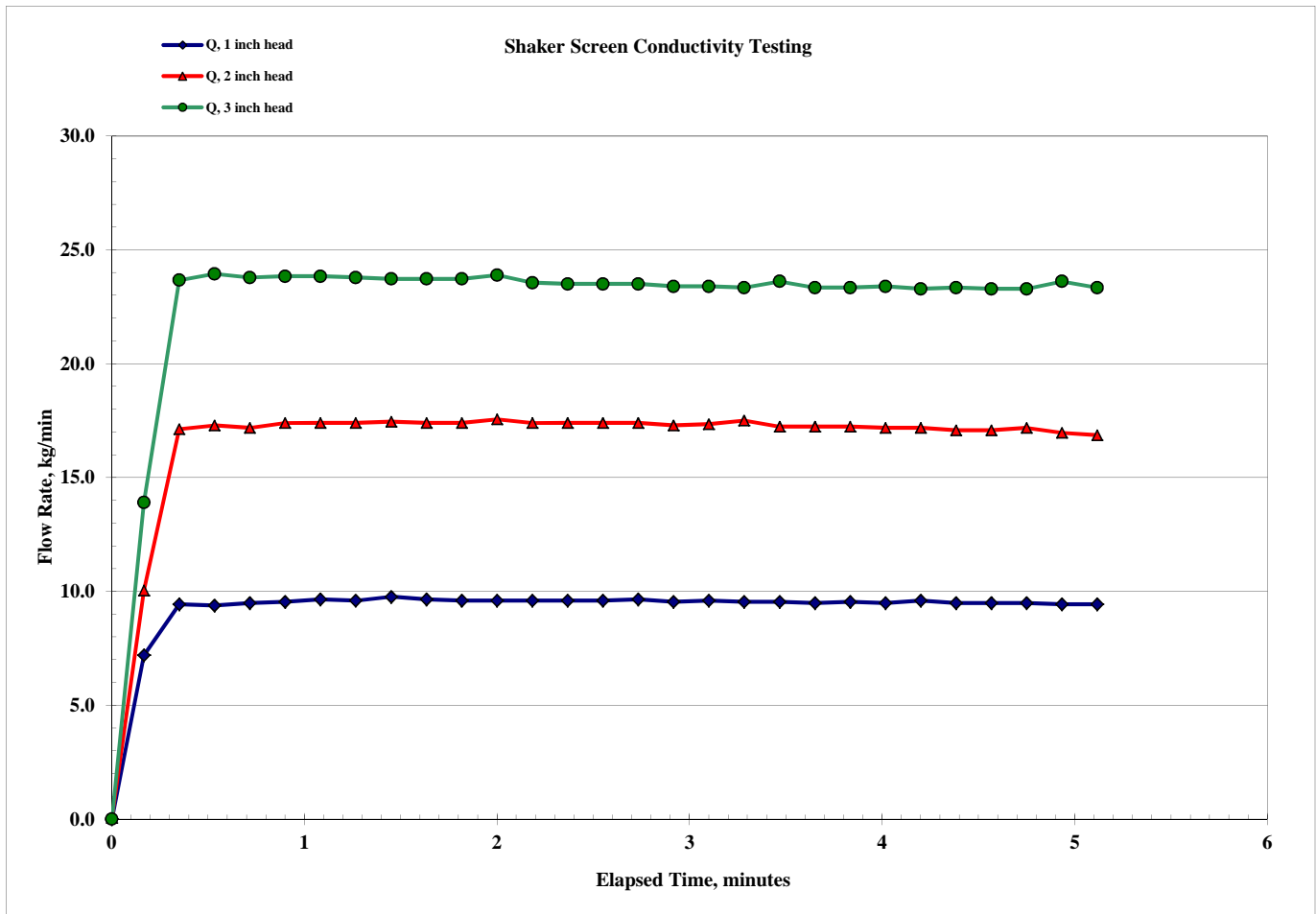


FIGURE 3
API RP 13C SHAKER SCREEN CONDUCTANCE TEST RESULTS FOR THE SCREEN LABELED 100-MESH-APAXC100

Manufacturer:	Shaanxi Aipu Machinery Manufacture Co., Ltd	Screen Diameter:	13.28 cm	5.23 inches
Screen ID:	100-MESH-APAXC100	Screen Thickness:	0.067 cm	0.026 inches
LIMS #:	202454	Area of Screen:	138.44 cm ²	21.46 in ²
Test Date:	9/19/2014			

	Oil Height (inches)	Avg. Temp. (°F)	Oil Density (g/cm ³)	Oil Viscosity (cP)	Pressure Drop (atm)	Mass Flow (kg/min)	Volume Flow Rate (cm ³ /sec)	Screen Conductance (kD/mm)
Run 1	1.00	73.92	0.8549	111.3	0.00210	5.10	99	3.81
Run 2	2.00	76.16	0.8543	104.2	0.00419	10.58	206	3.70
Run 3	3.00	76.90	0.8540	102.0	0.00629	15.89	310	3.63

Average Conductance, kD/mm 3.71

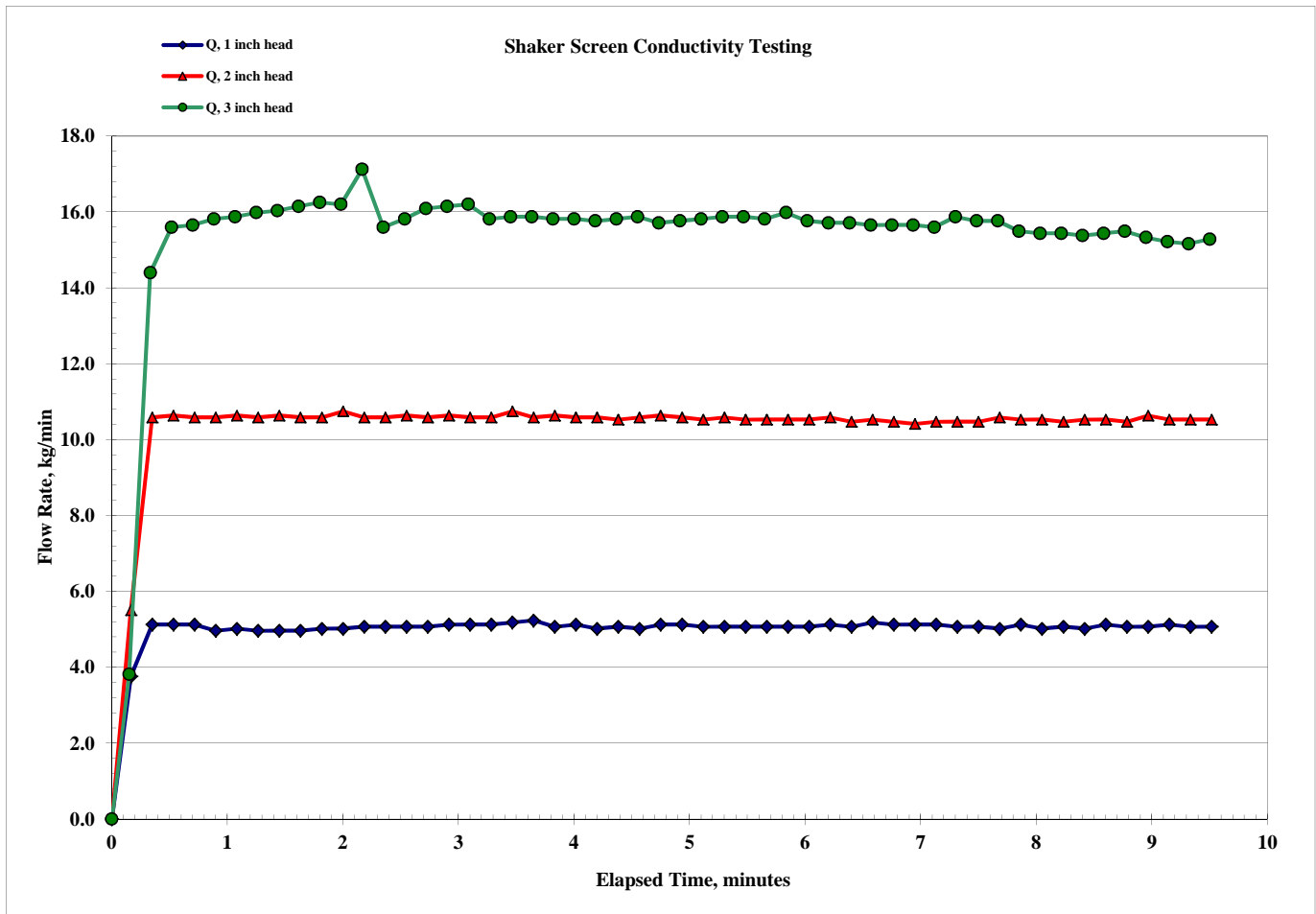


FIGURE 4
API RP 13C SHAKER SCREEN CONDUCTANCE TEST RESULTS FOR THE SCREEN LABELED 120-MESH-APAXC120

Manufacturer:	Shaanxi Aipu Machinery Manufacture Co., Ltd	Screen Diameter:	13.62 cm	5.36 inches
Screen ID:	120-MESH-APAXC120	Screen Thickness:	0.069 cm	0.027 inches
LIMS #:	202456	Area of Screen:	145.63 cm²	22.57 in²
Test Date:	9/25/2014			

	Oil Height (inches)	Avg. Temp. (°F)	Oil Density (g/cm ³)	Oil Viscosity (cP)	Pressure Drop (atm)	Mass Flow (kg/min)	Volume Flow Rate (cm ³ /sec)	Screen Conductance (kD/mm)
Run 1	1.00	73.96	0.8549	111.2	0.00210	3.79	74	2.69
Run 2	2.00	71.58	0.8556	119.5	0.00420	7.51	146	2.86
Run 3	3.00	72.84	0.8552	115.0	0.00630	10.36	202	2.53

Average Conductance, kD/mm 2.69

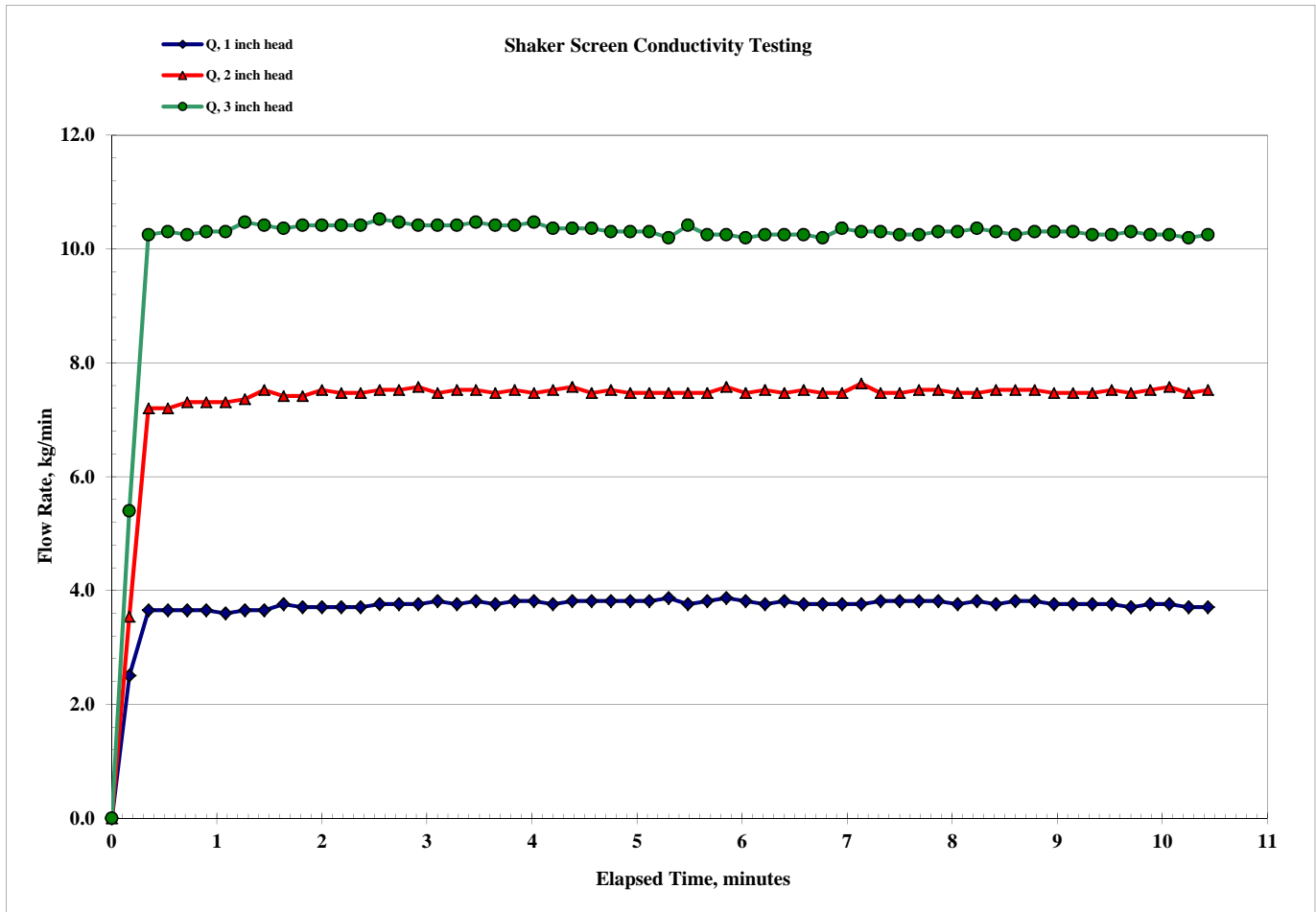


FIGURE 7
API RP 13C SHAKER SCREEN CONDUCTANCE TEST RESULTS FOR THE SCREEN LABELED 180-MESH-APAXC180

Manufacturer:	Shaanxi Aipu Machinery Manufacture Co., Ltd	Screen Diameter:	13.20 cm	5.20 inches
Screen ID:	180-MESH-APAXC180	Screen Thickness:	0.065 cm	0.025 inches
LIMS #:	202462	Area of Screen:	136.75 cm²	21.20 in²
Test Date:	9/26/2014			

	Oil Height (inches)	Avg. Temp. (°F)	Oil Density (g/cm³)	Oil Viscosity (cP)	Pressure Drop (atm)	Mass Flow (kg/min)	Volume Flow Rate (cm³/sec)	Screen Conductance (kD/mm)
Run 1	1.00	75.36	0.8545	106.6	0.00210	3.09	60	2.24
Run 2	2.00	75.52	0.8544	106.1	0.00420	5.28	103	1.91
Run 3	3.00	73.37	0.8551	113.2	0.00630	7.38	144	1.89

Average Conductance, kD/mm 2.01

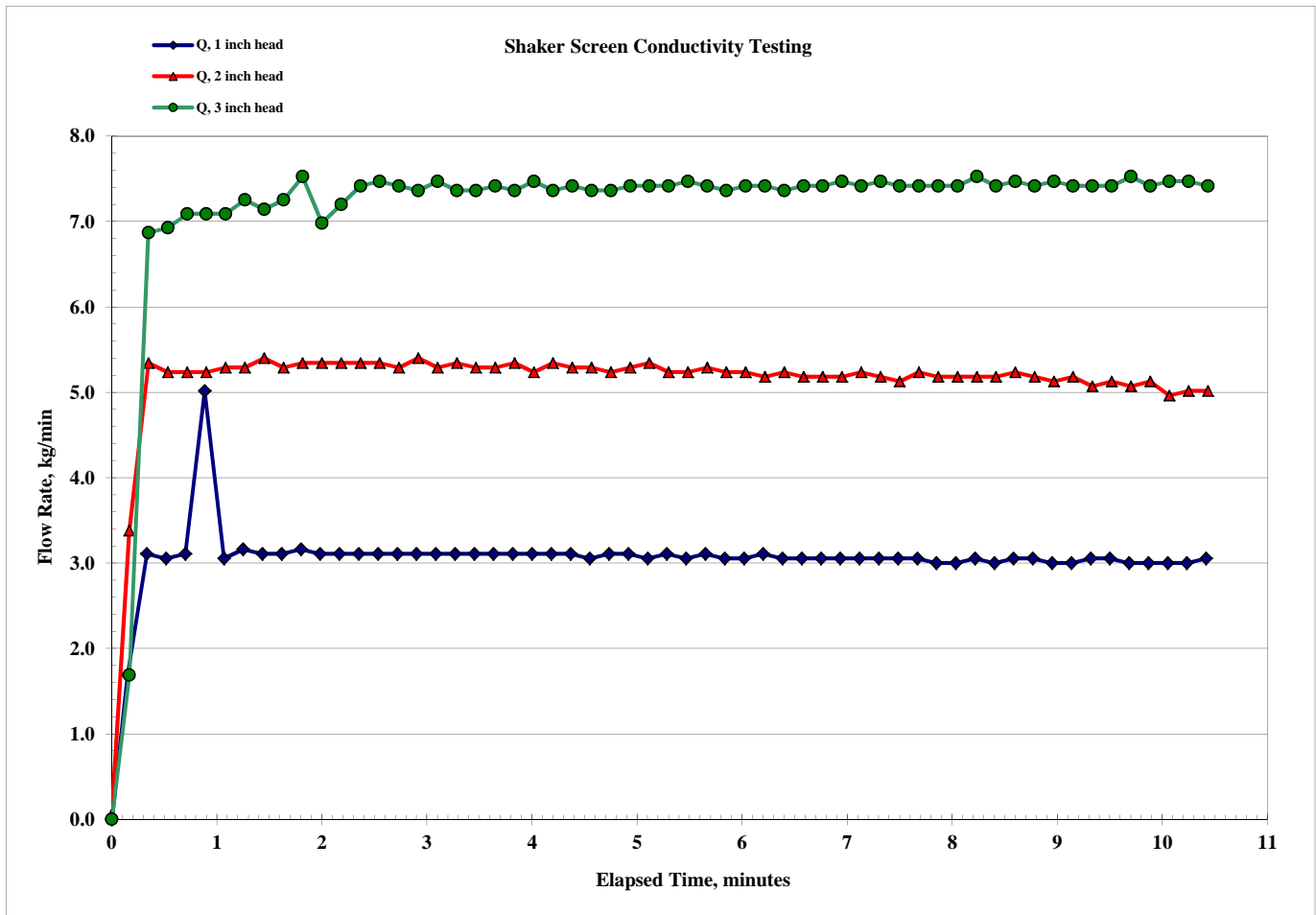


FIGURE 9
API RP 13C SHAKER SCREEN CONDUCTANCE TEST RESULTS FOR THE SCREEN LABELED 230-MESH-APAXC230

Manufacturer:	Shaanxi Aipu Machinery Manufacture Co., Ltd	Screen Diameter:	13.03 cm	5.13 inches
Screen ID:	230-MESH-APAXC230	Screen Thickness:	0.069 cm	0.027 inches
LIMS #:	202466	Area of Screen:	133.25 cm²	20.65 in²
Test Date:	9/25/2014			

	Oil Height (inches)	Avg. Temp. (°F)	Oil Density (g/cm³)	Oil Viscosity (cP)	Pressure Drop (atm)	Mass Flow (kg/min)	Volume Flow Rate (cm³/sec)	Screen Conductance (kD/mm)
Run 1	1.00	67.43	0.8569	136.2	0.00210	1.54	30	1.45
Run 2	2.00	75.18	0.8545	107.2	0.00420	2.91	57	1.09
Run 3	3.00	73.62	0.8550	112.3	0.00630	3.88	76	1.01

Average Conductance, kD/mm 1.18

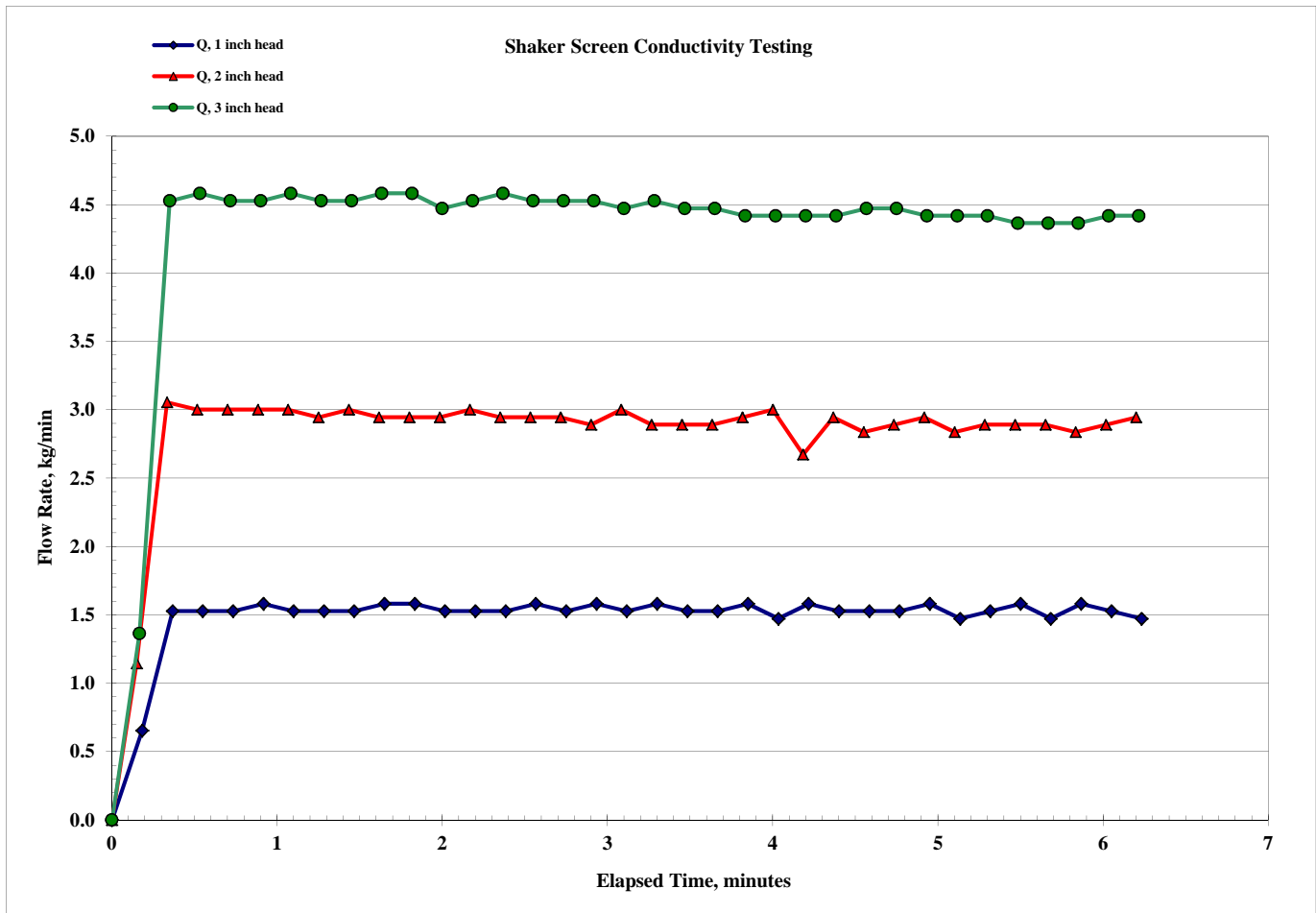


FIGURE 10
API RP 13C SHAKER SCREEN CONDUCTANCE TEST RESULTS FOR THE SCREEN LABELED 300-MESH-APAXC300

Manufacturer:	Shaanxi Aipu Machinery Manufacture Co., Ltd	Screen Diameter:	13.50 cm	5.32 inches
Screen ID:	300-MESH-APAXC300	Screen Thickness:	0.063 cm	0.025 inches
LIMS #:	202468	Area of Screen:	143.14 cm ²	22.19 in ²
Test Date:	9/25/2014			

	Oil Height (inches)	Avg. Temp. (°F)	Oil Density (g/cm ³)	Oil Viscosity (cP)	Pressure Drop (atm)	Mass Flow (kg/min)	Volume Flow Rate (cm ³ /sec)	Screen Conductance (kD/mm)
Run 1	1.00	70.63	0.8559	123.1	0.00210	1.14	22	0.91
Run 2	2.00	71.29	0.8557	120.6	0.00420	2.04	40	0.80
Run 3	3.00	72.12	0.8555	117.6	0.00630	2.77	54	0.70

Average Conductance, kD/mm **0.80**

