

Fire Test Report
API Standard 6FB, Third Edition

Performed for

Garlock Pipeline Technologies

<http://www.gptindustries.com>



2 inch Class 300 VCFS Gasket
2 mil Dielectric Film w/1 mil Adhesive Both Sides

Project Number: 215082
Test Date: March 24, 2015



Performed by

YARMOUTH RESEARCH AND TECHNOLOGY, LLC

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Yarmouth Research and Technology, LLC

API 6FB FIRE TEST REPORT

Customer:	Garlock Pipeline Technologies	Date:	3/24/2015
Project Number:	215082		
Product Code:	2 inch Class 300 VCFS Gasket		
	2 mil Dielectric Film w/ 1 mil Adhesive both sides		
Specification:	API 6FB, Third Edition, Nov. 1998 (R 2011)		
	Non-Bending, On-shore Test		
Gasket Thickness:	0.316	inches	
Seal Area OD:	2.813	Seal Area ID:	2.313 inches
Mean Seal Diameter:	2.563	inches	
Mean Circumference:	8.1	inches	
Allowable Leakage:	8.1	ml/min	
Nominal Test Pressure:	555	psig	
YRT Technician:	Matthew J. Wasielewski, P.E.		
	Version of YRT's FIRE-Control 6FB Software:	A	
	Equipment Confirmed to be in Calibration to NIST Standards:	Yes	

Burn and Cool Down Test

Burn Start Time:	9:04:00	
Burn / Cooldown Duration:	60	minutes
Average Pressure During Burn/Cooldown:	554	psig
Leak Rate During Burn/Cool Down:	0	ml/min
Allowable External Leak Rate:	8.1	ml/min
Amount of Time of Avg. Cal. Block > 1200 deg.:	20.3	minutes
Were Test Conditions Within Compliance?	Yes	

Was the Leakage Below the Allowable?	Yes
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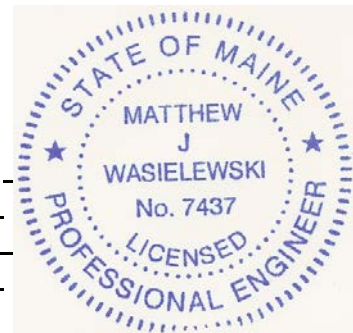
Depressurization - Re-pressurization Test

Average Pressure During Test:	554	psig
Gasket Leak Rate:	0	ml/min
Allowable External Leak Rate:	8.1	ml/min
Was the Leakage Below the Allowable?	Yes	
Does the Gasket Pass or Fail API 6FB?	PASS	

Certified By:



Matthew J. Wasielewski, PE
President and Manager
Yarmouth Research and Technology, LLC



Temperature verses Time Chart

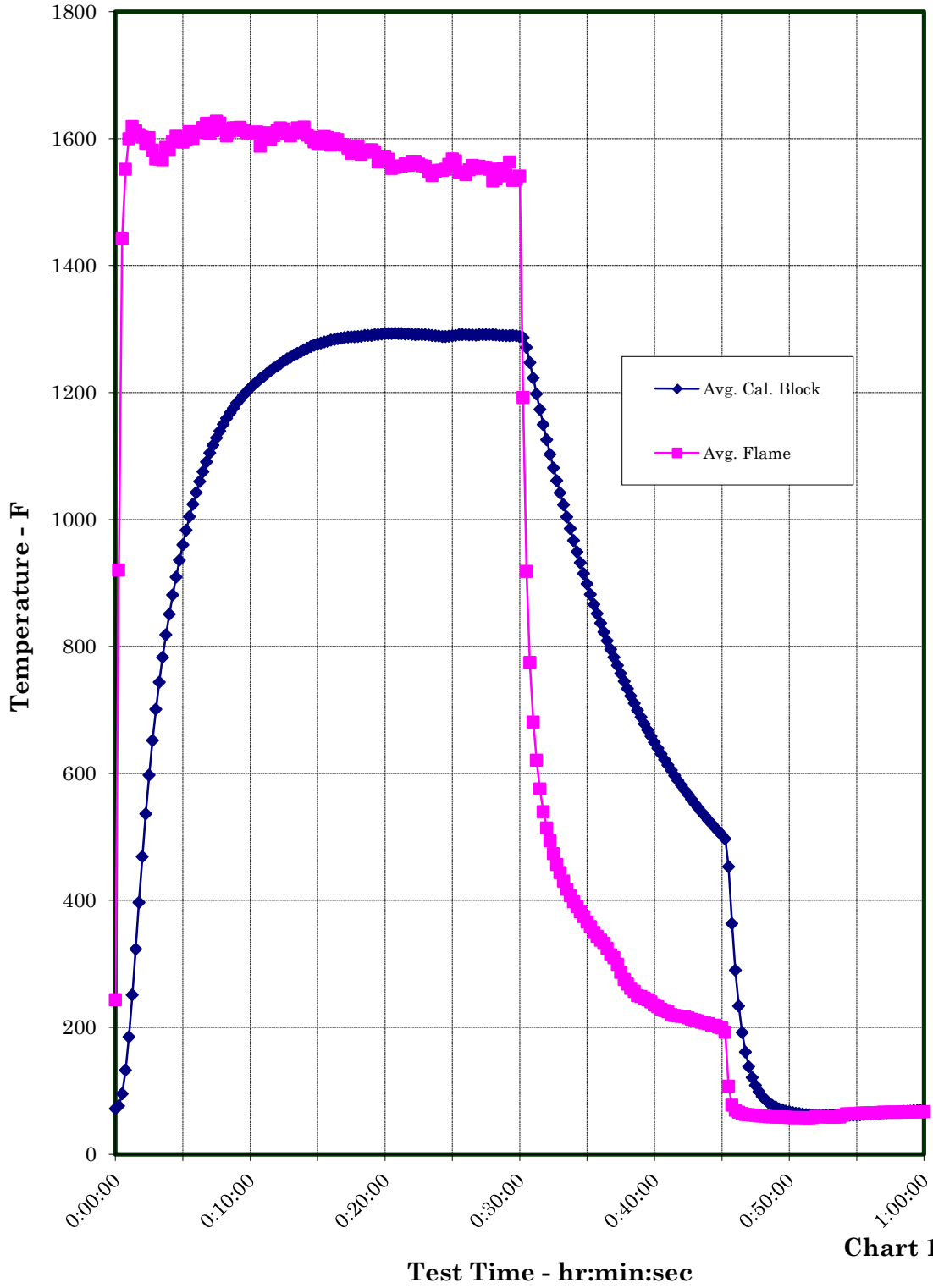
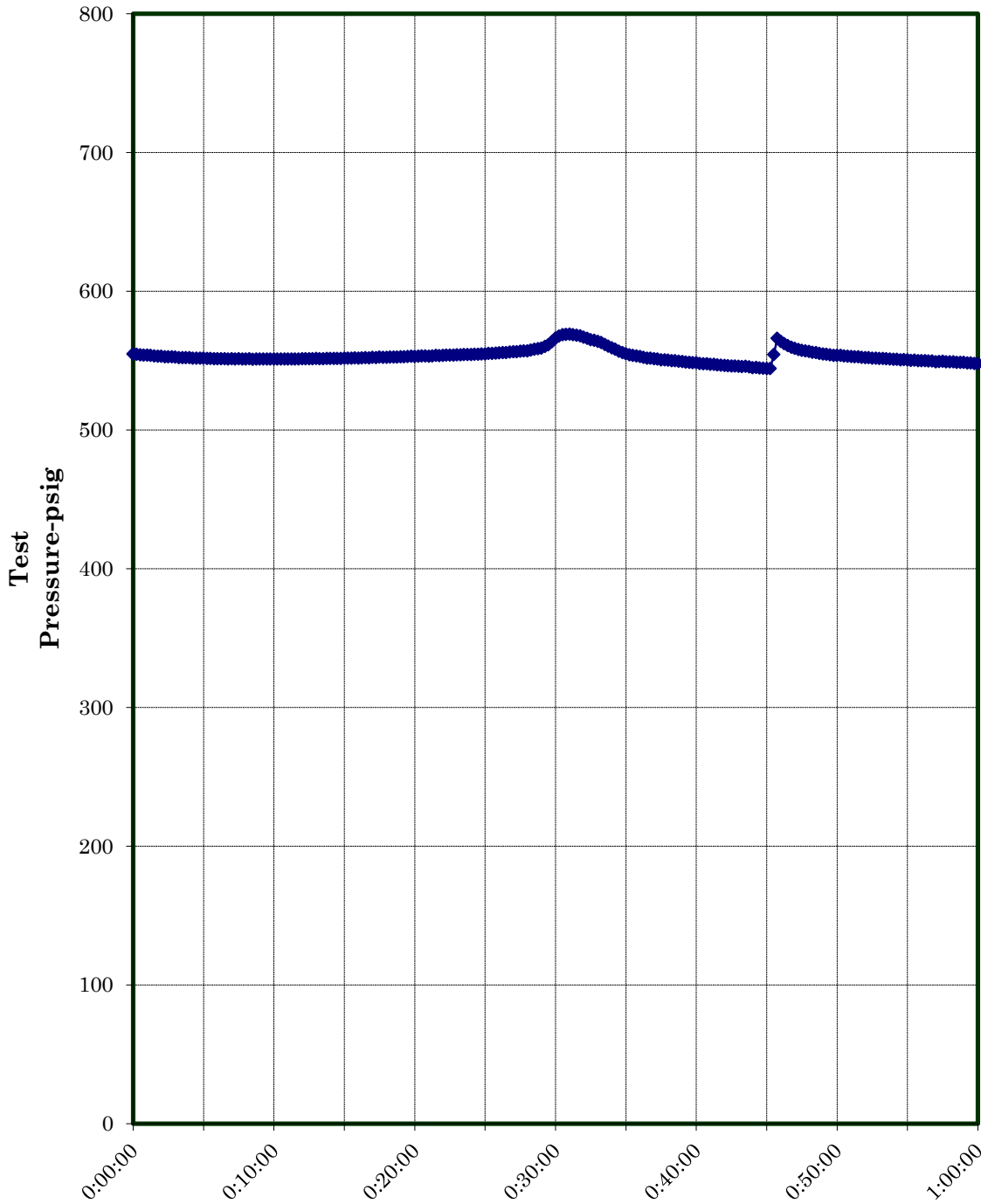


Chart 1

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Pressure versus Time Chart



Test Time - hr:min:sec

Chart 2

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Test Gasket Prior to Burn

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Test Setup Prior to Burn



Test Gasket During Burn



Test Gasket During Burn



Test Gasket Post-Burn

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Fire Test Information

Customer: Garlock Pipeline Technologies

Test Date: 3/24/2015

Product Code: 2 inch Class 300 VCFS Gasket

Project Number: 215082

Fire Test Raw Data

Time	Pressure (psig)	Water Volume (mls)	Cal. 1 Block Temp - F	Cal. 2 Block Temp - F	Cal. 3 Block Temp - F	Average Block Temp - F	Flame 1 Temp - F	Flame 2 Temp - F	Flame 3 Temp - F	Average Flame Temp - F
9:04:00	555	41103	73	74	68	72	225	338	167	243
9:04:15	555	41388	78	79	71	76	992	1006	763	920
9:04:30	554	41247	101	98	86	95	1476	1543	1309	1443
9:04:45	554	41393	142	138	117	132	1560	1667	1427	1551
9:05:00	554	41364	196	198	160	185	1617	1705	1477	1600
9:05:15	554	41376	260	278	215	251	1635	1710	1512	1619
9:05:30	553	41383	326	369	274	323	1593	1716	1527	1612
9:05:45	553	41206	391	464	335	397	1596	1727	1495	1606
9:06:00	553	41285	453	558	395	469	1585	1734	1488	1602
9:06:15	553	41409	510	646	452	536	1564	1742	1471	1592
9:06:30	553	41191	560	726	506	597	1570	1742	1492	1601
9:06:45	553	41070	605	795	555	652	1534	1741	1470	1582
9:07:00	553	41162	644	856	602	701	1535	1741	1427	1568
9:07:15	552	41232	679	909	643	744	1515	1752	1436	1568
9:07:30	552	41350	711	956	681	783	1528	1743	1428	1566
9:07:45	552	41329	740	999	716	818	1547	1756	1455	1586
9:08:00	552	41267	767	1037	748	851	1539	1757	1452	1583
9:08:15	552	41308	793	1071	779	881	1591	1749	1446	1595
9:08:30	552	41333	818	1102	808	909	1569	1758	1484	1604
9:08:45	552	41311	842	1130	835	936	1562	1756	1467	1595
9:09:00	552	41333	863	1156	861	960	1589	1744	1450	1594
9:09:15	551	41318	884	1180	885	983	1577	1748	1469	1598
9:09:30	552	41344	904	1203	906	1004	1598	1761	1473	1611
9:09:45	551	41339	922	1224	926	1024	1572	1755	1473	1600
9:10:00	551	41374	939	1243	945	1042	1590	1763	1477	1610
9:10:15	551	41156	955	1261	963	1060	1600	1762	1469	1610
9:10:30	551	41184	971	1276	979	1075	1606	1762	1484	1617

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9:10:45	551	41392	986	1290	995	1090	1609	1769	1494	1624
9:11:00	551	41384	1000	1304	1010	1105	1568	1767	1490	1608
9:11:15	551	41548	1011	1316	1024	1117	1587	1763	1488	1613
9:11:30	551	41365	1022	1327	1036	1128	1617	1759	1506	1627
9:11:45	551	41282	1033	1337	1048	1139	1624	1761	1488	1624
9:12:00	551	41347	1045	1346	1059	1150	1622	1756	1467	1615
9:12:15	551	41244	1055	1354	1069	1159	1565	1753	1494	1604
9:12:30	551	41522	1063	1362	1078	1168	1582	1763	1490	1612
9:12:45	551	41592	1070	1368	1087	1175	1592	1765	1494	1617
9:13:00	551	41239	1077	1375	1097	1183	1600	1761	1489	1617
9:13:15	551	41343	1083	1380	1105	1189	1591	1760	1502	1618
9:13:30	551	41568	1090	1384	1113	1196	1592	1758	1488	1613
9:13:45	551	41366	1095	1389	1120	1201	1567	1765	1495	1609
9:14:00	551	41421	1100	1394	1127	1207	1575	1763	1489	1609
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9:14:30	551	41514	1108	1403	1139	1217	1557	1762	1512	1610
9:14:45	551	41355	1111	1407	1147	1222	1498	1746	1519	1588
9:15:00	551	41597	1112	1410	1154	1225	1517	1749	1556	1607
9:15:15	551	41490	1114	1413	1162	1230	1535	1741	1552	1609
9:15:30	551	41490	1117	1417	1169	1234	1548	1733	1514	1598
9:15:45	551	41540	1120	1420	1175	1238	1564	1738	1511	1604
9:16:00	551	41496	1122	1424	1179	1242	1582	1751	1506	1613
9:16:15	551	41515	1126	1427	1183	1245	1579	1748	1523	1617
9:16:30	551	41478	1130	1430	1188	1249	1574	1752	1519	1615
9:16:45	551	41493	1133	1434	1192	1253	1576	1739	1507	1607
9:17:00	552	41531	1135	1437	1195	1256	1576	1745	1491	1604
9:17:15	551	41583	1138	1441	1198	1259	1584	1752	1493	1610
9:17:30	551	41619	1141	1443	1201	1262	1598	1755	1497	1617
9:17:45	552	41602	1143	1447	1203	1264	1574	1764	1495	1611
9:18:00	552	41589	1146	1450	1206	1267	1581	1767	1506	1618
9:18:15	552	41586	1148	1453	1209	1270	1558	1759	1500	1606
9:18:30	552	41629	1150	1456	1211	1272	1553	1757	1496	1602
9:18:45	552	41617	1150	1459	1214	1274	1537	1759	1488	1595
9:19:00	552	41595	1152	1462	1216	1277	1542	1753	1483	1593
9:19:15	552	41579	1152	1464	1218	1278	1533	1756	1487	1592
9:19:30	552	41583	1152	1467	1220	1280	1560	1764	1485	1603
9:19:45	552	41671	1153	1468	1221	1281	1546	1755	1503	1601
9:20:00	552	41675	1154	1470	1224	1283	1535	1754	1479	1589

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9:20:15	552	41616	1154	1471	1225	1283	1564	1760	1475	1600
9:20:30	552	41659	1155	1473	1226	1285	1557	1763	1475	1598
9:20:45	552	41601	1156	1474	1227	1286	1540	1765	1467	1591
9:21:00	552	41737	1156	1475	1229	1287	1530	1759	1480	1590
9:21:15	552	41628	1156	1476	1230	1287	1533	1751	1471	1585
9:21:30	553	41663	1155	1477	1231	1288	1516	1752	1462	1577
9:21:45	552	41705	1155	1477	1231	1288	1527	1750	1464	1580
9:22:00	552	41706	1155	1478	1232	1288	1525	1753	1487	1588
9:22:15	552	41718	1155	1478	1233	1289	1524	1743	1458	1575
9:22:30	552	41730	1155	1480	1234	1290	1527	1750	1458	1578
9:22:45	553	41738	1154	1481	1234	1290	1523	1748	1474	1582
9:23:00	553	41752	1153	1482	1235	1290	1513	1746	1488	1582
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9:23:30	553	41763	1152	1484	1238	1291	1475	1747	1467	1563
9:23:45	553	41764	1151	1486	1239	1292	1488	1740	1482	1570
9:24:00	553	41772	1150	1486	1242	1293	1498	1744	1474	1572
9:24:15	553	41803	1149	1487	1242	1293	1495	1754	1453	1567
9:24:30	553	41790	1148	1488	1243	1293	1491	1747	1421	1553
9:24:45	553	41842	1149	1489	1242	1293	1504	1738	1422	1555
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9:25:15	553	41834	1148	1489	1241	1293	1478	1750	1442	1557
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9:26:00	554	41882	1144	1489	1242	1292	1496	1748	1448	1564
9:26:15	554	41897	1143	1489	1241	1291	1508	1739	1445	1564
9:26:30	554	41861	1144	1488	1243	1292	1498	1745	1436	1560
9:26:45	554	41919	1143	1489	1242	1291	1494	1740	1437	1557
9:27:00	554	41902	1143	1488	1243	1291	1489	1745	1434	1556
9:27:15	554	41907	1142	1488	1242	1291	1493	1742	1410	1548
9:27:30	554	41900	1141	1488	1241	1290	1482	1737	1406	1542
9:27:45	554	41927	1140	1487	1241	1289	1468	1742	1435	1548
9:28:00	554	41934	1139	1487	1241	1289	1468	1739	1442	1550
9:28:15	555	41973	1137	1486	1242	1288	1473	1740	1437	1550
9:28:30	555	41977	1137	1486	1242	1288	1478	1736	1441	1552
9:28:45	555	41969	1136	1487	1243	1289	1490	1743	1444	1559
9:29:00	555	41980	1136	1488	1244	1289	1501	1741	1461	1568
9:29:15	555	41993	1136	1489	1245	1290	1479	1740	1475	1565
9:29:30	555	42013	1136	1490	1247	1291	1480	1734	1427	1547

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9:29:45	555	42031	1135	1491	1247	1291	1464	1727	1450	1547
9:30:00	556	42017	1133	1492	1248	1291	1454	1732	1443	1543
9:30:15	556	42052	1131	1492	1249	1291	1448	1724	1480	1551
9:30:30	556	42078	1129	1492	1251	1291	1462	1733	1478	1558
9:30:45	556	42062	1127	1492	1252	1290	1476	1742	1440	1553
9:31:00	556	42118	1127	1493	1253	1291	1455	1738	1476	1556
9:31:15	556	42121	1126	1493	1254	1291	1468	1724	1471	1554
9:31:30	557	42122	1125	1493	1255	1291	1450	1721	1492	1554
9:31:45	557	42145	1124	1493	1257	1291	1445	1732	1477	1551
9:32:00	557	42199	1123	1493	1258	1291	1441	1729	1429	1533
9:32:15	558	42203	1121	1493	1258	1291	1433	1729	1448	1537
9:32:30	558	42202	1119	1493	1257	1290	1438	1737	1480	1552
9:32:45	559	42236	1118	1492	1259	1290	1444	1736	1477	1552
9:33:00	559	42276	1116	1492	1260	1289	1449	1725	1450	1541
9:33:15	560	42350	1116	1491	1261	1289	1485	1727	1477	1563
9:33:30	561	42411	1116	1491	1262	1290	1455	1718	1429	1534
9:33:45	564	42495	1116	1491	1261	1289	1459	1717	1433	1536
9:34:00	566	42623	1115	1490	1260	1288	1437	1738	1447	1541
9:34:15	568	42732	1113	1488	1259	1287	1167	1297	1113	1192
9:34:30	569	42804	1102	1464	1247	1271	940	952	862	918
9:34:45	569	42816	1084	1432	1225	1247	820	773	731	775
9:35:00	569	42809	1064	1403	1201	1223	743	658	642	681
9:35:15	569	42831	1043	1374	1176	1198	693	582	587	621
9:35:30	568	42807	1023	1345	1152	1173	653	530	543	575
9:35:45	568	42809	1003	1317	1128	1149	618	491	510	540
9:36:00	567	42792	984	1288	1105	1126	595	460	487	514
9:36:15	566	42778	965	1261	1082	1103	574	440	467	494
9:36:30	565	42709	947	1235	1062	1081	554	416	450	473
9:36:45	565	42664	930	1213	1040	1061	539	396	434	456
9:37:00	564	42581	913	1193	1020	1042	528	381	421	443
9:37:15	563	42571	897	1172	1000	1023	517	366	408	430
9:37:30	562	42530	881	1150	981	1004	503	356	393	417
9:37:45	560	42454	866	1127	963	985	490	349	382	407
9:38:00	559	42406	851	1104	945	967	480	342	372	398
9:38:15	558	42332	837	1082	928	949	471	336	363	390
9:38:30	557	42249	823	1060	912	932	464	329	353	382
9:38:45	556	42183	810	1039	895	915	456	320	347	374
9:39:00	555	42136	797	1018	880	898	446	311	341	366

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9:39:15	554	42101	784	997	864	882	438	304	333	358
9:39:30	554	42034	772	977	849	866	430	296	322	349
9:39:45	553	41995	761	958	836	852	423	289	317	343
9:40:00	553	41991	749	940	821	837	417	286	309	337
9:40:15	552	41951	738	922	808	823	410	280	306	332
9:40:30	552	41938	727	905	794	809	401	273	299	324
9:40:45	552	41911	716	888	782	795	389	266	288	314
9:41:00	551	41902	706	872	770	783	386	259	284	310
9:41:15	551	41901	696	856	758	770	372	250	276	299
9:41:30	551	41883	686	840	746	757	355	239	265	286
9:41:45	551	41820	676	825	734	745	347	229	250	275
9:42:00	550	41813	666	811	723	733	337	223	244	268
9:42:15	550	41829	657	796	712	722	329	216	239	261
9:42:30	550	41794	648	782	701	710	323	211	236	257
9:42:45	550	41781	639	768	691	699	313	205	231	250
9:43:00	549	41781	630	755	681	689	311	203	231	248
9:43:15	549	41797	621	742	671	678	311	199	227	246
9:43:30	549	41748	613	730	661	668	309	196	225	243
9:43:45	549	41765	605	718	652	658	307	192	221	240
9:44:00	548	41778	597	706	643	649	301	189	216	235
9:44:15	548	41726	589	695	634	639	295	185	216	232
9:44:30	548	41730	582	684	625	630	292	181	212	228
9:44:45	548	41720	574	673	617	621	289	181	209	226
9:45:00	547	41717	567	663	609	613	287	181	205	224
9:45:15	547	41681	560	653	601	605	281	178	200	220
9:45:30	547	41742	553	643	593	596	282	177	197	219
9:45:45	547	41689	546	634	586	589	281	179	193	218
9:46:00	546	41718	540	625	578	581	279	181	192	217
9:46:15	546	41712	534	616	571	574	278	181	191	217
9:46:30	546	41717	528	607	564	566	274	180	190	215
9:46:45	546	41689	522	599	557	559	272	180	186	213
9:47:00	546	41701	516	590	550	552	271	180	183	211
9:47:15	546	41669	510	583	544	546	269	179	182	210
9:47:30	546	41668	504	575	538	539	266	176	181	208
9:47:45	546	41678	499	568	531	533	265	176	179	207
9:48:00	545	41676	494	560	525	526	263	176	178	206
9:48:15	545	41689	488	553	520	520	257	175	176	203
9:48:30	545	41654	483	546	514	514	258	174	177	203

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9:48:45	544	41649	478	539	508	508	256	171	174	200
9:49:00	544	41677	473	533	502	503	255	168	174	199
9:49:15	544	41668	468	526	497	497	236	169	171	192
9:49:30	554	40720	422	478	459	453	108	123	91	107
9:49:45	566	41513	326	389	375	363	74	89	69	77
9:50:00	564	41468	250	317	303	290	66	78	64	69
9:50:15	562	41464	194	261	245	233	63	72	63	66
9:50:30	561	41402	155	218	202	192	61	69	62	64
9:50:45	560	41380	128	184	171	161	60	67	60	62
9:51:00	559	41353	108	159	147	138	59	67	61	62
9:51:15	558	41365	95	139	129	121	59	66	59	61
9:51:30	557	41331	85	124	116	108	59	65	59	61
9:51:45	557	41328	78	112	106	99	58	64	59	60
9:52:00	556	41281	73	102	98	91	58	64	58	60
9:52:15	556	41322	70	94	92	85	58	63	58	60
9:52:30	556	41274	67	88	87	81	57	62	58	59
9:52:45	555	41278	65	83	82	77	57	62	58	59
9:53:00	555	41269	63	80	80	74	57	62	57	59
9:53:15	554	41266	62	76	76	71	57	62	57	59
9:53:30	554	41276	61	74	75	70	57	61	57	58
9:53:45	554	41259	61	71	72	68	57	61	57	58
9:54:00	554	41249	60	70	71	67	57	60	56	58
9:54:15	554	41222	59	68	70	66	56	60	57	58
9:54:30	553	41247	59	67	68	65	57	60	56	58
9:54:45	553	41228	59	66	67	64	57	60	56	58
9:55:00	553	41237	58	65	66	63	56	60	57	58
9:55:15	553	41200	58	64	65	62	56	59	56	57
9:55:30	553	41209	58	64	65	62	56	59	56	57
9:55:45	552	41189	58	63	64	62	56	60	57	58
9:56:00	552	41204	58	63	64	62	56	62	60	59
9:56:15	552	41220	58	63	64	62	56	62	60	59
9:56:30	552	41186	57	63	64	61	56	61	60	59
9:56:45	552	41206	57	63	64	61	55	61	60	59
9:57:00	552	41181	57	62	64	61	55	61	59	58
9:57:15	552	41171	57	62	65	61	56	61	59	59
9:57:30	551	41173	57	62	65	61	55	61	60	59
9:57:45	551	41200	57	62	65	61	55	61	59	58
9:58:00	551	41168	57	62	65	61	56	64	65	62

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9:58:15	551	41198	57	62	65	61	58	65	68	64
9:58:30	551	41179	57	62	66	62	58	64	67	63
9:58:45	551	41176	57	62	66	62	59	65	67	64
9:59:00	550	41169	57	62	67	62	59	65	67	64
9:59:15	550	41205	57	62	67	62	60	66	67	64
9:59:30	550	41204	57	63	68	63	61	67	67	65
9:59:45	550	41172	58	63	69	63	61	67	67	65
10:00:00	550	41204	58	63	70	64	61	67	67	65
10:00:15	550	41199	58	63	70	64	61	68	67	65
10:00:30	550	41193	59	63	70	64	61	68	67	65
10:00:45	550	41171	59	64	71	65	62	68	67	66
10:01:00	549	41201	60	64	72	65	62	68	68	66
10:01:15	549	41177	60	64	72	65	62	68	67	66
10:01:30	549	41195	61	64	73	66	62	68	68	66
10:01:45	549	41185	61	64	73	66	63	68	67	66
10:02:00	549	41167	61	64	73	66	62	68	67	66
10:02:15	549	41190	61	65	75	67	63	68	68	66
10:02:30	549	41187	62	65	75	67	64	68	68	67
10:02:45	549	41166	62	65	75	67	64	68	67	66
10:03:00	549	41176	63	65	76	68	64	68	68	67
10:03:15	548	41190	63	66	77	69	64	68	68	67
10:03:30	548	41184	63	66	77	69	64	68	68	67
10:03:45	548	41200	63	66	77	69	65	68	67	67
10:04:00	548	41164	64	66	77	69	65	68	68	67

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Leakage Summary for Burn and Cool Down Periods

All pressure transducers and thermocouples are in calibration per YRT's QA program.

External leakage was collected electronically.

Test Duration:	60	min
Tank Water Loss:	-61	ml
System Relief Water Collected:	0	ml
Calculated Water Loss:	0	ml
Average Leak Rate:	0	ml/min
Average Seal Circumference:	8.1	in
Allowable Leak Rate:	8.1	ml/min

Was the Leakage Below the Allowable?	Yes
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Summary of Test Parameters During Burn and Cool Down Periods

Amount of Time of Average Cal. Block > 1200 deg.:	20.3	min
Minimum Allowable Time at Temperature:	15	min
Average Cal. Block Temperature During Burn:	1122	F
Maximum Average Cal. Block Temperature During Burn:	1293	F
Minimum Average Cal. Block Temperature During Burn:	72	F
Average Flame Temperature During Burn:	1566	F
Maximum Average Flame Temperature During Burn:	1627	F
Minimum Average Flame Temperature During Burn:	243	F

Notes

Were Test Conditions Within Compliance?	Yes
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Yarmouth Research and Technology, LLC

Depressurization - Repressurization Test Information

Customer: Garlock Pipeline Technologies

Date: 3/24/2015

Product Code: 2 inch Class 300 VCFS Gasket

Project Number: 215082

System pressure was lowered to 0 and then repressurized.

Operational Test Raw Data

Time	Pressure (psig)	Average Block Temp-F
10:14:54	556	71
10:15:09	556	71
10:15:24	555	71
10:15:39	555	71
10:15:54	555	71
10:16:09	555	71
10:16:24	554	71
10:16:39	554	71
10:16:54	554	71
10:17:09	554	71
10:17:24	553	71
10:17:39	553	71
10:17:54	553	71
10:18:09	553	71
10:18:24	553	71
10:18:39	553	71
10:18:54	552	71
10:19:09	552	71
10:19:24	552	71
10:19:39	552	71
10:19:54	552	71

Leakage was collected manually.

Total External Leakage Collected Over 5 Minute Duration:	0	mls
Average Leak Rate Over 5 Minute Duration:	0	ml/min
Allowable Leak Rate:	8.1	ml/min

Was the Leakage Below the Allowable?	Yes
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