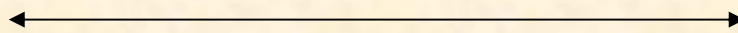


API 6FB Gasket Fire Test Report

Performed for

Klinger (Australia) Ltd

<http://klinger.com.au>



**Klinger Spiral Wound
Style CRIR 316/316/FG/316**

4 inch Class 300 Gaskets

Project Number: 205102

December 2005



Performed by

YARMOUTH RESEARCH AND TECHNOLOGY

92 East Elm Street
Yarmouth, ME 04096 USA
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API 6FB Third Edition Fire Test Data

Customer: Klinger (Australia) Ltd		Date: 12/1/2005
Project Number: PN205102		
Specification: API 6FB Third Edition On-Shore Non-Bending Test		
Product Code: Klinger Spiral Wound, Style CRIR 316/316/FG/316		
Flange Size: 4 inch Class 300		
Gasket Sealing Surface:	4.9 <-ID	OD-> 5.9
Raised Face Sealing Surface:	4.58 <-ID	OD-> 6.24
Mean Seal Circumference:	16.5	inches - based on contact area
Comments: New bolts/nuts, Used but good condition flanges.		
YRT Technician: Matthew J. Wasielewski, P.E.		

Fire and Cooldown Data:

Start Time:	10:03 AM	(EST)
Initial Bolt Torque:	200	ft-lb
Average Test Pressure:	553	psig
Time Average Cal. Block Temp >1200F	16.5	15 minute min.
Gasket Leak Rate:	4.5	ml/min
Allowable Leakage:	16.5	ml/min
Is Leakage Below Allowable?:	YES	

Post Burn Leakage Test

Pressure Vented and Repressurized:	Yes	
Average Test Pressure:	541	psig
Gasket Leak Rate:	0.0	ml/min
Allowable Leakage:	16.5	ml/min
Is Leakage Below Allowable?:	YES	

Does Gasket Pass API 6FB Leakage Requirements?:	YES
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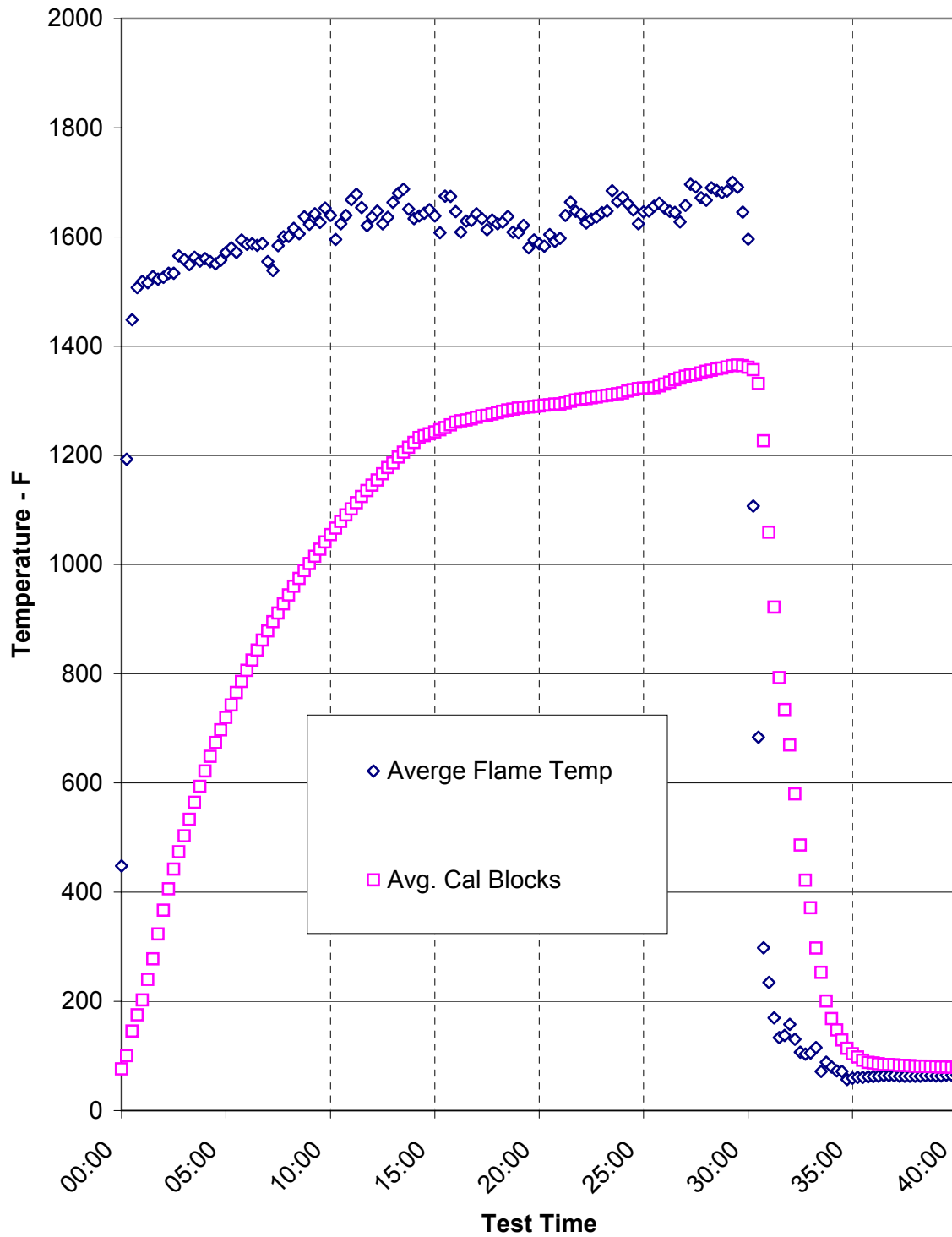


Witnesses



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Time verses Temperature Chart

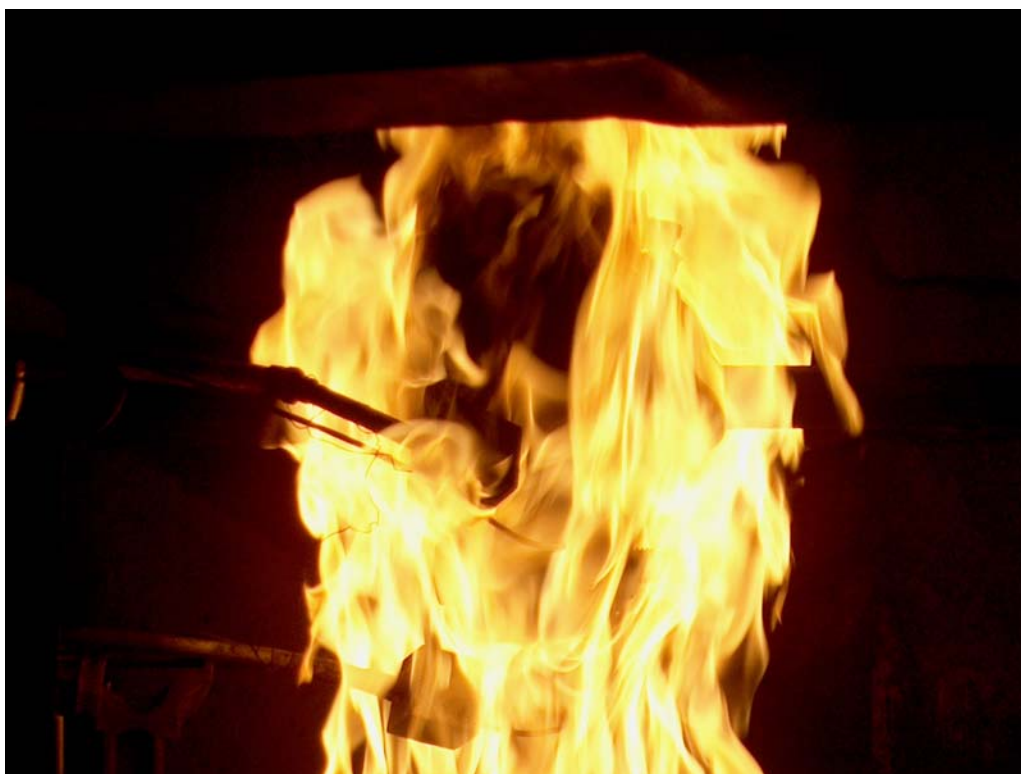


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Gasket Before Test

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Flange Assembly During Burn

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Gasket After Test.

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Fire Test Information

Customer: Klinger (Australia) Ltd

Date: 12/1/2005

Product Code: Klinger Spiral Wound, Style CRIR 316/316/FG/316

Project Number: PN205102

Burn and Cooldown Raw Data

Time	Pressure (psig)	Water Volume (mls)	Cal. Block 1 Temp - F	Cal. Block 2 Temp - F	Cal. Block 3 Temp - F	Average Block Temp Temp - F	Flame Probe 1 Temp - F	Flame Probe 2 Temp - F	Flame Probe 3 Temp - F	Average Flame Temp - F
10:03:00	541.0	3254	66	85	78	76	482	345	517	448
10:03:15	541.3	3230	102	109	91	101	1200	1209	1170	1193
10:03:30	541.3	3274	180	148	110	146	1484	1498	1363	1448
10:03:45	541.4	3232	214	178	134	175	1537	1549	1436	1507
10:04:00	541.2	3268	239	208	160	203	1547	1570	1439	1519
10:04:15	541.2	3234	302	234	185	240	1555	1582	1412	1516
10:04:30	541.4	3289	385	240	209	278	1544	1612	1427	1528
10:04:45	541.1	3221	468	271	230	323	1545	1602	1421	1523
10:05:00	540.9	3273	545	303	252	367	1549	1558	1472	1526
10:05:15	541.3	3250	613	332	274	406	1531	1551	1519	1534
10:05:30	541.1	3276	671	361	295	442	1535	1583	1482	1533
10:05:45	541.2	3256	720	389	311	474	1533	1698	1465	1565
10:06:00	541.1	3263	762	418	328	503	1556	1660	1460	1559
10:06:15	541.4	3269	799	447	354	533	1531	1716	1401	1549
10:06:30	541.4	3294	835	479	379	564	1542	1724	1422	1563
10:06:45	541.3	3291	868	511	403	594	1541	1719	1407	1556
10:07:00	541.4	3256	900	541	425	622	1551	1731	1399	1560
10:07:15	541.1	3277	930	569	447	649	1539	1733	1392	1555
10:07:30	541.5	3292	957	596	468	674	1564	1708	1381	1551
10:07:45	541.6	3257	983	621	488	697	1551	1724	1397	1557
10:08:00	541.2	3281	1006	647	507	720	1556	1738	1421	1572
10:08:15	541.7	3290	1028	673	527	743	1549	1721	1471	1580
10:08:30	541.4	3307	1050	699	547	765	1552	1688	1475	1572
10:08:45	541.9	3282	1068	723	567	786	1552	1718	1514	1595

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Time	Pressure (psig)	Water Volume (mls)	Cal. Block 1 Temp - F	Cal. Block 2 Temp - F	Cal. Block 3 Temp - F	Average Block Temp Temp - F	Flame Probe 1 Temp - F	Flame Probe 2 Temp - F	Flame Probe 3 Temp - F	Average Flame Temp - F
10:09:00	541.7	3276	1086	747	587	806	1578	1662	1519	1586
10:09:15	542.0	3290	1101	767	606	825	1554	1720	1489	1588
10:09:30	541.5	3354	1116	789	625	843	1542	1719	1492	1584
10:09:45	541.8	3317	1131	810	644	862	1550	1716	1498	1588
10:10:00	541.8	3334	1143	829	663	878	1554	1711	1399	1555
10:10:15	541.7	3339	1156	850	680	895	1558	1632	1426	1539
10:10:30	542.0	3378	1167	868	698	911	1558	1725	1469	1584
10:10:45	542.0	3363	1179	889	717	928	1554	1696	1551	1600
10:11:00	542.2	3353	1189	908	736	944	1559	1721	1522	1601
10:11:15	542.2	3328	1199	926	754	960	1551	1697	1599	1616
10:11:30	542.7	3367	1208	942	773	974	1562	1694	1561	1606
10:11:45	542.5	3349	1216	958	792	989	1535	1732	1644	1637
10:12:00	542.4	3355	1224	972	810	1002	1572	1655	1643	1623
10:12:15	542.5	3388	1232	986	828	1015	1568	1734	1625	1642
10:12:30	542.7	3376	1239	1000	845	1028	1552	1734	1594	1627
10:12:45	542.7	3425	1246	1016	863	1042	1562	1706	1690	1653
10:13:00	543.0	3409	1253	1029	882	1055	1562	1634	1723	1640
10:13:15	543.0	3408	1258	1042	900	1067	1561	1657	1569	1596
10:13:30	543.2	3450	1264	1055	917	1079	1566	1704	1602	1624
10:13:45	543.0	3388	1270	1067	935	1091	1573	1669	1676	1639
10:14:00	543.0	3406	1275	1078	953	1102	1583	1697	1724	1668
10:14:15	543.4	3450	1279	1089	972	1113	1577	1692	1766	1678
10:14:30	543.8	3465	1283	1100	991	1124	1568	1712	1681	1654
10:14:45	543.6	3468	1287	1110	1008	1135	1571	1666	1625	1621
10:15:00	544.0	3496	1291	1120	1025	1145	1579	1646	1685	1637
10:15:15	544.3	3513	1295	1129	1041	1155	1566	1700	1677	1648
10:15:30	545.1	3512	1299	1142	1058	1166	1574	1749	1549	1624
10:15:45	545.1	3556	1302	1155	1075	1177	1572	1705	1631	1636
10:16:00	546.5	3667	1304	1163	1091	1186	1573	1713	1704	1663
10:16:15	548.3	3781	1308	1174	1109	1197	1589	1681	1770	1680
10:16:30	550.5	3900	1310	1181	1126	1206	1579	1672	1811	1687
10:16:45	552.9	4095	1313	1188	1142	1215	1583	1697	1673	1651
10:17:00	554.3	4218	1315	1198	1157	1223	1581	1706	1614	1634

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Time	Pressure (psig)	Water Volume (mls)	Cal. Block 1 Temp - F	Cal. Block 2 Temp - F	Cal. Block 3 Temp - F	Average Block Temp Temp - F	Flame Probe 1 Temp - F	Flame Probe 2 Temp - F	Flame Probe 3 Temp - F	Average Flame Temp - F
10:17:15	556.1	4315	1318	1206	1173	1232	1579	1681	1656	1639
10:17:30	558.6	4475	1320	1209	1179	1236	1588	1642	1701	1644
10:17:45	561.1	4668	1322	1211	1185	1239	1584	1683	1682	1650
10:18:00	563.8	4859	1324	1214	1191	1243	1568	1677	1671	1639
10:18:15	566.1	5076	1326	1216	1198	1247	1580	1716	1527	1608
10:18:30	567.5	5208	1328	1220	1205	1251	1590	1681	1753	1675
10:18:45	568.1	5277	1330	1225	1213	1256	1582	1712	1728	1674
10:19:00	567.9	5242	1332	1229	1221	1261	1587	1716	1636	1646
10:19:15	567.6	5302	1333	1230	1226	1263	1577	1674	1575	1609
10:19:30	567.9	5254	1334	1229	1231	1265	1575	1673	1640	1629
10:19:45	567.9	5352	1334	1230	1236	1267	1571	1662	1657	1630
10:20:00	568.1	5335	1335	1232	1242	1270	1578	1692	1657	1642
10:20:15	568.2	5405	1337	1232	1247	1272	1577	1672	1652	1634
10:20:30	568.7	5465	1337	1231	1252	1273	1578	1662	1600	1613
10:20:45	569.0	5503	1339	1231	1257	1276	1602	1674	1617	1631
10:21:00	569.1	5479	1340	1231	1263	1278	1588	1647	1638	1624
10:21:15	569.0	5417	1342	1232	1268	1281	1579	1672	1631	1627
10:21:30	569.7	5415	1344	1232	1273	1283	1581	1643	1688	1637
10:21:45	569.8	5471	1345	1232	1277	1285	1565	1700	1562	1609
10:22:00	569.8	5495	1346	1232	1281	1286	1557	1698	1569	1608
10:22:15	570.1	5559	1346	1232	1284	1287	1571	1702	1590	1621
10:22:30	570.4	5529	1346	1231	1289	1289	1565	1690	1486	1580
10:22:45	570.2	5499	1348	1229	1292	1290	1578	1661	1545	1595
10:23:00	568.5	5450	1348	1228	1295	1290	1579	1696	1487	1587
10:23:15	566.6	5321	1349	1227	1299	1292	1568	1680	1501	1583
10:23:30	565.6	5240	1349	1226	1302	1292	1574	1646	1593	1604
10:23:45	565.7	5230	1351	1225	1305	1294	1581	1707	1488	1592
10:24:00	565.4	5249	1351	1223	1307	1294	1578	1668	1546	1597
10:24:15	566.3	5284	1352	1225	1310	1296	1582	1661	1675	1639
10:24:30	565.8	5221	1354	1229	1314	1299	1587	1630	1774	1664
10:24:45	566.1	5270	1356	1230	1318	1301	1564	1646	1731	1647
10:25:00	566.4	5255	1357	1231	1320	1303	1587	1662	1675	1641
10:25:15	566.3	5254	1357	1231	1323	1304	1582	1671	1624	1626

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Time	Pressure (psig)	Water Volume (mls)	Cal. Block 1 Temp - F	Cal. Block 2 Temp - F	Cal. Block 3 Temp - F	Average Block Temp Temp - F	Flame Probe 1 Temp - F	Flame Probe 2 Temp - F	Flame Probe 3 Temp - F	Average Flame Temp - F
10:25:30	566.6	5265	1359	1232	1325	1305	1585	1678	1635	1633
10:25:45	566.2	5228	1359	1233	1329	1307	1591	1660	1658	1636
10:26:00	566.0	5228	1360	1234	1332	1309	1581	1658	1695	1645
10:26:15	566.3	5240	1361	1234	1334	1310	1587	1696	1659	1647
10:26:30	566.5	5269	1362	1235	1337	1311	1589	1696	1768	1684
10:26:45	566.9	5252	1362	1236	1340	1313	1579	1696	1720	1665
10:27:00	567.0	5228	1364	1237	1342	1314	1583	1703	1732	1673
10:27:15	566.7	5277	1365	1242	1346	1318	1590	1712	1680	1661
10:27:30	566.9	5266	1366	1245	1349	1320	1578	1731	1639	1649
10:27:45	567.0	5255	1367	1249	1351	1322	1583	1720	1569	1624
10:28:00	567.0	5258	1366	1251	1352	1323	1580	1704	1654	1646
10:28:15	567.2	5265	1364	1254	1353	1324	1595	1720	1627	1647
10:28:30	567.1	5283	1362	1258	1353	1324	1589	1677	1703	1656
10:28:45	566.9	5249	1363	1263	1355	1327	1585	1730	1670	1662
10:29:00	567.1	5221	1364	1271	1357	1331	1572	1725	1661	1653
10:29:15	567.5	5309	1366	1277	1359	1334	1553	1709	1679	1647
10:29:30	567.2	5273	1367	1286	1362	1338	1572	1749	1614	1645
10:29:45	567.2	5287	1368	1293	1364	1342	1592	1774	1517	1628
10:30:00	567.2	5264	1371	1298	1365	1345	1587	1756	1630	1658
10:30:15	567.7	5266	1371	1302	1368	1347	1589	1701	1800	1697
10:30:30	567.5	5253	1371	1304	1369	1348	1568	1736	1771	1692
10:30:45	567.3	5271	1373	1308	1372	1351	1578	1738	1699	1672
10:31:00	567.4	5274	1374	1314	1373	1354	1584	1722	1696	1667
10:31:15	567.6	5296	1375	1318	1375	1356	1589	1733	1748	1690
10:31:30	567.3	5264	1375	1323	1377	1358	1572	1704	1779	1685
10:31:45	567.7	5249	1374	1326	1379	1360	1604	1712	1728	1681
10:32:00	567.4	5246	1374	1330	1381	1362	1583	1745	1724	1684
10:32:15	567.2	5263	1374	1334	1384	1364	1596	1733	1773	1701
10:32:30	567.3	5300	1375	1336	1384	1365	1582	1694	1797	1691
10:32:45	567.5	5280	1373	1334	1385	1364	1563	1737	1636	1645
10:33:00	567.6	5253	1370	1332	1382	1361	1569	1730	1489	1596
10:33:15	568.4	5298	1362	1330	1378	1357	1226	1240	855	1107
10:33:30	567.3	5223	1335	1296	1363	1331	867	671	514	684

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Time	Pressure (psig)	Water Volume (mls)	Cal. Block 1 Temp - F	Cal. Block 2 Temp - F	Cal. Block 3 Temp - F	Average Block Temp Temp - F	Flame Probe 1 Temp - F	Flame Probe 2 Temp - F	Flame Probe 3 Temp - F	Average Flame Temp - F
10:33:45	550.8	3468	1166	1170	1343	1226	581	162	151	298
10:34:00	542.1	3612	940	1017	1221	1059	405	174	125	235
10:34:15	541.6	3499	799	968	999	922	221	159	130	170
10:34:30	541.0	3372	682	919	777	793	145	130	126	134
10:34:45	541.4	3337	572	876	755	734	167	117	129	138
10:35:00	541.9	3316	487	800	721	669	188	167	119	158
10:35:15	541.8	3288	374	681	685	580	181	106	105	131
10:35:30	542.1	3242	278	530	651	486	154	88	79	107
10:35:45	541.8	3264	212	431	623	422	143	90	77	103
10:36:00	541.7	3240	169	344	601	371	148	68	101	106
10:36:15	541.9	3202	138	213	542	298	140	69	137	115
10:36:30	541.9	3170	115	199	445	253	79	61	75	72
10:36:45	541.8	3216	98	152	352	201	108	60	98	89
10:37:00	541.7	3163	85	131	289	168	115	57	67	80
10:37:15	542.1	3208	76	124	242	147	94	57	68	73
10:37:30	541.6	3171	69	114	205	129	98	54	63	72
10:37:45	541.4	3178	64	98	180	114	71	48	52	57
10:38:00	541.4	3164	59	91	162	104	75	50	54	60
10:38:15	541.5	3151	57	87	150	98	78	50	54	61
10:38:30	541.9	3160	54	81	141	92	79	50	54	61
10:38:45	541.3	3150	53	78	134	88	76	52	58	62
10:39:00	541.6	3148	52	78	131	87	72	55	60	62
10:39:15	541.8	3126	52	77	128	86	69	57	63	63
10:39:30	541.1	3118	51	76	126	84	69	59	63	64
10:39:45	541.6	3133	52	77	124	84	67	60	65	64
10:40:00	541.7	3110	52	77	122	84	66	60	66	64
10:40:15	541.5	3104	52	76	120	83	65	60	64	63
10:40:30	541.5	3121	53	76	119	83	64	61	64	63
10:40:45	541.5	3116	53	75	118	82	64	61	63	63
10:41:00	541.5	3100	53	75	116	81	64	61	64	63
10:41:15	541.6	3114	53	76	115	81	63	61	65	63
10:41:30	541.7	3098	54	75	114	81	64	61	66	64
10:41:45	541.5	3125	54	75	113	81	64	61	66	64

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Time	Pressure (psig)	Water Volume (mls)	Cal. Block 1 Temp - F	Cal. Block 2 Temp - F	Cal. Block 3 Temp - F	Average Block Temp Temp - F	Flame Probe 1 Temp - F	Flame Probe 2 Temp - F	Flame Probe 3 Temp - F	Average Flame Temp - F
10:42:00	541.4	3064	54	75	112	80	64	61	65	63
10:42:15	541.5	3123	54	74	111	80	64	61	65	63
10:42:30	540.8	3106	55	74	110	80	65	62	67	65
10:42:45	541.0	3128	55	74	108	79	65	62	68	65
10:43:00	541.3	3076	55	74	108	79	64	62	68	65

End of 30 minute Burn and 10 minute Cooldown

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Leakage Summary for Burn and Cool Down Periods

Leakage was collected electronically.

Start Water Volume:	3254	mls
End Water Volume:	3076	mls
Total Water Lost During 40 Minute Burn and Cooldown:	178	mls
Calculated Average Leak Rate Over 40 Minute Duration:	4.5	ml/min

Summary of Test Parameters During Burn and Cool Down Periods

Pressure Information

Gasket / Flange Rated Pressure:	740	psig
Nominal Test Pressure - 75% of Rated:	555	psig
Average Pressure During Burn:	552.5	psig
Maximum Pressure During Burn/Cool Down:	570.4	psig
Minimum Pressure During Burn/Cool Down:	540.8	psig

Calorimeter Block Temperature Information

Average Cal. Block 1 Temperature During Burn:	1182	deg. F
Maximum Cal. Block 1 Temperature During Burn:	1375	deg. F
Average Cal. Block 1 Temperature During Burn:	1018	deg. F
Maximum Cal. Block 1 Temperature During Burn:	1336	deg. F
Average Cal. Block 1 Temperature During Burn:	996	deg. F
Maximum Cal. Block 1 Temperature During Burn:	1385	deg. F

Flame Temperature Information

Average Flame 1 Temperature During Burn:	1557	deg. F
Maximum Flame 1 Temperature During Burn:	1604	deg. F
Average Flame 1 Temperature During Burn:	1672	deg. F
Maximum Flame 1 Temperature During Burn:	1774	deg. F
Average Flame 1 Temperature During Burn:	1588	deg. F
Maximum Flame 1 Temperature During Burn:	1811	deg. F

Yarmouth Research and Technology

Post Burn Test Information

Customer: Klinger (Australia) Ltd

Date: 12/1/2005

Product Code: Klinger Spiral Wound, Style CRIR 316/316/FG/316

Project Number: PN205102

Pressure vented to 0 and then Repressurized

Raw Data

Time	Pressure (psig)	Block 1 Temp - F	Block 2 Temp - F	Block 3 Temp - F
10:45:15	541	57	73	101
10:45:30	541	57	73	101
10:45:45	541	58	72	99
10:46:00	541	58	72	100
10:46:15	541	58	72	99
10:46:30	541	58	72	98
10:46:45	541	58	72	97
10:47:00	541	58	72	98
10:47:15	541	59	72	97
10:47:30	541	59	71	96
10:47:45	541	59	71	96
10:48:00	540	59	72	95
10:48:15	541	59	71	95
10:48:30	541	59	71	95
10:48:45	541	59	71	95
10:49:00	541	60	71	94
10:49:15	541	60	71	94
10:49:30	541	60	71	94
10:49:45	541	60	70	93
10:50:00	540	60	70	93
10:50:15	541	60	71	93

Leakage Collected from Gasket:	0	mls
Average Leak Rate Over 5 Minute Duration:	0	ml/min
Max. Allowable Leakage Rate:	16	ml/min
Was the Leakage Below the Allowable?	Yes	