

API 589 Second Edition Fire Test Report

Performed for

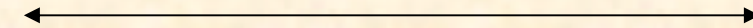
Teadit North America

558 Garden Oaks Blvd.

Houston, TX 77018

PH (713) 699-0169

www.teadit.net



Style 2000IC
in a 6 inch Class 300 Gate Valve
Project Number: 203113
January 2004



Performed by

YARMOUTH RESEARCH AND TECHNOLOGY

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TEST RESULT SUMMARY API STANDARD 589 - SECOND EDITION

Test Number: PN203113	Test Date: 13-Jan-04
Packing Material: Style 2000IC	
Packing Manufacturer: Teadit	
Test Valve Size: 6" Class 300 Crane Gate Valve - Bonnet Fixture	
Bore Diameter: 1.904	
Stem Diameter: 1.247	
Packing Configuration: 5 rings packing set wih joints staggered	
Packing Compression % of Free Height:	30%
Packing Gland Bolt Diameter:	5/8 inch

Torque on Gland Nuts (ft-lb):

	<i>Side A</i>	<i>Side B</i>
As Installed:	50	60
After HydroTest:	50	60
After Burn:	15	20

Leakage Measurements (ml/min):

	<i>Actual</i>	<i>Allowable</i>
During two minute pretest hydrotest:	0.0	0
During burn and cooldown:	0.0	60
During low pressure test:	0.0	3
After operating close and open:	0.4	60

Packing Qualification:

This packing does comply with the performance requirements of this standard.

Test Conducted and Witnessed by



Matthew J. Wasielewski, P.E.



Yarmouth Research and Technology

Customer: Teadit

Test Date: 13-Jan-04

Product Code: Style 2000IC

Project Number: PN203113

Dimensional Information

Initial Packing Height:	1.563	inches
Stem Diameter:	1.247	inches
Bore Diameter:	1.904	inches
Gland Follower ID:	1.288	inches
Gland Follower OD:	1.863	inches
Gland Follower Length:	0.975	inches
Bottom Bushing ID:	1.290	inches
Bottom Bushing OD:	1.880	inches
Bore Depth with Bushing Installed:	1.450	inches

Clearances and Finishes

	Actual	Allowable
Between Stem and Follower:	0.041	.040-.060
Between Follower and Bore:	0.041	.040-.060
Between Stem and Bottom Bushing:	0.043	.040-.060
Between Bottom Bushing and Bore:	0.024	-
Stem Surface Roughness (Ra):	12	32 max.
Bore Surface Roughness (Ra):	125	125 max.

Packing Compression Data

Packing Free Height:	1.563	inches
Packing Compression Amount:	0.468	inches
% Compression:	30%	
Gland adjustment length:	0.620	inches
This height complies with API 600. (.563 minimum)		

Instrumentation

Version of YRT's Fire-Control 589 Software:	B
Differential Pressure Sensor No.:	PT-60-1
Pressure Gauge Number:	PG-1000-2, PG-2000-1 PT-1000-1, PG-100-1
Thermocouple Type:	K

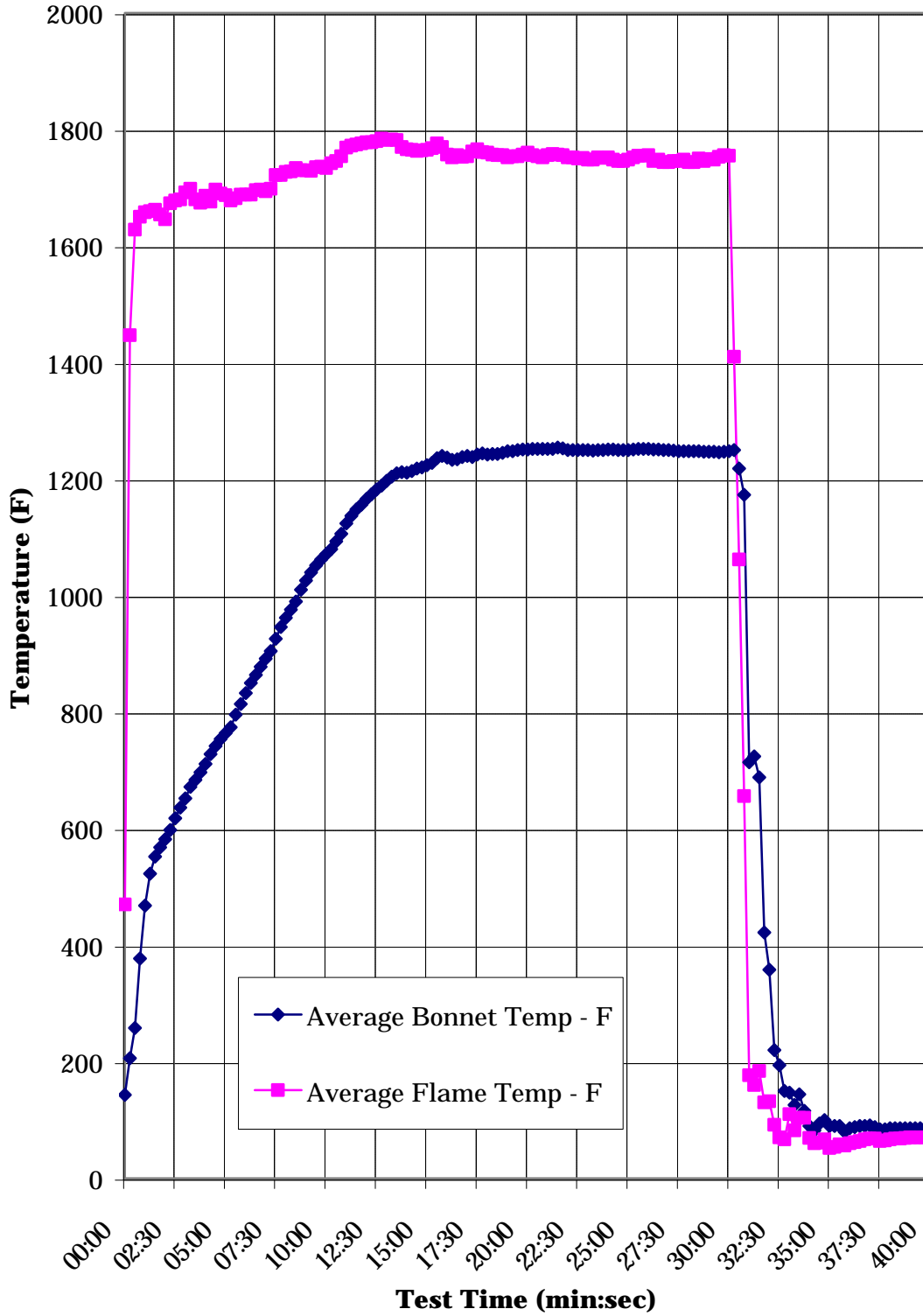
Were all instruments verified to be calibrated to NIST standards?: Yes

Notes

The gland eyebolts and pins were new.

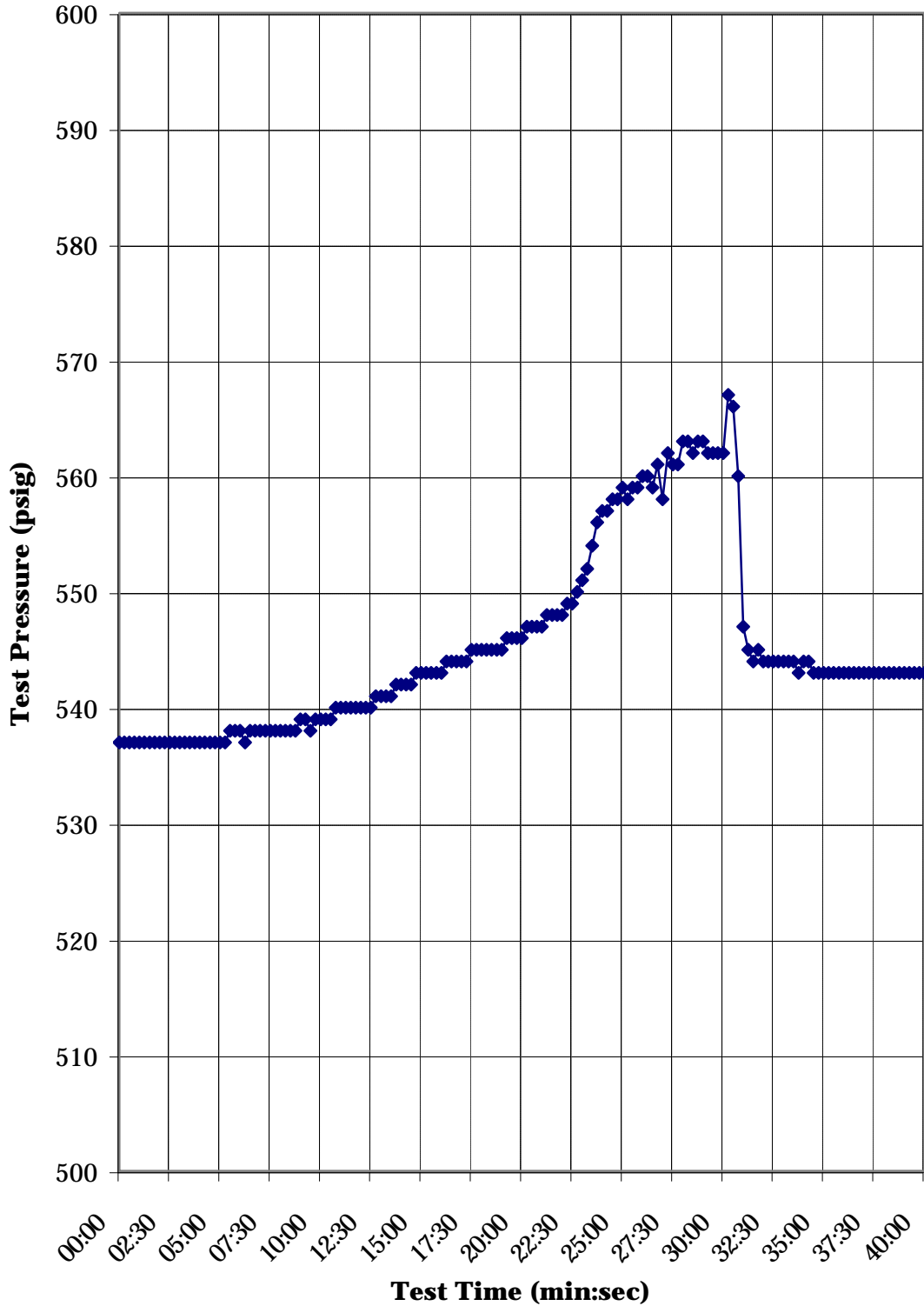
The bonnet and stem were used, but in very good condition.

Temperature vs. Time Chart



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Pressure vs. Time Chart



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Packing received from manufacturer. Five rings cut at 45 deg. angle.

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6" Class 300 Bonnet Fixture



During Burn

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Fire Test During Burn

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Packing After Test



Top (left) and Bottom (right) Rings After Test.

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Fire Test Information

Customer: Teadit

Date: 1/13/2004

Product Code: Style 2000IC

Project Number: PN203113

System was pressurized with no leakages found.

Fire Test Raw Data

Time	Pressure (psig)	Water Volume (mls)	Left Bonnet Temp - F	Right Bonnet Temp - F	Average Bonnet Temp - F	Left Flame Temp - F	Right Flame Temp - F	Average Flame Temp - F
11:58:00	537	9660	168	118	143	438	502	470
11:58:15	537	9658	230	183	206	1494	1400	1447
11:58:30	537	9650	267	248	258	1639	1618	1628
11:58:45	537	9665	304	450	377	1659	1641	1650
11:59:00	537	9668	365	571	468	1686	1631	1658
11:59:15	537	9671	402	644	523	1715	1605	1660
11:59:30	537	9686	438	667	552	1732	1591	1662
11:59:45	537	9653	467	669	568	1740	1568	1654
12:00:00	537	9676	495	668	582	1748	1545	1646
12:00:15	537	9696	519	676	598	1760	1586	1673
12:00:30	537	9673	543	693	618	1762	1593	1678
12:00:45	537	9673	566	706	636	1764	1596	1680
12:01:00	537	9686	585	720	652	1763	1621	1692
12:01:15	537	9691	606	737	672	1772	1623	1698
12:01:30	537	9693	625	744	684	1771	1589	1680
12:01:45	537	9686	643	751	697	1771	1577	1674
12:02:00	537	9688	660	762	711	1777	1594	1686
12:02:15	537	9698	680	777	728	1773	1580	1676
12:02:30	537	9688	696	787	742	1807	1587	1697
12:02:45	537	9708	715	794	754	1820	1559	1690
12:03:00	537	9701	734	793	764	1824	1550	1687
12:03:15	537	9701	751	797	774	1834	1522	1678
12:03:30	538	9724	773	818	796	1842	1522	1682
12:03:45	538	9711	790	839	814	1848	1529	1688
12:04:00	538	9703	809	857	833	1850	1525	1688
12:04:15	537	9714	826	873	850	1857	1520	1688
12:04:30	538	9719	842	886	864	1859	1532	1696
12:04:45	538	9734	858	899	878	1859	1535	1697
12:05:00	538	9741	873	912	892	1860	1529	1694
12:05:15	538	9736	887	923	905	1863	1533	1698
12:05:30	538	9744	914	937	926	1879	1565	1722
12:05:45	538	9757	941	952	946	1886	1558	1722
12:06:00	538	9764	960	964	962	1886	1568	1727

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Fire Test Data - continued

Time	Pressure (psig)	Water Volume (mls)	Left Bonnet Temp - F	Right Bonnet Temp - F	Average Bonnet Temp - F	Left Flame Temp - F	Right Flame Temp - F	Average Flame Temp - F
12:06:15	538	9739	978	975	976	1889	1567	1728
12:06:30	538	9739	992	987	990	1891	1577	1734
12:06:45	538	9754	1004	1015	1010	1894	1567	1730
12:07:00	539	9774	1015	1038	1026	1891	1569	1730
12:07:15	539	9772	1026	1053	1040	1894	1564	1729
12:07:30	538	9769	1038	1065	1052	1898	1572	1735
12:07:45	539	9774	1050	1073	1062	1897	1574	1736
12:08:00	539	9769	1061	1081	1071	1894	1573	1734
12:08:15	539	9800	1073	1086	1080	1903	1581	1742
12:08:30	539	9807	1089	1097	1093	1904	1587	1746
12:08:45	540	9810	1101	1110	1106	1915	1592	1754
12:09:00	540	9817	1122	1125	1124	1929	1609	1769
12:09:15	540	9815	1137	1137	1137	1925	1619	1772
12:09:30	540	9825	1148	1147	1148	1929	1619	1774
12:09:45	540	9817	1159	1154	1156	1930	1622	1776
12:10:00	540	9822	1171	1161	1166	1929	1626	1778
12:10:15	540	9832	1180	1167	1174	1932	1625	1778
12:10:30	540	9845	1188	1175	1182	1935	1625	1780
12:10:45	541	9868	1198	1180	1189	1939	1628	1784
12:11:00	541	9878	1208	1186	1197	1937	1626	1782
12:11:15	541	9870	1216	1191	1204	1937	1629	1783
12:11:30	541	9878	1223	1198	1210	1935	1629	1782
12:11:45	542	9901	1223	1200	1212	1925	1615	1770
12:12:00	542	9921	1224	1198	1211	1924	1607	1766
12:12:15	542	9931	1229	1199	1214	1923	1607	1765
12:12:30	542	9949	1233	1202	1218	1921	1605	1763
12:12:45	543	9959	1234	1205	1220	1918	1610	1764
12:13:00	543	9954	1235	1213	1224	1918	1612	1765
12:13:15	543	9974	1236	1220	1228	1915	1622	1768
12:13:30	543	9959	1237	1234	1236	1915	1636	1776
12:13:45	543	9977	1238	1243	1240	1910	1630	1770
12:14:00	543	9997	1239	1235	1237	1911	1603	1757
12:14:15	544	10007	1239	1227	1233	1908	1596	1752
12:14:30	544	10017	1241	1228	1234	1907	1604	1756
12:14:45	544	10025	1244	1232	1238	1905	1601	1753
12:15:00	544	10027	1246	1233	1240	1909	1600	1754
12:15:15	544	10022	1244	1232	1238	1916	1608	1762
12:15:30	545	10030	1246	1239	1242	1912	1620	1766
12:15:45	545	10050	1250	1237	1244	1911	1611	1761
12:16:00	545	10040	1251	1234	1242	1910	1609	1760
12:16:15	545	10058	1252	1234	1243	1911	1603	1757

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Fire Test Data - continued

Time	Pressure (psig)	Water Volume (mls)	Left Bonnet Temp - F	Right Bonnet Temp - F	Average Bonnet Temp - F	Left Flame Temp - F	Right Flame Temp - F	Average Flame Temp - F
12:16:30	545	10065	1253	1233	1243	1913	1600	1756
12:16:45	545	10083	1256	1234	1245	1913	1599	1756
12:17:00	545	10098	1259	1236	1248	1908	1597	1752
12:17:15	546	10113	1258	1237	1248	1908	1600	1754
12:17:30	546	10113	1259	1240	1250	1905	1604	1754
12:17:45	546	10113	1258	1244	1251	1903	1611	1757
12:18:00	546	10123	1256	1246	1251	1906	1615	1760
12:18:15	547	10151	1255	1249	1252	1899	1613	1756
12:18:30	547	10166	1253	1251	1252	1898	1611	1754
12:18:45	547	10166	1253	1252	1252	1896	1609	1752
12:19:00	547	10156	1252	1252	1252	1898	1613	1756
12:19:15	548	10189	1252	1253	1252	1903	1614	1758
12:19:30	548	10197	1253	1254	1254	1902	1612	1757
12:19:45	548	10187	1253	1253	1253	1900	1613	1756
12:20:00	548	10214	1252	1249	1250	1896	1609	1752
12:20:15	549	10247	1253	1248	1250	1897	1607	1752
12:20:30	549	10273	1253	1246	1250	1896	1605	1750
12:20:45	550	10275	1253	1246	1250	1897	1605	1751
12:21:00	551	10311	1254	1245	1250	1898	1599	1748
12:21:15	552	10384	1253	1245	1249	1897	1599	1748
12:21:30	554	10488	1254	1245	1250	1896	1607	1752
12:21:45	556	10579	1254	1246	1250	1897	1605	1751
12:22:00	557	10624	1255	1247	1251	1901	1603	1752
12:22:15	557	10665	1255	1247	1251	1896	1599	1748
12:22:30	558	10695	1255	1245	1250	1897	1594	1746
12:22:45	558	10718	1255	1246	1250	1896	1597	1746
12:23:00	559	10723	1255	1246	1250	1896	1601	1748
12:23:15	558	10738	1255	1247	1251	1896	1608	1752
12:23:30	559	10756	1256	1248	1252	1901	1609	1755
12:23:45	559	10756	1256	1249	1252	1894	1616	1755
12:24:00	560	10870	1257	1246	1252	1894	1617	1756
12:24:15	560	10880	1257	1245	1251	1884	1609	1746
12:24:30	559	10905	1257	1245	1251	1886	1611	1748
12:24:45	561	10999	1257	1243	1250	1881	1608	1744
12:25:00	558	10915	1256	1243	1250	1878	1609	1744
12:25:15	562	10953	1255	1243	1249	1879	1613	1746
12:25:30	561	10890	1255	1242	1248	1878	1613	1746
12:25:45	561	10862	1254	1242	1248	1874	1621	1748
12:26:00	563	11092	1255	1242	1248	1871	1618	1744
12:26:15	563	10905	1254	1242	1248	1872	1616	1744
12:26:30	562	10963	1254	1242	1248	1879	1620	1750

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Fire Test Data - continued

Time	Pressure (psig)	Water Volume (mls)	Left Bonnet Temp - F	Right Bonnet Temp - F	Average Bonnet Temp - F	Left Flame Temp - F	Right Flame Temp - F	Average Flame Temp - F
12:26:45	563	10925	1253	1241	1247	1873	1618	1746
12:27:00	563	10978	1253	1241	1247	1875	1623	1749
12:27:15	562	11047	1253	1241	1247	1876	1619	1748
12:27:30	562	11011	1252	1240	1246	1870	1636	1753
12:27:45	562	10999	1253	1241	1247	1868	1643	1756
12:28:00	562	11062	1254	1241	1248	1870	1640	1755
12:28:15	567	11075	1250	1251	1250	1326	1494	1410
12:28:30	566	11183	1234	1202	1218	923	1202	1062
12:28:45	560	10867	1210	1136	1173	530	783	656
12:29:00	547	10090	1180	249	714	212	142	177
12:29:15	545	10078	1169	279	724	147	172	160
12:29:30	544	10037	1111	266	688	166	203	184
12:29:45	545	10010	629	215	422	134	127	130
12:30:00	544	9934	484	233	358	130	134	132
12:30:15	544	9896	226	213	220	75	110	92
12:30:30	544	9893	213	175	194	76	63	70
12:30:45	544	9886	193	108	150	79	55	67
12:31:00	544	9860	141	153	147	95	126	110
12:31:15	544	9840	128	125	126	103	62	82
12:31:30	544	9830	141	148	144	123	86	104
12:31:45	543	9815	128	103	116	118	90	104
12:32:00	544	9802	98	81	90	55	83	69
12:32:15	544	9805	79	85	82	51	68	60
12:32:30	543	9779	87	101	94	54	68	61
12:32:45	543	9769	92	108	100	63	71	67
12:33:00	543	9759	87	92	90	50	54	52
12:33:15	543	9759	87	92	90	52	56	54
12:33:30	543	9754	87	93	90	56	61	58
12:33:45	543	9744	81	79	80	55	56	56
12:34:00	543	9716	84	88	86	58	61	60
12:34:15	543	9724	84	92	88	60	65	62
12:34:30	543	9719	86	94	90	62	67	64
12:34:45	543	9719	85	95	90	65	69	67
12:35:00	543	9721	87	95	91	66	70	68
12:35:15	543	9714	86	90	88	66	70	68
12:35:30	543	9706	83	85	84	68	59	64
12:35:45	543	9701	83	86	84	68	62	65
12:36:00	543	9703	83	88	86	68	66	67
12:36:15	543	9708	83	88	86	68	68	68
12:36:30	543	9724	83	88	86	68	69	68
12:36:45	543	9706	83	89	86	69	69	69

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Fire Test Data - continued

Time	Pressure (psig)	Water Volume (mls)	Left Bonnet Temp - F	Right Bonnet Temp - F	Average Bonnet Temp - F	Left Flame Temp - F	Right Flame Temp - F	Average Flame Temp - F
12:37:00	543	9714	83	89	86	69	70	70
12:37:15	543	9703	84	89	86	69	71	70
12:37:30	543	9693	84	89	86	68	71	70
12:37:45	543	9672	84	88	86	69	71	70
12:38:00	543	9664	84	88	86	69	71	70

Starting Water Volume:	9660	ml
Ending Water Volume:	9664	ml
Water Loss:	0	ml
Test Duration:	40	min.
Average Leakage During Burn and Cooldown:	0.0	ml/min.
Allowable Leakage Rate for 6" Valve:	60.0	ml/min.
Does Packing Comply with Leakage Requirement:	YES	

Notes:

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Low Pressure Test Information

Customer: Teadit

Date: 1/13/2004

Product Code: Style 2000IC

Project Number: PN203113

Low Pressure Test Raw Data

Time	Pressure (psig)	Average Bonnet Temp - F
12:48:58	50	86
12:49:13	50	86
12:49:28	50	86
12:49:43	50	86
12:49:58	50	86
12:50:13	50	86
12:50:28	50	86
12:50:43	50	85
12:50:58	50	86
12:51:13	50	86
12:51:28	50	85
12:51:43	50	85
12:51:58	50	85
12:52:13	50	86
12:52:28	50	86
12:52:43	50	85
12:52:58	50	85
12:53:13	50	84
12:53:28	50	85
12:53:43	50	84

Manual leakage measurement was made.

Total Leakage Collected Over 5 Minute Duration:	0.0	mls
Average Leak Rate Over 5 Minute Duration:	0.0	ml/min
Allowable Leak Rate for 6 inch Valve:	3.0	ml/min
Does Packing Comply with Leakage Requirement:	Yes	

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Operational Test Information

Customer: Teadit

Date: 1/13/2004

Product Code: Style 2000IC

Project Number: PN203113

Operational Test Raw Data

Time	Pressure (psig)	Average Bonnet Temp - F
13:04:55	536	86
13:05:10	536	85
13:05:25	536	86
13:05:40	536	86
13:05:55	536	86
13:06:10	536	86
13:06:25	536	86
13:06:40	536	86
13:06:55	536	86
13:07:10	536	86
13:07:25	537	86
13:07:40	537	86
13:07:55	536	86
13:08:10	536	86
13:08:25	537	86
13:08:40	536	85
13:08:55	537	86
13:09:10	536	86
13:09:25	536	85
13:09:40	537	85
13:09:55	536	86

Manual leakage measurement was made.

Total Leakage Collected Over 5 Minute Duration:	2	mls
Average Leak Rate Over 5 Minute Duration:	0.4	ml/min
Allowable Leak Rate for 6 inch Valve:	60	ml/min
Does Packing Comply with Leakage Requirement:	Yes	