Fugitive Emission Gasket Test Report

Chevron Fugitive Emission Test (CFET), March 2013

Performed for

Environmental Gasket Co.

www.environmentalgasket.com

6 inch Class 300
Fishbone Gasket

Project Number: 213269
Test Start Date: November6, 2013

Performed by

YARMOUTH RESEARCH AND TECHNOLOGY, LLC

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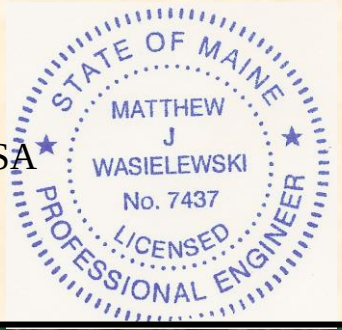

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DATA SUMMARY

Customer:	Environmental Gasket Co.	**Start Date:**	6-Nov-13
Project #:	213269		
Gasket Description:	Fishbone Gasket		
Test Description:	Chevron Fugitive Emissions Test (CFET) Protocol for Pipe Flange Gaskets, 3/1/2013		
Gasket Size / Class:	6 inch ANSI Class 300		
Flange Condition:	New		
Test Media / Pressure:	600 psig Methane		

Test Results: The average and maximum leakage results shown below were calculated from 60 readings measured during a minute duration.
See data sheets for more detailed information.

Test Procedure:		
Score grooves on outer rings - both sides:	Yes	
Measure OD of Sealing Surface:	8.38	inches
Measure ID of Sealing Surface:	7.00	inches
Measure gasket thickness (4):	0.160, 0.159, 0.159, 0.160	
Outer ring thickness:	0.080	inches
Lube studs and nuts with Jet-Lube 550 Extreme:	Yes	
Assemble gasket in flanges with 190 ft-lb nut torque:	Yes	
Verify parallelism is within .010 inch:	Yes	
Compressed Gasket Thickness:	0.216	inches
Pressurize with 600 psig methane for 15 minutes:	Yes	

Thermal Cycling	
Perform thermal cycle and record leakage readings below:	Yes
Heat 1 flange only. Record other flange temp when heated	Yes
flange reaches 500F.	Yes
Reduce pressure to 0, zero meter, repressurize, dwell 15 min.	Yes

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Thermal Cycle Number	*Leakage Readings (PPMv)*				*Flange Temperatures*	
	Ambient Temp.		*500 deg F Temp.*		*Heated*	*Other*
	Avg.	*Max.*	*Avg.*	*Max.*	*(deg F)*	*(deg F)*
Start	1	1	11	12	500	473
1	10	15	10	11	500	474
2	2	2	8	8	500	457
3	6	7	3	3	499	458
4	3	3	6	6	500	441
5	11	13				
Averages ->	**5**	**7**	**8**	**8**	**500**	**461**
Maximums ->	**11**	**15**	**11**	**12**	**500**	**474**

Gasket thickness at end of test:	**0.215**	**inches**

The gasket passed the leakage requirements of the test with all leakages being below 500 PPMv.

Tested by:

Test Gasket as Received

Grooves cut in out ring to prevent sealing.

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Valve Description: Fishbone Gasket

Thermal Cycle Number: 0 **Date** 11/6/2013

Time	Pressure (psig)	Temp. (deg. F)	Temp. (deg. F)	Leakage (PPMv)
11:08:43 AM	600	69	70	1.1
11:08:44 AM	600	69	68	1.1
11:08:45 AM	600	69	70	1.1
11:08:46 AM	600	69	69	1.1
11:08:47 AM	600	69	69	1.1
11:08:48 AM	600	69	68	1.1
11:08:49 AM	600	69	69	1.1
11:08:50 AM	600	68	68	1.1
11:08:51 AM	600	69	68	1.1
11:08:52 AM	600	69	68	1.1
11:08:53 AM	600	68	69	1.1
11:08:53 AM	600	69	69	1.1
11:08:54 AM	600	69	69	1.1
11:08:55 AM	600	69	69	1.1
11:08:56 AM	600	68	68	1.1
11:08:57 AM	600	69	69	1.1
11:08:58 AM	600	69	69	1.1
11:08:59 AM	600	69	68	1.1
11:09:00 AM	600	69	69	1.1
11:09:01 AM	600	69	68	1.1
11:09:02 AM	600	69	68	1.1
11:09:03 AM	600	68	69	1.1
11:09:04 AM	600	69	69	1.1
11:09:05 AM	600	69	69	1.1
11:09:06 AM	600	69	68	1.1
11:09:07 AM	600	68	69	1.1
11:09:08 AM	600	69	69	1.1
11:09:09 AM	600	69	69	1.1
11:09:10 AM	600	69	69	1.0
11:09:11 AM	600	69	69	1.0
11:09:12 AM	600	69	70	1.0
11:09:13 AM	600	69	68	1.0
11:09:14 AM	600	69	69	1.0
11:09:15 AM	600	69	70	1.1
11:09:16 AM	600	69	69	1.0
11:09:17 AM	600	69	68	1.0
11:09:18 AM	600	69	68	1.0
11:09:19 AM	600	69	69	1.1
11:09:20 AM	600	69	69	1.1
11:09:21 AM	600	69	69	1.1
11:09:22 AM	600	69	69	1.1
11:09:23 AM	600	70	68	1.1
11:09:24 AM	600	68	68	1.0
11:09:25 AM	600	69	69	1.1
11:09:26 AM	600	69	68	1.1
11:09:27 AM	600	70	68	1.1
11:09:28 AM	600	69	69	1.1
11:09:29 AM	600	69	69	1.1
11:09:30 AM	600	69	68	1.1
11:09:31 AM	600	68	68	1.1
11:09:32 AM	600	69	70	1.1
11:09:33 AM	600	70	69	1.1
11:09:34 AM	600	69	69	1.1
11:09:35 AM	600	69	68	1.1
11:09:36 AM	600	69	70	1.1
11:09:37 AM	600	69	68	1.0
11:09:38 AM	600	69	69	1.0
11:09:39 AM	600	69	69	1.0
11:09:40 AM	600	69	69	1.0
11:09:41 AM	600	69	68	1.0
Averages ->	**600**	**69**	**69**	**1.1**
			Maximum ->	**1.1**

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Valve Description: Fishbone Gasket

Thermal Cycle Number: 0 **Date** 11/6/2013

Time	Pressure (psig)	Temp. (deg. F)	Temp. (deg. F)	Leakage (PPMv)
5:39:08 PM	600	500	472	11.1
5:39:09 PM	600	500	473	10.9
5:39:10 PM	600	499	473	11.1
5:39:11 PM	600	500	473	11.3
5:39:12 PM	600	500	473	11.4
5:39:13 PM	600	500	474	11.3
5:39:14 PM	600	501	474	11.0
5:39:15 PM	600	500	473	11.1
5:39:16 PM	600	500	473	11.5
5:39:17 PM	600	500	473	11.4
5:39:18 PM	600	500	474	11.2
5:39:19 PM	600	500	473	11.0
5:39:20 PM	600	500	473	11.2
5:39:21 PM	600	500	474	11.7
5:39:22 PM	600	499	473	11.2
5:39:23 PM	600	500	474	11.3
5:39:24 PM	600	501	473	11.5
5:39:25 PM	600	501	472	11.6
5:39:26 PM	600	499	473	11.4
5:39:27 PM	600	501	473	11.1
5:39:28 PM	600	501	474	11.3
5:39:29 PM	600	501	473	11.7
5:39:30 PM	600	500	472	11.5
5:39:31 PM	600	500	473	11.2
5:39:32 PM	600	500	472	11.3
5:39:33 PM	600	500	473	11.6
5:39:34 PM	600	500	473	11.5
5:39:35 PM	600	501	473	11.2
5:39:35 PM	600	500	472	11.2
5:39:36 PM	600	501	474	11.3
5:39:37 PM	600	500	474	11.8
5:39:38 PM	600	501	473	11.6
5:39:39 PM	600	500	474	11.2
5:39:40 PM	600	501	473	11.4
5:39:41 PM	600	501	473	11.4
5:39:42 PM	600	500	473	11.7
5:39:43 PM	600	500	473	11.7
5:39:44 PM	600	500	473	11.3
5:39:45 PM	600	500	473	11.4
5:39:46 PM	600	500	473	11.8
5:39:47 PM	600	501	473	11.8
5:39:48 PM	600	500	473	11.2
5:39:49 PM	600	500	473	11.7
5:39:50 PM	600	501	474	11.9
5:39:51 PM	600	500	473	11.6
5:39:52 PM	600	500	473	11.5
5:39:53 PM	600	500	472	11.9
5:39:54 PM	600	500	472	11.9
5:39:55 PM	600	500	473	11.5
5:39:56 PM	600	500	473	11.6
5:39:57 PM	600	500	472	12.1
5:39:58 PM	600	500	473	11.8
5:39:59 PM	600	500	473	11.5
5:40:00 PM	600	500	474	12.0
5:40:01 PM	600	501	473	12.1
5:40:02 PM	600	500	473	11.5
5:40:03 PM	600	500	473	12.0
5:40:04 PM	600	500	473	12.1
5:40:05 PM	600	500	473	11.5
5:40:06 PM	600	500	473	11.8
Averages ->	**600**	**500**	**473**	**11.5**
			Maximum ->	**12.1**

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Valve Description: Fishbone Gasket

Thermal Cycle Number: 1 **Date** 11/7/2013

Time	Pressure (psig)	Temp. (deg. F)	Temp. (deg. F)	Leakage (PPMv)
10:25:33 AM	600	71	71	7.8
10:25:34 AM	600	72	70	7.8
10:25:35 AM	600	71	70	7.8
10:25:36 AM	600	71	71	7.8
10:25:37 AM	600	71	69	7.4
10:25:38 AM	600	71	70	7.0
10:25:39 AM	600	71	70	7.0
10:25:40 AM	600	72	69	7.3
10:25:41 AM	600	71	72	7.8
10:25:42 AM	600	72	69	8.6
10:25:43 AM	600	71	70	9.5
10:25:44 AM	600	71	70	10.0
10:25:45 AM	600	72	70	10.8
10:25:46 AM	600	71	69	11.3
10:25:47 AM	600	71	70	11.5
10:25:48 AM	600	71	70	12.0
10:25:49 AM	600	71	70	12.1
10:25:50 AM	600	71	70	12.1
10:25:51 AM	600	71	70	12.1
10:25:52 AM	600	71	70	12.1
10:25:53 AM	600	72	70	11.8
10:25:54 AM	600	71	70	11.4
10:25:55 AM	600	71	70	10.7
10:25:56 AM	600	71	70	10.7
10:25:57 AM	600	71	71	10.1
10:25:58 AM	600	71	71	9.8
10:25:59 AM	600	71	70	10.1
10:26:00 AM	600	71	70	10.4
10:26:01 AM	600	71	70	10.6
10:26:02 AM	600	71	69	10.1
10:26:03 AM	600	72	70	9.5
10:26:04 AM	600	71	70	9.2
10:26:05 AM	600	71	71	9.5
10:26:06 AM	600	72	70	10.1
10:26:07 AM	600	71	71	10.4
10:26:08 AM	600	71	70	10.4
10:26:09 AM	600	71	70	10.3
10:26:10 AM	600	71	70	10.3
10:26:11 AM	600	71	70	10.3
10:26:12 AM	600	71	70	10.8
10:26:13 AM	600	72	70	11.0
10:26:14 AM	600	71	70	11.4
10:26:15 AM	600	71	70	12.0
10:26:16 AM	600	71	70	12.3
10:26:17 AM	600	71	71	12.6
10:26:18 AM	600	71	70	12.4
10:26:19 AM	600	71	70	11.8
10:26:20 AM	600	71	69	11.3
10:26:21 AM	600	71	71	11.2
10:26:22 AM	600	71	71	11.0
10:26:23 AM	600	71	70	11.0
10:26:24 AM	600	70	70	10.6
10:26:25 AM	600	71	70	9.9
10:26:26 AM	600	71	71	9.5
10:26:27 AM	600	71	70	9.9
10:26:28 AM	600	71	70	10.5
10:26:29 AM	600	71	71	10.9
10:26:30 AM	600	71	71	12.5
10:26:31 AM	600	71	69	15.1
10:26:32 AM	600	71	70	14.9
Averages ->	**600**	**71**	**70**	**10.5**
			Maximum ->	**15.1**

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Valve Description: Fishbone Gasket

Thermal Cycle Number: 1 **Date** 11/7/2013

Time	Pressure (psig)	Temp. (deg. F)	Temp. (deg. F)	Leakage (PPMv)
1:52:43 PM	600	500	474	9.7
1:52:44 PM	600	500	474	9.7
1:52:44 PM	600	500	473	9.9
1:52:45 PM	600	500	475	9.8
1:52:46 PM	600	499	474	9.8
1:52:47 PM	600	500	473	10.0
1:52:48 PM	600	500	474	9.8
1:52:49 PM	600	499	474	9.8
1:52:50 PM	600	500	474	10.1
1:52:51 PM	600	500	474	9.9
1:52:52 PM	600	500	474	9.9
1:52:53 PM	600	500	473	10.1
1:52:54 PM	600	499	474	10.0
1:52:55 PM	600	500	474	9.8
1:52:56 PM	600	500	473	10.1
1:52:57 PM	600	500	474	10.1
1:52:58 PM	600	500	474	10.1
1:52:59 PM	600	500	473	9.9
1:53:00 PM	600	500	473	10.1
1:53:01 PM	600	499	473	10.1
1:53:02 PM	600	500	474	10.0
1:53:03 PM	600	500	473	10.0
1:53:04 PM	600	500	473	10.0
1:53:05 PM	600	499	473	9.8
1:53:06 PM	600	501	472	10.0
1:53:07 PM	600	500	473	10.2
1:53:08 PM	600	500	474	10.1
1:53:09 PM	600	500	474	10.0
1:53:10 PM	600	501	473	10.3
1:53:11 PM	600	500	474	10.0
1:53:12 PM	600	501	474	10.1
1:53:13 PM	600	500	475	10.3
1:53:14 PM	600	500	473	10.1
1:53:15 PM	600	501	475	10.2
1:53:16 PM	600	501	473	10.4
1:53:17 PM	600	500	474	10.1
1:53:18 PM	600	501	473	10.4
1:53:19 PM	600	500	473	10.4
1:53:20 PM	600	500	474	10.1
1:53:21 PM	600	501	474	10.5
1:53:22 PM	600	500	474	10.3
1:53:23 PM	600	500	473	10.3
1:53:24 PM	600	500	473	10.5
1:53:25 PM	600	500	474	10.2
1:53:26 PM	600	500	473	10.5
1:53:27 PM	600	500	473	10.3
1:53:28 PM	600	501	473	10.2
1:53:29 PM	600	500	473	10.6
1:53:30 PM	600	500	473	10.4
1:53:31 PM	600	501	474	10.6
1:53:32 PM	600	500	473	10.3
1:53:33 PM	600	500	473	10.5
1:53:34 PM	600	500	474	10.6
1:53:35 PM	600	500	474	10.3
1:53:36 PM	600	500	473	10.6
1:53:37 PM	600	500	474	10.3
1:53:38 PM	600	500	474	10.4
1:53:39 PM	600	500	474	10.5
1:53:40 PM	600	500	474	10.3
1:53:41 PM	600	500	475	10.6
Averages ->	**600**	**500**	**474**	**10.2**
			Maximum ->	**10.6**

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Valve Description: Fishbone Gasket

Thermal Cycle Number: 2 **Date** 11/8/2013

Time	Pressure (psig)	Temp. (deg. F)	Temp. (deg. F)	Leakage (PPMv)
10:31:09 AM	600	69	69	1.5
10:31:10 AM	600	69	68	1.5
10:31:11 AM	600	68	69	1.5
10:31:12 AM	600	70	70	1.5
10:31:13 AM	600	68	70	1.5
10:31:14 AM	600	70	68	1.5
10:31:15 AM	600	69	69	1.5
10:31:16 AM	600	70	69	1.5
10:31:17 AM	601	69	68	1.5
10:31:18 AM	600	69	70	1.5
10:31:19 AM	600	69	69	1.5
10:31:20 AM	600	69	68	1.4
10:31:21 AM	600	69	69	1.5
10:31:22 AM	600	69	68	1.5
10:31:23 AM	600	70	69	1.5
10:31:24 AM	600	70	70	1.5
10:31:25 AM	600	70	70	1.5
10:31:26 AM	600	68	68	1.5
10:31:27 AM	600	68	69	1.5
10:31:28 AM	600	69	68	1.4
10:31:29 AM	600	69	69	1.4
10:31:30 AM	600	69	69	1.4
10:31:31 AM	600	70	69	1.4
10:31:32 AM	600	68	69	1.4
10:31:33 AM	600	70	68	1.4
10:31:34 AM	600	70	69	1.4
10:31:35 AM	600	69	69	1.5
10:31:36 AM	600	69	69	1.5
10:31:37 AM	600	69	69	1.5
10:31:38 AM	600	70	69	1.5
10:31:39 AM	600	69	69	1.6
10:31:40 AM	600	69	68	1.6
10:31:41 AM	600	69	70	1.6
10:31:41 AM	600	69	69	1.6
10:31:42 AM	600	69	68	1.7
10:31:43 AM	600	69	69	1.7
10:31:44 AM	600	70	68	1.7
10:31:45 AM	600	68	68	1.7
10:31:46 AM	600	71	70	1.7
10:31:47 AM	600	69	69	1.7
10:31:48 AM	600	69	68	1.7
10:31:49 AM	600	68	68	1.7
10:31:50 AM	600	68	70	1.7
10:31:51 AM	600	68	69	1.7
10:31:52 AM	600	69	67	1.7
10:31:53 AM	600	69	69	1.7
10:31:54 AM	600	69	70	1.7
10:31:55 AM	600	70	69	1.8
10:31:56 AM	600	69	68	1.8
10:31:57 AM	600	69	67	1.8
10:31:58 AM	600	68	68	1.7
10:31:59 AM	600	69	68	1.7
10:32:00 AM	600	68	69	1.7
10:32:01 AM	600	69	68	1.8
10:32:02 AM	600	69	69	1.8
10:32:03 AM	600	69	69	1.8
10:32:04 AM	600	69	70	1.8
10:32:05 AM	600	69	68	1.9
10:32:06 AM	600	70	68	2.0
10:32:07 AM	600	70	68	2.0
Averages ->	**600**	**69**	**69**	**1.6**
			Maximum ->	**2.0**

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Valve Description: Fishbone Gasket

Thermal Cycle Number: 2 **Date** 11/8/2013

Time	Pressure (psig)	Temp. (deg. F)	Temp. (deg. F)	Leakage (PPMv)
3:48:05 PM	600	500	456	7.3
3:48:06 PM	600	499	458	7.3
3:48:07 PM	600	500	456	7.3
3:48:08 PM	600	500	458	7.4
3:48:09 PM	600	500	457	7.4
3:48:10 PM	600	500	457	7.4
3:48:11 PM	600	500	458	7.4
3:48:12 PM	600	500	456	7.5
3:48:13 PM	600	500	456	7.5
3:48:14 PM	600	500	457	7.4
3:48:15 PM	600	500	457	7.5
3:48:16 PM	600	499	457	7.5
3:48:17 PM	600	500	456	7.5
3:48:18 PM	600	500	457	7.5
3:48:19 PM	600	500	456	7.5
3:48:20 PM	600	500	458	7.5
3:48:21 PM	600	500	457	7.5
3:48:22 PM	600	500	458	7.6
3:48:23 PM	600	500	457	7.6
3:48:24 PM	600	500	457	7.6
3:48:25 PM	600	500	457	7.6
3:48:26 PM	600	500	457	7.6
3:48:27 PM	600	500	457	7.6
3:48:28 PM	600	500	457	7.6
3:48:29 PM	600	500	458	7.6
3:48:30 PM	600	500	457	7.6
3:48:31 PM	600	500	458	7.6
3:48:32 PM	600	500	458	7.6
3:48:32 PM	600	501	458	7.6
3:48:33 PM	600	500	456	7.6
3:48:34 PM	600	500	457	7.7
3:48:35 PM	600	500	457	7.7
3:48:36 PM	600	500	457	7.7
3:48:37 PM	600	501	457	7.7
3:48:38 PM	600	501	456	7.7
3:48:39 PM	600	500	457	7.7
3:48:40 PM	600	500	457	7.7
3:48:41 PM	600	500	457	7.7
3:48:42 PM	600	499	457	7.7
3:48:43 PM	600	501	458	7.7
3:48:44 PM	600	501	458	7.7
3:48:45 PM	600	500	457	7.7
3:48:46 PM	600	500	458	7.7
3:48:47 PM	600	500	457	7.7
3:48:48 PM	600	500	457	7.7
3:48:49 PM	600	500	458	7.7
3:48:50 PM	600	500	458	7.7
3:48:51 PM	600	500	458	7.7
3:48:52 PM	600	500	457	7.8
3:48:53 PM	600	500	457	7.8
3:48:54 PM	600	500	458	7.8
3:48:55 PM	600	500	458	7.8
3:48:56 PM	600	500	457	7.8
3:48:57 PM	600	500	458	7.8
3:48:58 PM	600	500	457	7.8
3:48:59 PM	600	500	458	7.8
3:49:00 PM	600	500	458	7.8
3:49:01 PM	600	501	458	7.8
3:49:02 PM	600	500	457	7.8
3:49:03 PM	600	500	458	7.9
Averages ->	**600**	**500**	**457**	**7.6**
			Maximum ->	**7.9**

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Valve Description: Fishbone Gasket

Thermal Cycle Number: 3 **Date** 11/11/2013

Time	Pressure (psig)	Temp. (deg. F)	Temp. (deg. F)	Leakage (PPMv)
10:32:48 AM	600	66	66	3.3
10:32:49 AM	600	67	65	3.5
10:32:50 AM	600	67	65	3.5
10:32:51 AM	600	66	65	3.7
10:32:52 AM	600	67	66	3.8
10:32:53 AM	600	66	66	4.0
10:32:54 AM	600	66	66	4.1
10:32:55 AM	600	67	65	4.4
10:32:56 AM	600	66	66	4.6
10:32:57 AM	600	66	66	4.9
10:32:58 AM	600	67	67	5.2
10:32:59 AM	600	67	67	5.2
10:33:00 AM	600	66	66	5.4
10:33:01 AM	600	66	65	5.6
10:33:02 AM	600	66	66	5.9
10:33:03 AM	600	65	66	6.1
10:33:04 AM	600	66	65	6.3
10:33:05 AM	600	66	66	6.5
10:33:06 AM	600	66	66	6.7
10:33:07 AM	600	67	66	6.9
10:33:08 AM	600	66	66	6.9
10:33:09 AM	600	66	66	6.9
10:33:10 AM	600	66	66	6.9
10:33:11 AM	600	67	65	6.8
10:33:12 AM	600	66	66	6.8
10:33:13 AM	600	66	66	6.7
10:33:14 AM	600	66	66	6.6
10:33:15 AM	600	66	65	6.4
10:33:16 AM	600	65	66	6.3
10:33:17 AM	600	65	66	6.2
10:33:18 AM	600	66	66	6.2
10:33:19 AM	600	67	66	6.1
10:33:20 AM	600	66	64	6.1
10:33:21 AM	600	67	66	6.2
10:33:22 AM	600	67	67	6.2
10:33:23 AM	600	66	66	6.3
10:33:24 AM	600	67	66	6.5
10:33:25 AM	600	67	66	6.6
10:33:26 AM	600	66	66	6.7
10:33:27 AM	600	66	66	6.8
10:33:28 AM	600	66	65	6.9
10:33:29 AM	600	66	66	6.9
10:33:30 AM	600	66	65	6.9
10:33:31 AM	600	66	66	6.9
10:33:32 AM	600	66	67	6.9
10:33:33 AM	600	67	65	6.9
10:33:34 AM	600	66	66	6.8
10:33:35 AM	600	66	66	6.7
10:33:36 AM	600	66	66	6.6
10:33:37 AM	600	66	66	6.4
10:33:38 AM	600	66	66	6.4
10:33:38 AM	600	66	66	6.3
10:33:39 AM	600	66	65	6.1
10:33:40 AM	600	67	66	6.0
10:33:41 AM	600	66	66	5.9
10:33:42 AM	600	66	66	5.8
10:33:43 AM	600	66	66	5.7
10:33:44 AM	600	66	65	5.6
10:33:45 AM	600	66	65	5.6
10:33:46 AM	600	66	65	5.7
Averages ->	**600**	**66**	**66**	**5.9**
			Maximum ->	**6.9**

Yarmouth Research and Technology, LLC

Valve Description: Fishbone Gasket

Thermal Cycle Number: 3 **Date** 11/11/2013

Time	Pressure (psig)	Temp. (deg. F)	Temp. (deg. F)	Leakage (PPMv)
3:24:43 PM	600	500	459	3.5
3:24:44 PM	600	499	457	3.5
3:24:45 PM	600	499	458	3.4
3:24:46 PM	600	499	458	3.4
3:24:47 PM	600	499	457	3.5
3:24:48 PM	600	499	456	3.5
3:24:49 PM	600	500	459	3.5
3:24:50 PM	600	499	459	3.5
3:24:51 PM	600	500	458	3.5
3:24:52 PM	600	499	458	3.5
3:24:53 PM	600	499	457	3.5
3:24:54 PM	600	499	458	3.5
3:24:55 PM	600	500	458	3.5
3:24:56 PM	600	500	458	3.5
3:24:57 PM	600	500	458	3.5
3:24:58 PM	600	499	458	3.5
3:24:59 PM	600	499	458	3.5
3:25:00 PM	600	500	459	3.5
3:25:01 PM	600	500	458	3.5
3:25:02 PM	600	500	459	3.4
3:25:03 PM	600	500	458	3.4
3:25:04 PM	600	500	459	3.4
3:25:05 PM	600	500	459	3.4
3:25:06 PM	600	500	458	3.4
3:25:07 PM	600	500	459	3.4
3:25:08 PM	600	499	459	3.4
3:25:09 PM	600	499	458	3.4
3:25:10 PM	600	499	457	3.4
3:25:11 PM	600	499	459	3.4
3:25:12 PM	600	499	458	3.4
3:25:13 PM	600	499	458	3.4
3:25:14 PM	600	500	459	3.4
3:25:15 PM	600	499	459	3.4
3:25:16 PM	600	500	459	3.4
3:25:17 PM	600	500	458	3.4
3:25:18 PM	600	500	458	3.4
3:25:19 PM	600	498	458	3.4
3:25:20 PM	600	500	459	3.4
3:25:21 PM	600	500	457	3.4
3:25:22 PM	600	498	459	3.4
3:25:23 PM	600	500	458	3.4
3:25:24 PM	600	499	460	3.4
3:25:25 PM	600	499	458	3.4
3:25:26 PM	600	499	458	3.4
3:25:26 PM	600	499	458	3.4
3:25:27 PM	600	499	458	3.4
3:25:28 PM	600	500	458	3.4
3:25:29 PM	600	499	459	3.4
3:25:30 PM	600	499	458	3.4
3:25:31 PM	600	500	457	3.4
3:25:32 PM	600	500	458	3.4
3:25:33 PM	600	500	458	3.4
3:25:34 PM	600	499	459	3.4
3:25:35 PM	600	500	458	3.4
3:25:36 PM	600	500	458	3.4
3:25:37 PM	600	500	459	3.4
3:25:38 PM	600	499	457	3.4
3:25:39 PM	600	499	459	3.4
3:25:40 PM	600	500	457	3.4
3:25:41 PM	600	500	458	3.4
Averages ->	**600**	**499**	**458**	**3.4**
			Maximum ->	**3.5**

Yarmouth Research and Technology, LLC

Valve Description: Fishbone Gasket

Thermal Cycle Number: 4 **Date** 11/12/2013

Time	Pressure (psig)	Temp. (deg. F)	Temp. (deg. F)	Leakage (PPMv)
10:24:16 AM	600	72	71	2.7
10:24:17 AM	600	72	72	2.7
10:24:18 AM	600	72	71	2.7
10:24:19 AM	600	71	72	2.7
10:24:20 AM	600	72	71	2.7
10:24:21 AM	600	73	70	2.7
10:24:22 AM	600	73	71	2.7
10:24:23 AM	600	72	72	2.7
10:24:24 AM	600	72	72	2.7
10:24:25 AM	600	71	71	2.7
10:24:26 AM	600	71	71	2.7
10:24:27 AM	600	72	71	2.7
10:24:28 AM	600	72	71	2.7
10:24:29 AM	600	72	72	2.7
10:24:30 AM	600	71	71	2.7
10:24:31 AM	600	72	72	2.7
10:24:32 AM	600	72	71	2.7
10:24:33 AM	600	71	71	2.7
10:24:34 AM	600	72	72	2.7
10:24:35 AM	600	72	72	2.7
10:24:36 AM	600	72	72	2.7
10:24:37 AM	600	72	72	2.7
10:24:38 AM	600	72	71	2.7
10:24:39 AM	600	73	71	2.7
10:24:40 AM	600	72	72	2.7
10:24:41 AM	600	72	71	2.7
10:24:42 AM	600	71	71	2.7
10:24:43 AM	600	72	72	2.7
10:24:44 AM	600	72	71	2.7
10:24:45 AM	600	72	71	2.7
10:24:46 AM	600	72	71	2.7
10:24:47 AM	600	73	71	2.7
10:24:48 AM	600	72	72	2.7
10:24:49 AM	600	73	71	2.7
10:24:50 AM	600	73	70	2.7
10:24:51 AM	600	72	71	2.7
10:24:52 AM	600	72	72	2.7
10:24:53 AM	600	72	71	2.7
10:24:54 AM	600	72	71	2.7
10:24:55 AM	600	72	72	2.7
10:24:56 AM	600	71	70	2.7
10:24:57 AM	600	71	70	2.7
10:24:58 AM	600	72	72	2.7
10:24:59 AM	600	72	71	2.7
10:25:00 AM	600	72	71	2.7
10:25:01 AM	600	72	71	2.7
10:25:02 AM	600	72	72	2.7
10:25:03 AM	600	72	72	2.7
10:25:04 AM	600	72	71	2.7
10:25:05 AM	600	72	71	2.7
10:25:06 AM	600	72	71	2.7
10:25:07 AM	600	73	71	2.7
10:25:08 AM	600	73	71	2.7
10:25:09 AM	600	72	70	2.7
10:25:10 AM	600	72	71	2.7
10:25:11 AM	600	72	72	2.7
10:25:12 AM	600	72	72	2.7
10:25:13 AM	600	71	71	2.7
10:25:14 AM	600	72	71	2.6
10:25:15 AM	600	72	73	2.6
Averages ->	**600**	**72**	**71**	**2.7**
			Maximum ->	**2.7**

Yarmouth Research and Technology, LLC

Valve Description: Fishbone Gasket

Thermal Cycle Number: 4 **Date** 11/12/2013

Time	Pressure (psig)	Temp. (deg. F)	Temp. (deg. F)	Leakage (PPMv)
2:07:06 PM	600	500	440	5.9
2:07:07 PM	600	500	440	5.9
2:07:08 PM	600	499	441	5.9
2:07:09 PM	600	499	440	5.9
2:07:10 PM	600	500	441	6.0
2:07:11 PM	600	499	440	6.0
2:07:12 PM	600	499	441	6.0
2:07:13 PM	600	500	440	6.1
2:07:13 PM	600	500	441	6.1
2:07:14 PM	600	500	440	6.1
2:07:15 PM	600	499	440	6.1
2:07:16 PM	600	499	441	6.1
2:07:17 PM	600	500	440	6.0
2:07:18 PM	600	499	441	6.1
2:07:19 PM	600	499	440	6.0
2:07:20 PM	600	500	441	6.0
2:07:21 PM	600	500	440	6.1
2:07:22 PM	600	500	441	6.0
2:07:23 PM	600	500	440	6.1
2:07:24 PM	600	500	440	6.1
2:07:25 PM	600	499	441	6.1
2:07:26 PM	600	500	440	6.1
2:07:27 PM	600	500	441	6.2
2:07:28 PM	600	500	441	6.1
2:07:29 PM	600	500	441	6.2
2:07:30 PM	600	499	442	6.2
2:07:31 PM	600	500	441	6.2
2:07:32 PM	600	499	441	6.2
2:07:33 PM	600	500	441	6.2
2:07:34 PM	600	500	440	6.2
2:07:35 PM	600	499	440	6.3
2:07:36 PM	600	500	441	6.3
2:07:37 PM	600	499	440	6.2
2:07:38 PM	600	500	441	6.2
2:07:39 PM	600	499	441	6.2
2:07:40 PM	600	500	440	6.2
2:07:41 PM	600	499	440	6.1
2:07:42 PM	600	500	440	6.1
2:07:43 PM	600	500	441	6.1
2:07:44 PM	600	500	441	6.0
2:07:45 PM	600	500	440	6.0
2:07:46 PM	600	500	440	6.0
2:07:47 PM	600	499	441	6.0
2:07:48 PM	600	500	441	6.1
2:07:49 PM	600	500	442	6.1
2:07:50 PM	600	500	441	6.1
2:07:51 PM	600	501	442	6.2
2:07:52 PM	600	499	440	6.2
2:07:53 PM	600	501	441	6.2
2:07:54 PM	600	500	440	6.3
2:07:55 PM	600	500	440	6.3
2:07:56 PM	600	499	441	6.3
2:07:57 PM	600	500	440	6.4
2:07:58 PM	600	500	441	6.4
2:07:59 PM	600	499	441	6.4
2:08:00 PM	600	499	441	6.4
2:08:01 PM	600	499	442	6.4
2:08:02 PM	600	500	441	6.4
2:08:03 PM	600	499	440	6.4
2:08:04 PM	599	499	441	6.4
Averages ->	**600**	**500**	**441**	**6.1**
			Maximum ->	**6.4**

Yarmouth Research and Technology, LLC

Valve Description: Fishbone Gasket

Thermal Cycle Number: 5 **Date** 11/13/2013

Time	Pressure (psig)	Temp. (deg. F)	Temp. (deg. F)	Leakage (PPMv)
12:24:51 PM	600	68	68	10.7
12:24:52 PM	600	69	67	10.8
12:24:53 PM	600	68	67	10.9
12:24:54 PM	600	68	68	11.0
12:24:55 PM	600	68	68	11.1
12:24:56 PM	600	68	67	11.3
12:24:57 PM	600	69	68	11.4
12:24:58 PM	600	68	68	11.4
12:24:58 PM	600	68	68	11.4
12:24:59 PM	600	69	68	11.1
12:25:00 PM	600	67	68	11.0
12:25:01 PM	600	67	67	10.8
12:25:02 PM	600	67	69	10.6
12:25:03 PM	600	69	68	10.3
12:25:04 PM	600	69	67	10.2
12:25:05 PM	600	69	68	10.1
12:25:06 PM	600	68	67	10.0
12:25:07 PM	600	69	68	9.9
12:25:08 PM	600	69	67	9.8
12:25:09 PM	600	68	67	9.7
12:25:10 PM	600	69	68	9.8
12:25:11 PM	600	67	68	9.7
12:25:12 PM	600	68	68	9.8
12:25:13 PM	600	67	67	9.7
12:25:14 PM	600	69	69	9.6
12:25:15 PM	600	68	68	9.7
12:25:16 PM	600	69	67	9.7
12:25:17 PM	600	68	67	9.6
12:25:18 PM	600	68	68	9.5
12:25:19 PM	600	68	68	9.7
12:25:20 PM	600	68	68	9.8
12:25:21 PM	600	68	68	10.0
12:25:22 PM	600	68	68	10.0
12:25:23 PM	600	68	68	10.2
12:25:24 PM	600	68	68	10.3
12:25:25 PM	600	68	68	10.5
12:25:26 PM	600	68	68	10.5
12:25:27 PM	600	68	68	10.6
12:25:28 PM	600	68	68	10.8
12:25:29 PM	600	68	69	10.7
12:25:30 PM	600	69	68	10.9
12:25:31 PM	600	68	68	11.1
12:25:32 PM	600	68	68	11.4
12:25:33 PM	600	68	67	12.0
12:25:34 PM	600	68	68	12.7
12:25:35 PM	600	68	68	13.0
12:25:36 PM	600	68	67	13.1
12:25:37 PM	600	69	68	13.3
12:25:38 PM	600	68	66	12.7
12:25:39 PM	600	68	66	12.7
12:25:40 PM	600	68	68	12.1
12:25:41 PM	600	68	68	11.5
12:25:42 PM	600	68	67	10.9
12:25:43 PM	600	68	68	10.4
12:25:44 PM	600	68	67	9.8
12:25:45 PM	600	68	68	9.2
12:25:46 PM	600	68	68	8.7
12:25:47 PM	600	68	68	8.6
12:25:48 PM	600	69	69	8.0
12:25:49 PM	600	68	68	7.9
Averages ->	**600**	**68**	**68**	**10.6**
			Maximum ->	**13.3**