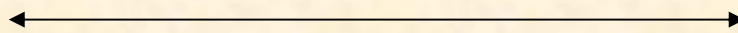


API 6FB Gasket Fire Test Report

Performed for

Klinger (Australia) Ltd

<http://klinger.com.au>



**Klinger Graphite Laminate
PSM150B AS**

4 inch Class 300 Gaskets

Project Number: 205102

November 2005



Performed by

YARMOUTH RESEARCH AND TECHNOLOGY

92 East Elm Street
Yarmouth, ME 04096 USA
(207) 829-5359
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API 6FB Third Edition Fire Test Data

Customer: Klinger (Australia) Ltd		Date: 11/30/2005
Project Number: PN205102		
Specification: API 6FB Third Edition On-Shore Non-Bending Test		
Product Code: Klinger Graphite Laminate PSM150B AS		
Flange Size: 4 inch Class 300		
Gasket Sealing Surface:	4.51 <-ID	OD-> 7.13
Raised Face Sealing Surface:	4.58 <-ID	OD-> 6.24
Mean Seal Circumference:	17.0	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:	2:13 PM	(EST)
Initial Bolt Torque:	200	ft-lb
Average Test Pressure:	547	psig
Time Average Cal. Block Temp >1200F	18.0	15 minute min.
Gasket Leak Rate:	7.3	ml/min
Allowable Leakage:	17.0	ml/min
Is Leakage Below Allowable?:	YES	

Post Burn Leakage Test

Pressure Vented and Repressurized:	Yes	
Average Test Pressure:	539	psig
Gasket Leak Rate:	0.8	ml/min
Allowable Leakage:	17.0	ml/min
Is Leakage Below Allowable?:	YES	

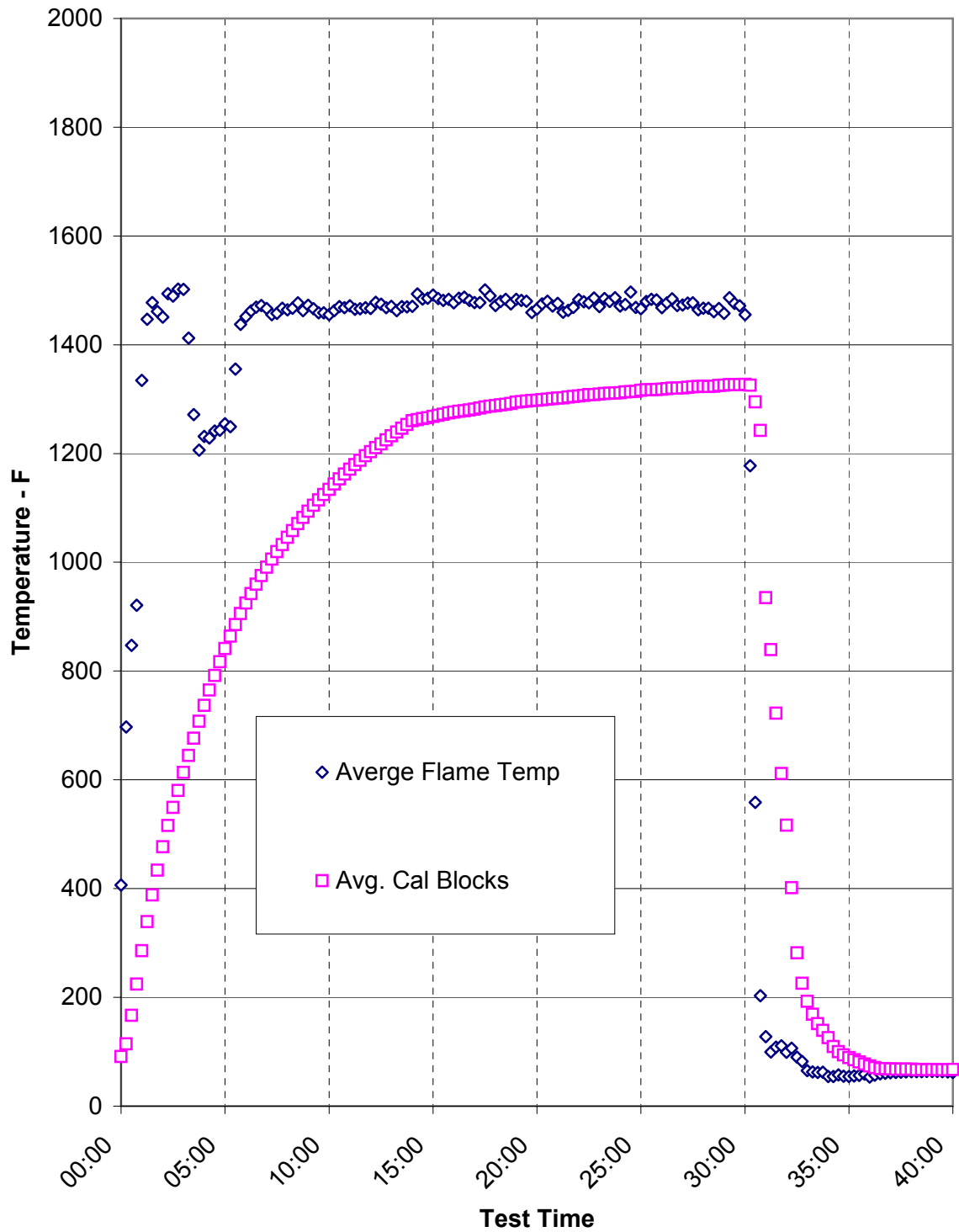
Does Gasket Pass API 6FB Leakage Requirements?:	YES
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Witnesses



Time verses Temperature Chart

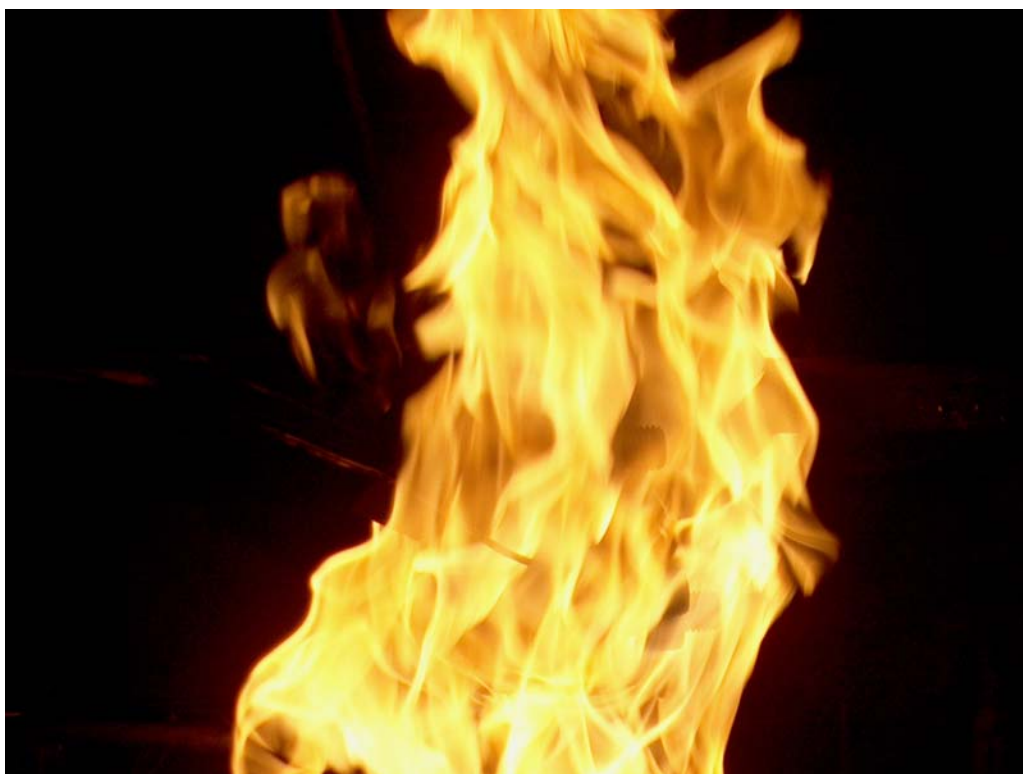


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Gasket Before Test

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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: 11/30/2005

Product Code: Klinger Graphite Laminate PSM150B AS

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
14:13:00	536.6	2084	81	120	72	91	132	301	786	406
14:13:15	536.7	2093	104	148	92	115	241	1017	834	697
14:13:30	536.6	2082	168	204	129	167	414	1225	902	847
14:13:45	536.8	2081	221	269	183	224	541	1239	983	921
14:14:00	536.6	2109	291	328	237	285	1235	1467	1301	1334
14:14:15	536.6	2082	365	377	276	339	1474	1528	1339	1447
14:14:30	536.8	2090	441	422	302	388	1559	1542	1332	1478
14:14:45	536.9	2096	514	464	323	434	1538	1522	1324	1461
14:15:00	536.7	2097	582	506	342	477	1519	1496	1338	1451
14:15:15	536.6	2081	642	545	360	516	1570	1535	1377	1494
14:15:30	536.5	2068	688	579	380	549	1513	1549	1407	1490
14:15:45	536.8	2099	730	612	400	581	1548	1544	1415	1502
14:16:00	536.5	2115	773	648	419	613	1558	1525	1423	1502
14:16:15	536.6	2113	812	682	440	645	1399	1432	1405	1412
14:16:30	536.8	2111	849	718	462	676	1129	1316	1370	1272
14:16:45	536.7	2105	884	757	482	708	1010	1281	1328	1206
14:17:00	537.0	2121	915	793	503	737	1045	1304	1346	1232
14:17:15	536.9	2099	942	828	525	765	1067	1297	1321	1228
14:17:30	536.7	2125	967	860	548	792	1067	1290	1367	1241
14:17:45	536.8	2161	990	890	571	817	1059	1303	1367	1243
14:18:00	537.1	2136	1012	918	594	841	1045	1332	1388	1255
14:18:15	537.2	2131	1033	943	616	864	1052	1303	1393	1249
14:18:30	537.3	2147	1051	967	638	885	1335	1300	1431	1355
14:18:45	537.0	2147	1070	987	660	906	1454	1399	1460	1438

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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
14:19:00	537.4	2134	1089	1006	680	925	1471	1395	1489	1452
14:19:15	537.3	2172	1105	1024	698	942	1451	1426	1509	1462
14:19:30	537.2	2190	1121	1041	717	960	1459	1458	1491	1469
14:19:45	537.4	2180	1135	1057	734	975	1464	1459	1493	1472
14:20:00	537.5	2229	1149	1071	753	991	1461	1458	1481	1467
14:20:15	537.8	2213	1162	1085	771	1006	1430	1471	1465	1455
14:20:30	537.6	2204	1173	1097	788	1019	1420	1492	1462	1458
14:20:45	537.4	2203	1183	1108	806	1032	1441	1465	1496	1467
14:21:00	537.6	2235	1194	1120	823	1046	1417	1469	1506	1464
14:21:15	537.6	2240	1204	1131	840	1058	1415	1456	1530	1467
14:21:30	537.8	2237	1214	1141	858	1071	1444	1464	1523	1477
14:21:45	538.0	2221	1223	1150	874	1082	1429	1466	1493	1463
14:22:00	538.0	2234	1231	1159	891	1094	1424	1500	1494	1473
14:22:15	538.2	2274	1238	1168	907	1104	1446	1478	1474	1466
14:22:30	538.3	2288	1245	1175	924	1115	1426	1474	1477	1459
14:22:45	538.4	2304	1251	1182	941	1125	1425	1456	1495	1459
14:23:00	538.7	2313	1257	1189	956	1134	1431	1449	1486	1455
14:23:15	538.7	2289	1263	1196	972	1144	1430	1453	1505	1463
14:23:30	538.8	2314	1269	1203	989	1154	1431	1466	1514	1470
14:23:45	538.6	2343	1273	1210	1004	1162	1432	1460	1512	1468
14:24:00	538.8	2362	1278	1216	1020	1171	1435	1492	1488	1472
14:24:15	539.3	2361	1282	1221	1035	1179	1418	1477	1501	1465
14:24:30	539.7	2376	1286	1225	1051	1187	1422	1478	1499	1466
14:24:45	539.5	2370	1291	1230	1067	1196	1428	1478	1499	1468
14:25:00	539.9	2409	1294	1234	1082	1203	1408	1481	1511	1467
14:25:15	540.2	2416	1298	1238	1097	1211	1428	1496	1510	1478
14:25:30	541.1	2487	1301	1241	1111	1218	1429	1492	1503	1475
14:25:45	542.0	2544	1304	1244	1127	1225	1425	1484	1495	1468
14:26:00	543.0	2606	1308	1248	1142	1233	1420	1498	1494	1471
14:26:15	544.4	2712	1311	1250	1157	1239	1429	1477	1482	1463
14:26:30	546.6	2843	1314	1252	1173	1246	1434	1490	1487	1470
14:26:45	548.2	3008	1318	1254	1188	1253	1438	1487	1484	1470
14:27:00	549.1	3058	1321	1256	1203	1260	1446	1474	1492	1471

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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
14:27:15	550.5	3150	1323	1257	1207	1262	1455	1524	1502	1494
14:27:30	552.9	3369	1324	1258	1211	1264	1451	1516	1485	1484
14:27:45	555.0	3490	1325	1258	1214	1266	1468	1483	1505	1485
14:28:00	557.6	3713	1328	1259	1218	1268	1472	1502	1501	1492
14:28:15	559.8	3900	1330	1259	1221	1270	1451	1521	1483	1485
14:28:30	561.2	3992	1332	1260	1225	1272	1447	1507	1490	1481
14:28:45	562.3	4111	1334	1261	1228	1274	1430	1537	1484	1484
14:29:00	562.0	4137	1336	1260	1232	1276	1435	1518	1478	1477
14:29:15	562.0	4123	1336	1260	1236	1277	1432	1533	1491	1485
14:29:30	562.1	4132	1337	1259	1240	1279	1448	1526	1489	1488
14:29:45	562.3	4152	1338	1260	1242	1280	1434	1509	1501	1481
14:30:00	562.4	4202	1340	1261	1243	1281	1446	1494	1493	1478
14:30:15	562.4	4221	1343	1262	1245	1283	1433	1495	1505	1478
14:30:30	562.7	4234	1345	1263	1249	1286	1458	1513	1532	1501
14:30:45	563.1	4243	1347	1264	1250	1287	1438	1522	1510	1490
14:31:00	563.2	4256	1348	1264	1252	1288	1416	1506	1495	1472
14:31:15	563.3	4305	1349	1265	1254	1289	1435	1513	1491	1480
14:31:30	563.5	4269	1350	1265	1256	1290	1459	1490	1501	1483
14:31:45	563.8	4389	1350	1266	1260	1292	1441	1477	1508	1475
14:32:00	564.1	4319	1351	1268	1264	1294	1434	1513	1503	1483
14:32:15	564.2	4348	1351	1268	1267	1295	1465	1488	1491	1481
14:32:30	564.2	4428	1351	1268	1270	1296	1441	1505	1494	1480
14:32:45	564.4	4313	1352	1267	1273	1297	1405	1486	1487	1459
14:33:00	564.3	4395	1352	1267	1275	1298	1418	1501	1478	1466
14:33:15	564.3	4405	1352	1267	1277	1299	1430	1482	1513	1475
14:33:30	562.6	4283	1352	1267	1280	1300	1434	1492	1514	1480
14:33:45	559.9	4104	1355	1267	1281	1301	1450	1469	1494	1471
14:34:00	560.4	4143	1356	1268	1282	1302	1449	1493	1486	1476
14:34:15	559.3	4036	1356	1268	1283	1302	1402	1495	1483	1460
14:34:30	559.9	4081	1358	1269	1285	1304	1416	1487	1486	1463
14:34:45	559.5	4072	1359	1268	1287	1305	1434	1483	1489	1469
14:35:00	559.6	4070	1361	1268	1289	1306	1436	1518	1495	1483
14:35:15	559.7	4055	1361	1267	1292	1307	1443	1508	1486	1479

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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
14:35:30	560.8	4102	1361	1266	1297	1308	1430	1498	1503	1477
14:35:45	560.0	4057	1359	1265	1301	1308	1450	1501	1507	1486
14:36:00	560.7	4074	1358	1265	1305	1309	1430	1471	1510	1470
14:36:15	559.9	4088	1359	1266	1306	1310	1434	1526	1495	1485
14:36:30	560.6	4055	1359	1265	1308	1311	1436	1516	1486	1479
14:36:45	560.4	4083	1359	1263	1311	1311	1416	1540	1503	1486
14:37:00	560.9	4099	1359	1262	1314	1312	1418	1497	1498	1471
14:37:15	560.7	4077	1361	1261	1317	1313	1413	1504	1506	1474
14:37:30	560.8	4081	1360	1261	1320	1314	1431	1555	1504	1497
14:37:45	560.5	4059	1361	1259	1323	1314	1411	1497	1498	1469
14:38:00	561.0	4093	1363	1259	1327	1316	1413	1503	1483	1466
14:38:15	560.9	4098	1365	1259	1328	1317	1445	1523	1470	1479
14:38:30	560.5	4059	1365	1257	1329	1317	1434	1545	1472	1484
14:38:45	560.8	4068	1366	1257	1330	1318	1431	1519	1498	1483
14:39:00	560.4	4066	1366	1257	1331	1318	1419	1488	1498	1468
14:39:15	560.6	4026	1367	1258	1333	1319	1397	1520	1515	1477
14:39:30	560.7	4087	1368	1258	1334	1320	1425	1531	1498	1485
14:39:45	560.6	4062	1367	1257	1337	1320	1423	1476	1518	1472
14:40:00	560.7	4047	1367	1256	1339	1321	1420	1485	1515	1473
14:40:15	560.7	4041	1368	1256	1341	1322	1401	1507	1522	1477
14:40:30	560.8	4072	1370	1256	1342	1323	1425	1504	1503	1477
14:40:45	561.0	4013	1371	1257	1341	1323	1403	1492	1497	1464
14:41:00	561.0	4073	1372	1257	1342	1324	1406	1517	1479	1467
14:41:15	561.2	4045	1370	1256	1344	1323	1433	1499	1469	1467
14:41:30	561.0	4060	1371	1255	1345	1324	1402	1491	1489	1461
14:41:45	561.0	4073	1373	1255	1347	1325	1406	1503	1491	1467
14:42:00	561.0	4067	1374	1255	1348	1326	1393	1478	1502	1458
14:42:15	560.8	4037	1375	1255	1350	1327	1450	1501	1509	1487
14:42:30	561.0	4063	1374	1254	1351	1326	1426	1525	1477	1476
14:42:45	561.0	4056	1373	1253	1353	1326	1416	1512	1487	1472
14:43:00	560.6	4007	1373	1253	1355	1327	1408	1460	1498	1455
14:43:15	561.0	4071	1367	1254	1355	1325	1118	1059	1356	1178
14:43:30	555.2	3640	1337	1241	1306	1295	651	164	861	559

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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
14:43:45	533.2	2217	1240	1206	1281	1242	127	154	328	203
14:44:00	534.4	2172	989	1152	663	935	134	106	144	128
14:44:15	534.8	2105	785	1091	642	839	110	75	114	100
14:44:30	535.4	2067	573	975	620	723	75	126	125	109
14:44:45	535.6	2035	412	823	599	611	116	107	110	111
14:45:00	536.2	2035	301	671	577	516	97	71	129	99
14:45:15	536.1	2032	224	447	534	402	111	68	141	107
14:45:30	535.7	1951	173	220	453	282	76	61	134	90
14:45:45	535.3	1956	142	165	371	226	84	66	97	82
14:46:00	535.4	1936	123	148	307	193	73	67	56	65
14:46:15	535.5	1911	111	135	260	169	68	68	53	63
14:46:30	535.6	1901	102	126	226	151	68	69	49	62
14:46:45	535.0	1886	96	120	202	139	65	68	54	62
14:47:00	535.1	1889	90	105	183	126	57	52	54	54
14:47:15	535.1	1882	80	83	166	110	57	51	55	54
14:47:30	535.0	1844	72	74	154	100	61	55	56	57
14:47:45	535.4	1905	68	71	143	94	62	53	50	55
14:48:00	535.4	1859	64	70	133	89	61	53	49	54
14:48:15	535.5	1843	63	69	124	85	62	55	49	55
14:48:30	535.5	1825	61	68	114	81	60	56	54	57
14:48:45	535.2	1834	60	65	107	77	60	58	59	59
14:49:00	535.0	1850	58	62	101	74	52	51	57	53
14:49:15	535.5	1818	56	60	96	71	57	56	58	57
14:49:30	535.5	1804	55	59	93	69	59	59	60	59
14:49:45	535.4	1858	55	60	91	69	61	60	60	60
14:50:00	535.5	1836	55	60	90	68	62	61	61	61
14:50:15	535.4	1811	55	60	89	68	62	62	62	62
14:50:30	534.9	1799	55	60	88	68	63	62	62	62
14:50:45	535.2	1819	55	61	87	68	63	62	63	63
14:51:00	535.3	1819	56	61	86	68	64	63	63	63
14:51:15	535.4	1824	56	60	85	67	64	63	63	63
14:51:30	535.2	1790	56	61	85	67	64	63	63	63
14:51:45	535.2	1804	56	61	84	67	65	63	63	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
14:52:00	535.4	1850	57	61	84	67	65	63	64	64
14:52:15	535.1	1842	57	61	83	67	64	63	64	64
14:52:30	535.3	1778	57	61	83	67	64	63	63	63
14:52:45	535.1	1830	57	61	82	67	63	63	63	63
14:53:00	535.1	1794	58	62	82	67	62	62	62	62

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:	2084	mls
End Water Volume:	1794	mls
Total Water Lost During 40 Minute Burn and Cooldown:	290	mls
Calculated Average Leak Rate Over 40 Minute Duration:	7.3	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:	546.9	psig
Maximum Pressure During Burn/Cool Down:	564.4	psig
Minimum Pressure During Burn/Cool Down:	533.2	psig

Calorimeter Block Temperature Information

Average Cal. Block 1 Temperature During Burn:	1188	deg. F
Maximum Cal. Block 1 Temperature During Burn:	1375	deg. F
Average Cal. Block 1 Temperature During Burn:	1107	deg. F
Maximum Cal. Block 1 Temperature During Burn:	1269	deg. F
Average Cal. Block 1 Temperature During Burn:	1021	deg. F
Maximum Cal. Block 1 Temperature During Burn:	1355	deg. F

Flame Temperature Information

Average Flame 1 Temperature During Burn:	1375	deg. F
Maximum Flame 1 Temperature During Burn:	1570	deg. F
Average Flame 1 Temperature During Burn:	1462	deg. F
Maximum Flame 1 Temperature During Burn:	1555	deg. F
Average Flame 1 Temperature During Burn:	1455	deg. F
Maximum Flame 1 Temperature During Burn:	1532	deg. F

Yarmouth Research and Technology

Post Burn Test Information

Customer: Klinger (Australia) Ltd

Date: 11/30/2005

Product Code: Klinger Graphite Laminate PSM150B AS

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
14:58:12	534	62	64	75
14:58:27	539	62	63	75
14:58:42	541	62	63	75
14:58:57	541	62	63	75
14:59:12	540	62	64	75
14:59:27	540	62	63	75
14:59:42	540	62	64	74
14:59:57	539	62	64	75
15:00:12	539	62	64	74
15:00:27	539	62	64	74
15:00:42	539	63	64	74
15:00:57	539	63	64	73
15:01:12	539	63	64	73
15:01:27	538	63	64	73
15:01:42	538	63	64	73
15:01:57	538	63	64	73
15:02:12	538	63	64	73
15:02:27	538	63	63	72
15:02:42	538	63	64	73
15:02:57	538	63	64	73
15:03:12	538	63	64	72

Leakage Collected from Gasket:	4	mls
Average Leak Rate Over 5 Minute Duration:	0.8	ml/min
Max. Allowable Leakage Rate:	17	ml/min
Was the Leakage Below the Allowable?	Yes	