Fire Test Report

API Standard 607, 4th Edition

Performed for

ValvTechnologies, Inc.

www.valv.com

4 inch Class 300 Ball Valve
Product Code: V5CC-RF-FP-B040-008ZZ

Project Number: 210245
February 22, 2011

Performed by

YARMOUTH RESEARCH AND TECHNOLOGY, LLC

434 Walnut Hill Road
North Yarmouth, ME 04097 USA
(207) 829-5359
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Yarmouth Research and Technology

Customer: ValvTechnologies, Inc. **Date:** 2/22/2011

Specification: API 607, Fourth Edition, May 1993

Product Description: 4 inch Class 300 Ball Valve

Project Number: PN2110245

Comments: Model:V5CC-RF-FP-B040-008ZZ

Yarmouth Engineer: Matthew J. Wasielewski, P.E.

Equipment Confirmed to be in Calibration to NIST Standards: Yes

Burn and Cool Down Test

Burn Start Time:	**11:56:00**	
Average Pressure During Burn:	**31**	psig
Seat Leak Rate During Burn:	**51.3**	ml/min
Allowable Seat Leak Rate:	**400**	ml/min
External Leak Rate During Burn/Cool Down:	**0.7**	ml/min
Allowable External Leak Rate:	**100.0**	ml/min
Were the Valve Leakages Below the Allowables?	**Yes**	

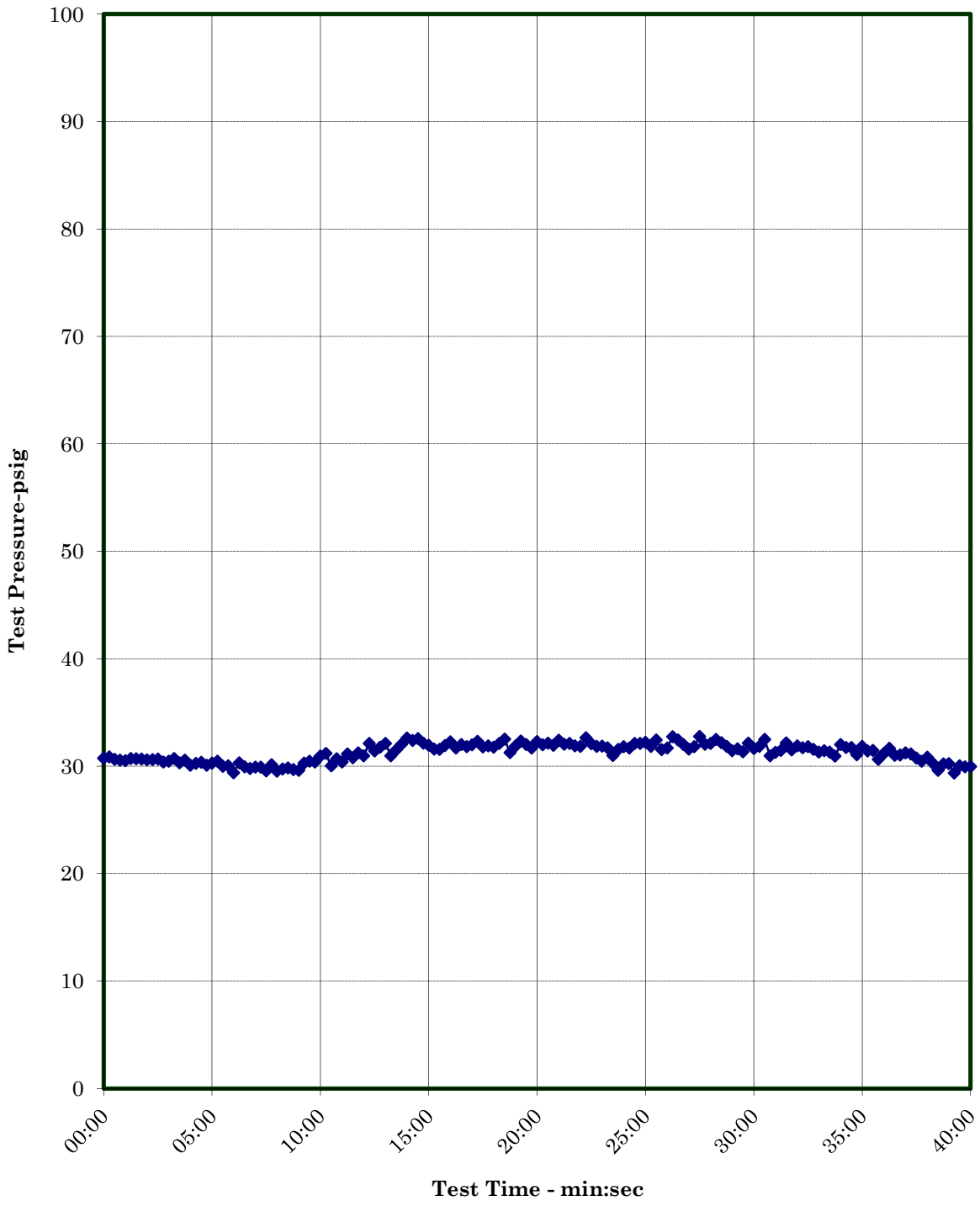
Operational Test

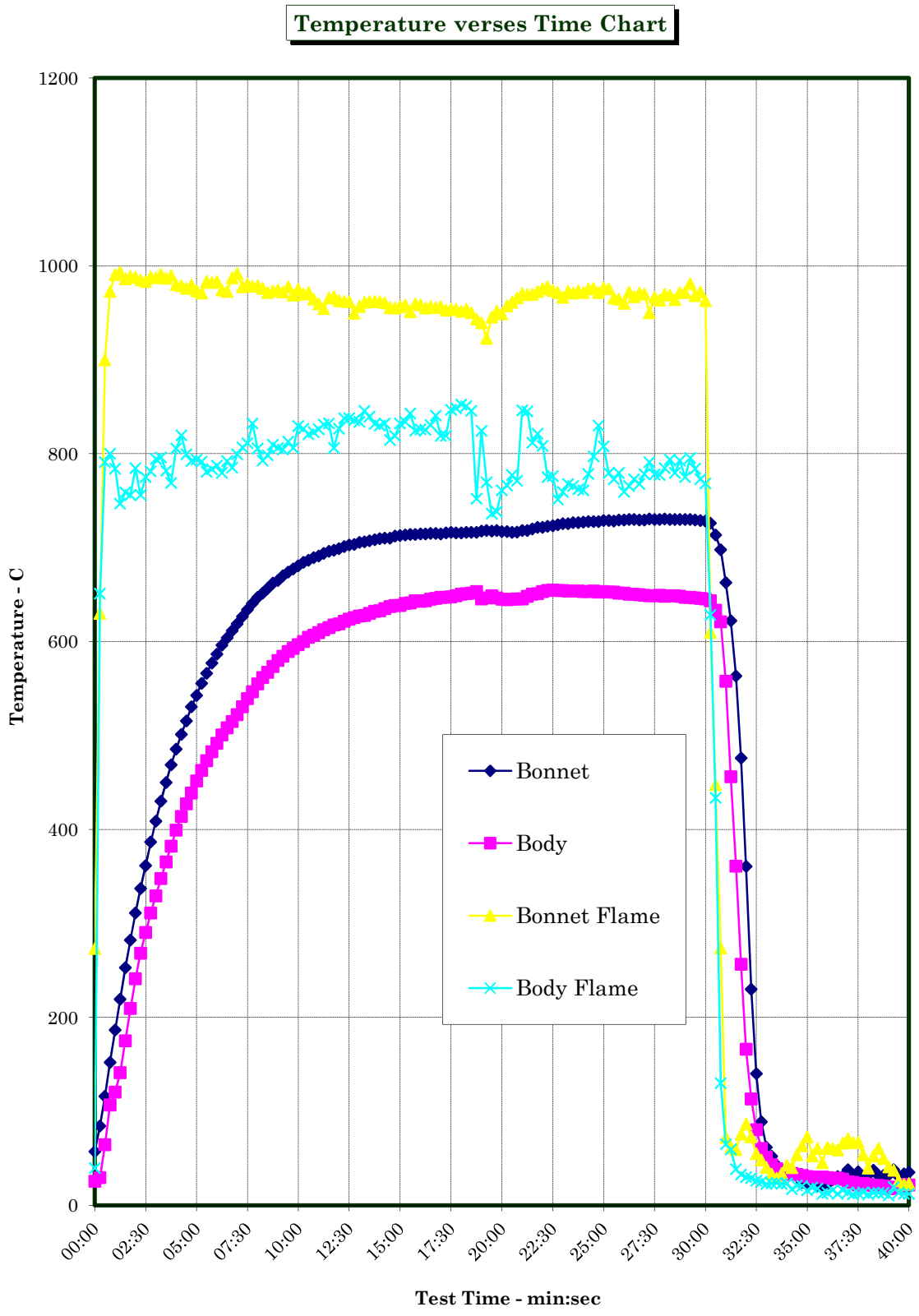
Average Pressure During Test:	**31**	psig
Seat Leak Rate After Operating:	**0**	ml/min
Allowable Seat Leak Rate:	**80**	ml/min
External Leak Rate After Operating:	**0**	ml/min
Allowable External Leak Rate:	**100.0**	ml/min
Were the Valve Leakages Below the Allowables?	**Yes**	

Valve Pass or Fail the Test Standard?	**PASS**

Witnesses

Pressure verses Time Chart

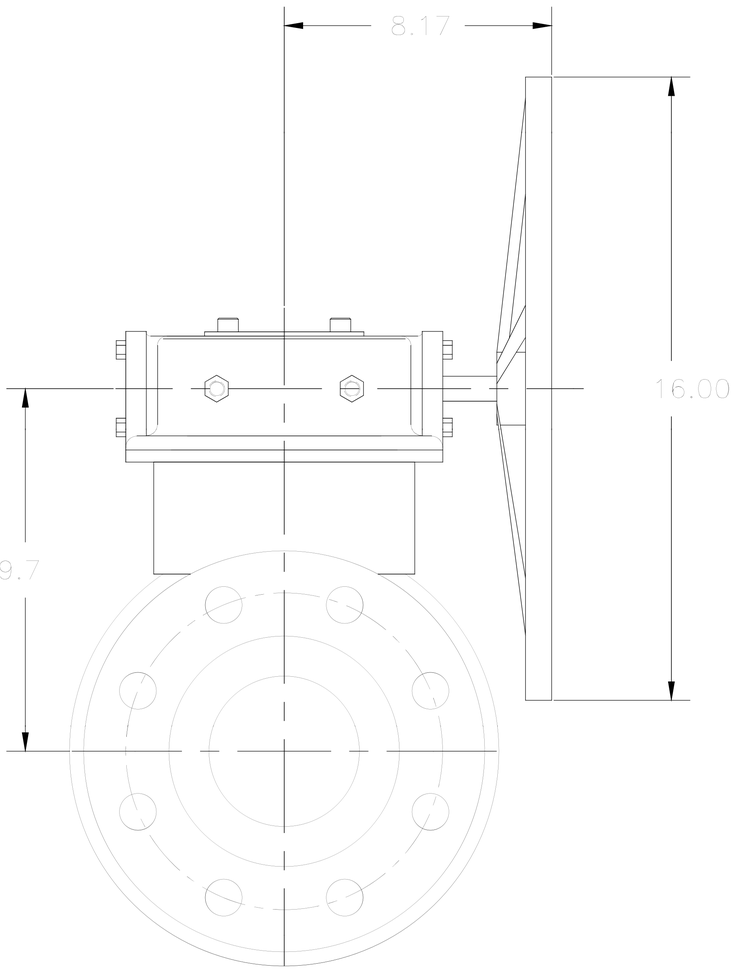


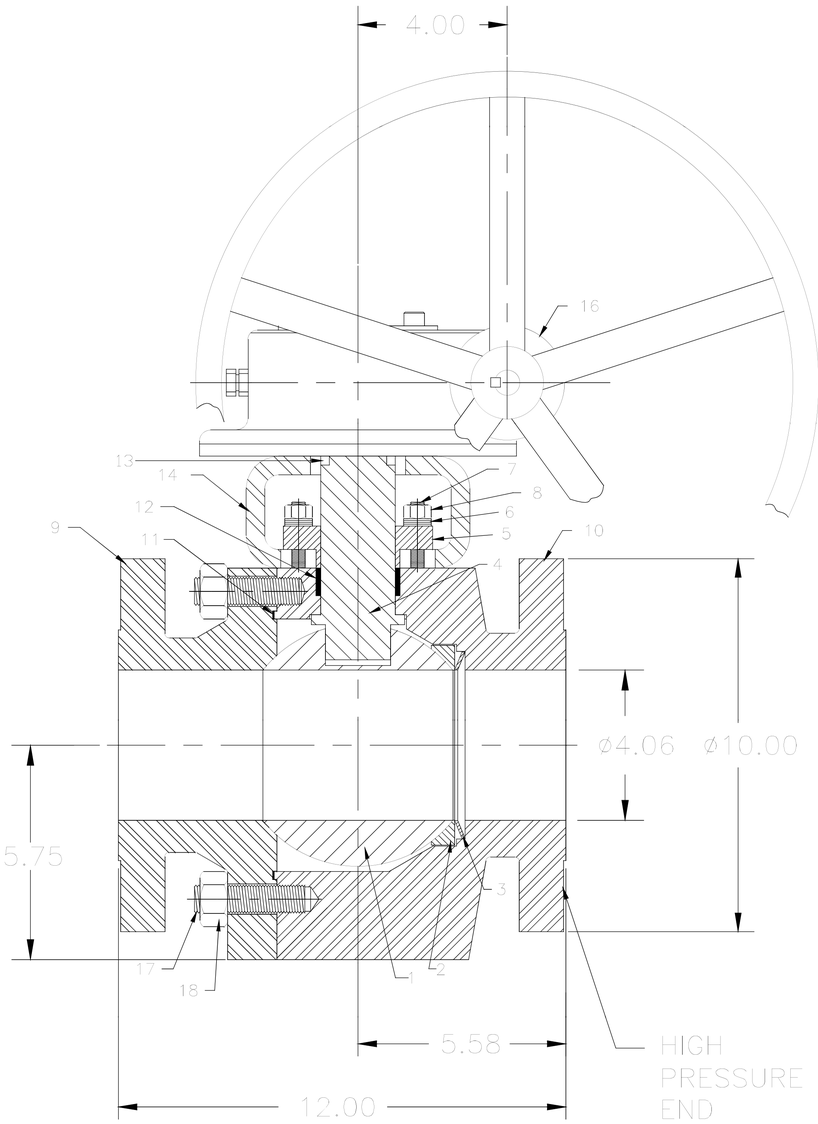

Temperature verses Time Chart
1200
1000
800
600
400
200
0
Temperature - C
00:00
02:30
05:00
07:30
10:00
12:30
15:00
17:30
20:00
22:30
25:00
27:30
30:00
32:30
35:00
37:30
40:00
Test Time - min:sec
Bonnet
Body
Bonnet Flame
Body Flame

Fire Test Information Sheet

Valve Manufacturer's Name:	Valvtechnologies
Valve Manufacturer's Address:	5904 Bingle Road Houston, Texas 77092
Did valve meet all required hydrostatic, leakage and other production pressure tests?	Yes
Valve Product Code:	V5CC-RF-FP-B040-008ZZ
Valve Description Size:	4"
Pressure Rating:	300#
Pressure Rating at 100F:	740 psi
Type:	Seat supported Ball valve
Weight:	180 lb
Reduced or Full Bore:	Full Bore
Body/Bonnet Material:	ASME SA-105
Trim Material:	ASME SA-182 Grade 316
Seat Material:	ASME SA-182 Grade 316
Stem / Body Seal Material:	ASME SA-479 Grade 316
Bolting Material:	ASME SA193 Gr. B7M/SA-194 Gr. 2HM
Is valve considered "Soft-Seated"?	NO
Valve Markings	
Nameplate Information:	V5CC-RF-FP-B040-008ZZ
Casting Markings:	NA
Assembly Drawing Number / Revision / Date of Issue:	110032
Assembly Drawing sent to Yarmouth:	Yes
If valve is fitted with gearbox, state gearbox manufacturer, model number and mechanical advantage:	Exeeco Gearbox IW-4, ME: 23 +/- 10%
If valve is non-symmetric, state direction of flow for test:	Direction of flow is from the high pressure end of the valve – high pressure end tag is attached to the inlet flange.
For double-seated valves, state maximum allowable cavity pressure:	NA
Manufacturer's Contact Name /Date:	Jonathan Jones / 02/22/11

Project Name: AMAL PROJECT
FIRE SAFE TEST VALVE FOR SALES ORDER 102876
SALE ORDER: 110032





BILL OF MATERIAL

ITEM	DESCRIPTION	MATERIAL	QTY.
1	BALL	316 SS/RAM31	1*
2	UPSTREAM SEAT	316 SS/QPQ	1*
3	BELLVILLE SPRING	INCONEL 718	1*
4	STEM	316 SS/QPQ	1
5	GLAND	4130 HT/QPQ	1
6	GLAND LOAD SPRING	302 SS	24
7	GLAND STUD	A193 Gr. B8M	4
8	GLAND NUT	A194 Gr. 8M	4
9	END CAP	A105/RAM31	1*
10	BODY	A105	1
11	BODY GASKET	GRAFOIL	1*
12	GLAND PACKING	CHESTERTON 1600/GTP5300	3*
13	KEY	1018	2
14	MOUNTING BRACKET	A500	1
15			
16	OPERATOR	EXEECO IW-4	1
17	BODY STUD	A193 Gr. B7	8
18	BODY NUT	A194 Gr. 2H	8

* Recommended Spare Parts

Release For Customer Request

Approx. Total Weight: 280 Lbs

THIRD ANGLE PROJECTION

REV	DATE	DESCRIPTION	ECN	BY	CHK	APR
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–

DIMENSIONS ARE IN INCHES
REMOVE BURRS AND BREAK EDGES
UNLESS OTHERWISE SPECIFIED

CORNER RADII
.X= ±
.XX= ±
.XXX= ±
CONCENTRICITY
ANGULAR= ±
SURFACE TEXTURE
MIN. INTERNAL FILLETS

SCALE: NTS | MODEL FILE | SIZE: B

MATERIAL: –
–

COATING: –
–

DRAWN BY: PN DATE: 02/22/11
CHECKED BY: NN DATE: 02/22/11
ENGINEER: CWF DATE: 02/22/11
APPROVED BY: CWF DATE: 02/22/11

VALVTECHNOLOGIES
5904 BINGLE ROAD, HOUSTON TEXAS 77092
PH: (713) 860-0400 FAX: (713) 860-0499

TITLE:
V5CC-RF-FP-B040-008ZZ-001, ANSI 300#
WITH EXXECO IW-4
–

110032 | REV. 0 | SH. 1 OF 1

Valve During Burn

Valve During Burn

Fire Test Information

Customer: ValvTechnologies, Inc. **Date:** 2/22/2011

Product Code: 4 inch Class 300 Ball Valve

Project Number: PN2110245

Fire Test Raw Data

Time	Pressure (psig)	Water Volume (mls)	Bonnet Temp-C	Body Temp-C	Bonnet Flame Temp-C	Body Flame Temp-C	Average Flame Temp-C
11:56:00	31	31645	57	26	273	39	156
11:56:15	31	31640	84	29	630	651	641
11:56:30	31	31582	116	64	900	791	846
11:56:45	31	31631	152	107	973	800	886
11:57:00	31	31609	187	121	991	784	887
11:57:15	31	31597	219	141	993	747	870
11:57:30	31	31572	253	175	986	759	873
11:57:45	31	31667	282	209	989	756	873
11:58:00	31	31613	311	241	988	784	886
11:58:15	31	31620	337	268	985	756	871
11:58:30	31	31640	362	291	983	775	879
11:58:45	30	31644	387	311	988	781	885
11:59:00	30	31632	409	329	987	794	891
11:59:15	31	31601	430	348	991	796	894
11:59:30	30	31573	450	366	987	782	884
11:59:45	31	31570	469	382	989	769	879
12:00:00	30	31529	486	399	980	806	893
12:00:15	30	31457	501	414	979	819	899
12:00:30	30	31406	516	427	976	799	888
12:00:45	30	31375	531	439	979	792	886
12:01:00	30	31360	543	452	973	794	884
12:01:15	30	31313	556	463	971	792	881
12:01:30	30	31139	566	473	983	781	882
12:01:45	30	31102	577	483	982	783	883
12:02:00	29	30949	587	492	983	787	885
12:02:15	30	30922	596	501	974	779	877
12:02:30	30	30794	604	508	973	792	883
12:02:45	30	30744	612	515	987	785	886
12:03:00	30	30683	619	522	992	799	896
12:03:15	30	30618	627	531	978	807	892
12:03:30	30	30543	634	539	981	811	896
12:03:45	30	30565	641	547	978	832	905
12:04:00	30	30500	647	555	979	806	892

Fire Test Data - continued

12:04:15	30	30456	652	562	976	793	884
12:04:30	30	30454	657	567	972	798	885
12:04:45	30	30403	662	573	973	809	891
12:05:00	30	30463	665	580	974	806	890
12:05:15	30	31017	670	584	972	804	888
12:05:30	30	31192	674	589	978	813	895
12:05:45	30	31142	677	593	969	806	888
12:06:00	31	31413	681	597	975	829	902
12:06:15	31	31934	684	600	970	827	898
12:06:30	30	31685	687	604	972	821	896
12:06:45	31	31303	689	607	964	823	894
12:07:00	30	31962	691	609	959	826	893
12:07:15	31	31625	694	613	954	831	893
12:07:30	31	31658	696	615	966	832	899
12:07:45	31	32068	697	618	967	806	887
12:08:00	31	31578	699	619	963	827	895
12:08:15	32	32523	701	622	962	838	900
12:08:30	31	32079	703	624	962	838	900
12:08:45	32	32676	703	626	949	836	893
12:09:00	32	33277	706	627	957	834	895
12:09:15	31	32608	706	628	961	846	903
12:09:30	32	33167	707	630	962	839	901
12:09:45	32	31674	708	632	962	832	897
12:10:00	33	33411	709	633	962	830	896
12:10:15	32	33105	710	635	961	832	896
12:10:30	33	32877	710	637	956	814	885
12:10:45	32	32831	712	638	955	819	887
12:11:00	32	32605	713	638	957	832	894
12:11:15	32	31970	713	641	958	834	896
12:11:30	32	31817	714	641	951	843	897
12:11:45	32	32349	714	643	959	824	892
12:12:00	32	32508	714	643	958	826	892
12:12:15	32	32482	714	643	955	826	890
12:12:30	32	32466	715	645	957	831	894
12:12:45	32	32459	715	646	956	841	898
12:13:00	32	32517	714	647	957	819	888
12:13:15	32	32501	716	647	953	819	886
12:13:30	32	32485	716	648	954	847	900
12:13:45	32	32391	716	649	954	848	901
12:14:00	32	32431	716	651	952	852	902
12:14:15	32	32433	716	651	954	851	902
12:14:30	33	32839	716	652	950	846	898
12:14:45	31	32039	716	653	943	752	848

Fire Test Data - continued

12:15:00	32	32413	718	646	939	824	882
12:15:15	32	32638	718	647	923	769	846
12:15:30	32	32482	718	649	946	736	841
12:15:45	32	32437	718	647	952	738	845
12:16:00	32	32699	717	645	949	761	855
12:16:15	32	32050	717	644	957	766	862
12:16:30	32	32702	716	645	961	777	869
12:16:45	32	32260	717	646	966	771	869
12:17:00	32	32695	718	646	971	846	908
12:17:15	32	32506	718	648	969	845	907
12:17:30	32	32671	720	651	970	812	891
12:17:45	32	32630	722	651	973	821	897
12:18:00	32	32109	722	653	976	808	892
12:18:15	33	32647	723	654	978	775	876
12:18:30	32	32311	723	655	974	776	875
12:18:45	32	32065	724	654	972	751	861
12:19:00	32	32131	726	654	967	759	863
12:19:15	32	32095	726	654	973	768	870
12:19:30	31	32105	727	654	971	766	868
12:19:45	32	32114	727	654	973	762	868
12:20:00	32	32204	727	653	972	761	866
12:20:15	32	32292	728	653	976	778	877
12:20:30	32	32315	728	654	976	797	887
12:20:45	32	32655	728	653	972	830	901
12:21:00	32	32598	729	653	977	808	892
12:21:15	32	31990	729	653	976	779	878
12:21:30	32	32721	728	653	966	773	869
12:21:45	32	32005	729	652	964	779	872
12:22:00	32	32233	729	652	960	759	860
12:22:15	33	32677	730	651	972	766	869
12:22:30	32	32649	730	651	967	773	870
12:22:45	32	32331	729	650	971	768	869
12:23:00	32	31933	729	649	970	778	874
12:23:15	32	32058	731	649	950	791	871
12:23:30	33	32196	730	649	967	778	872
12:23:45	32	32425	730	649	963	777	870
12:24:00	32	32612	731	648	970	784	877
12:24:15	32	32692	730	649	969	794	881
12:24:30	32	32538	730	649	964	779	872
12:24:45	32	32417	730	648	972	793	882
12:25:00	31	32206	730	647	972	775	873
12:25:15	32	32074	730	647	981	796	888
12:25:30	31	32204	729	647	968	784	876

Fire Test Data - continued

12:25:45	32	32627	729	646	972	773	873
12:26:00	32	32385	728	646	963	768	866
12:26:15	32	32293	726	643	610	628	619
12:26:30	32	32580	713	633	448	434	441
12:26:45	31	31616	698	621	274	130	202
12:27:00	31	31851	663	558	72	65	69
12:27:15	31	32080	622	456	62	59	61
12:27:30	32	32436	563	361	59	38	49
12:27:45	32	32416	476	257	76	33	54
12:28:00	32	32420	361	166	87	30	58
12:28:15	32	32189	230	113	73	29	51
12:28:30	32	32278	140	81	55	26	41
12:28:45	32	32448	89	61	48	25	37
12:29:00	31	31641	62	51	41	23	32
12:29:15	31	32008	52	43	33	23	28
12:29:30	31	31798	43	39	29	24	26
12:29:45	31	31547	38	36	34	23	28
12:30:00	32	31774	33	33	43	23	33
12:30:15	32	31983	36	34	40	17	29
12:30:30	32	31612	31	33	54	21	38
12:30:45	31	31422	24	32	63	21	42
12:31:00	32	32187	24	31	73	16	44
12:31:15	31	31576	25	30	53	19	36
12:31:30	31	31988	21	29	61	18	39
12:31:45	31	31643	22	30	46	12	29
12:32:00	31	31720	23	29	62	13	38
12:32:15	32	31811	27	28	61	16	38
12:32:30	31	31667	31	29	59	12	36
12:32:45	31	31640	31	28	66	16	41
12:33:00	31	31454	38	25	71	14	42
12:33:15	31	31208	32	24	67	12	39
12:33:30	31	31007	36	22	67	13	40
12:33:45	30	30918	29	23	54	14	34
12:34:00	31	30763	32	22	39	12	26
12:34:15	30	30584	37	21	53	13	33
12:34:30	30	30452	32	21	61	13	37
12:34:45	30	30350	32	21	50	13	32
12:35:00	30	30169	32	18	41	11	26
12:35:15	29	30048	38	19	37	19	28
12:35:30	30	29865	31	18	26	13	20
12:35:45	30	29813	33	22	22	12	17
12:36:00	30	29577	35	22	23	12	18

Leakage Summary for Burn and Cool Down Periods

All pressure transducers and thermocouples are in calibration per YRT's QA program.
Seat leakages were collected manually. External leakage was collected electronically.

Total Through Seat Leakage Collected Over 30 Minute Duration:	1540	mls
Average Leak Rate Over 30 Minute Duration:	51.3	ml/min
Allowable Leak Rate:	400	ml/min

Total Through Seat Leakage Collected Over 10 Minute Cool Down:	500	mls

Total Water Volume Lost Over 40 Minute Burn and Cool Down:	2068	mls
Water Collected in System Relief Valve:	0	mls
Calculated External Leakage During 40 Minute Duration:	28	mls
Average Leak Rate Over 40 Minute Duration:	0.7	ml/min
Allowable Leak Rate:	100	ml/min

Were the Valve Leakages Below the Allowables?	**Yes**

Yarmouth Research and Technology

Summary of Test Parameters During Burn and Cool Down Periods

Amount of Time Pressure Dropped Below 50%:	0.0	minutes
Maximum Allowable Low Pressure Time:	2.0	minutes
Maximum Pressure During Burn/Cool Down:	32.8	psig
Average Pressure During Burn/Cool Down:	31.3	psig
Minimum Pressure During Burn/Cool Down:	29.4	psig
Maximum Body Flame Temperature During Burn:	852.2	deg. C
Average Body Flame Temperature During Burn:	793.7	deg. C
Maximum Bonnet Flame Temperature During Burn:	993.3	deg. C
Average Bonnet Flame Temperature During Burn:	958.0	deg. C
Average of Both Flame Temperatures During Burn:	875.8	deg. C

Note

Were Test Conditions Within Compliance?	**Yes**

Yarmouth Research and Technology

Post-Burn Seat Test Information

Customer: ValvTechnologies, Inc. **Date:** 2/22/2011

Product Code: 4 inch Class 300 Ball Valve

Project Number: PN2110245

Test Data

Time	Pressure (psig)	Cal Block Temp - C
12:55:38	31	17
12:55:53	31	16
12:56:08	31	16
12:56:23	31	21
12:56:38	31	15
12:56:53	31	17
12:57:08	31	13
12:57:23	31	20
12:57:38	31	16
12:57:53	31	19
12:58:08	31	16
12:58:23	31	20
12:58:38	31	18
12:58:53	31	18
12:59:08	31	16
12:59:23	31	16
12:59:38	31	18
12:59:53	31	17
13:00:08	31	16
13:00:23	31	19
13:00:38	31	16

Leakages were collected manually.

Total Seat Leakage Collected Over 5 Minute Duration:	0	mls
Average Leak Rate Over 5 Minute Duration:	0	ml/min
Allowable Leak Rate:	80	ml/min

Total External Leakage Collected Over 5 Minute Duration:	0	mls
Average Leak Rate Over 5 Minute Duration:	0.0	ml/min
Allowable Leak Rate:	100	ml/min

Was the Valve Leakage Below the Allowable?	**Yes**