

Fire Test Report

API Standard 6FA, Third Edition, 1999

Performed for

Valvtechnologies Inc.

5904 Bingle Road

Houston, Texas 77092

www.valv.com



5-1/8 inch 10,000 psi

Top-Entry Ball Valve

Model: NACXT-RJ-FP-BS-5

Project Number: 20991

September 2009



Performed by

YARMOUTH RESEARCH AND TECHNOLOGY

434 Walnut Hill Road

North Yarmouth, ME 04097 USA

(207) 829-5359

info@yarmouthresearch.com

www.yarmouthresearch.com

Yarmouth Research and Technology

Customer: ValvTechnologies	Date: 9/1/2009
Specification: API Standard 6FA, Third Edition, April 1999	
"Specification for Fire Testing of Valves"	
Product Description: 5 1/8 inch 10000 psi Top-Entry Ball Valve	
Project Number: PN20991	
Comments: Model: NACXT-RJ-FP-BS-5	
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:	10:41:00	
Average Pressure During Burn:	7558	psig
Seat Leak Rate During Burn:	6.0	ml/min
Allowable Seat Leak Rate:	2050	ml/min
External Leak Rate During Burn/Cool Down:	5.7	ml/min
Allowable External Leak Rate:	513	ml/min
Amount of Time of Avg. Cal. Blocks > 650 deg. C:	21.0	minutes
Were Test Conditions Within Compliance?	Yes	
Were the Valve Leakages Below the Allowables?	Yes	

Operational Test

Did Valve Unseat and Open Fully?:	Yes	
Average Pressure During Test:	7484	psig
External Leak Rate After Operating:	0.0	ml/min
Allowable External Leak Rate:	1025	ml/min
Was the Leakage Below the Allowable?	Yes	

Does Valve Pass or Fail the Test Standard?	PASS
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Witnesses

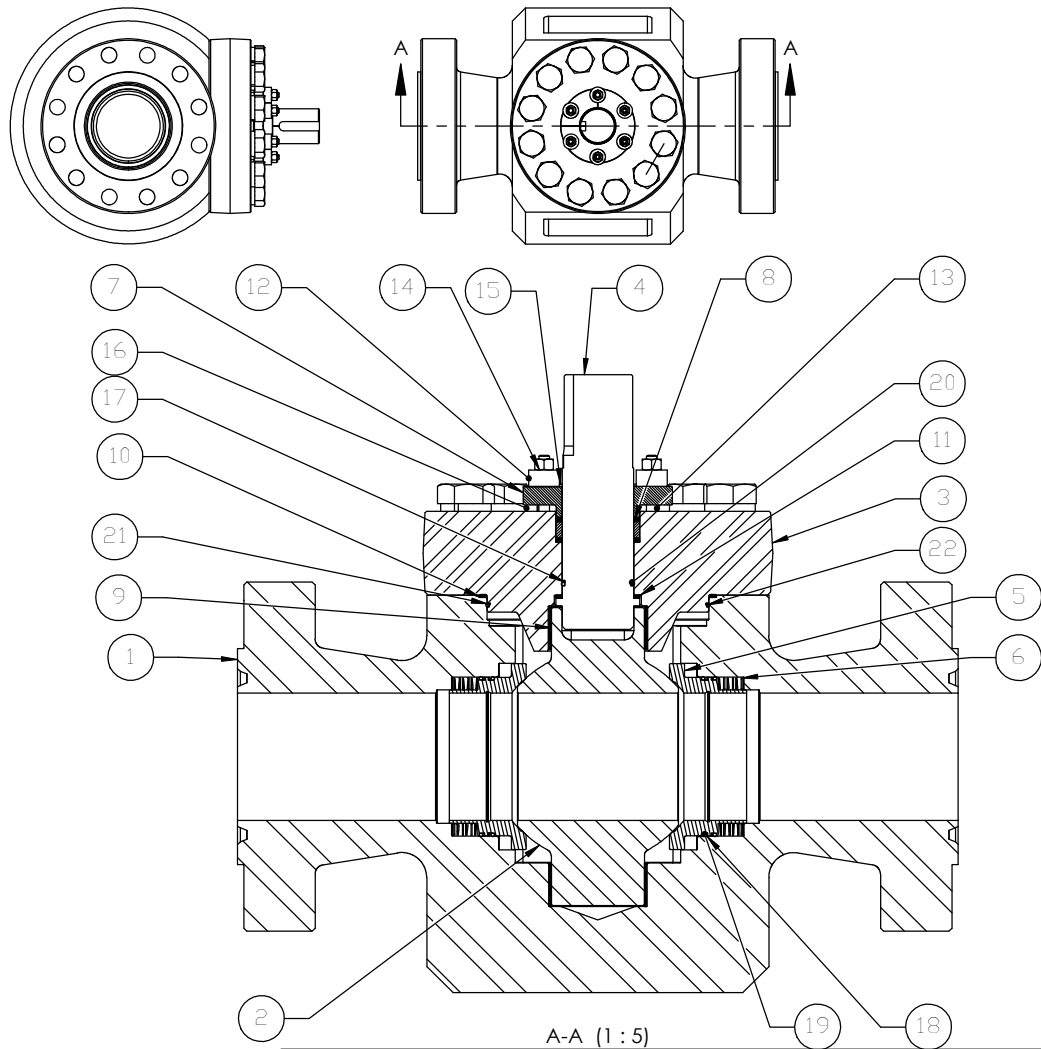
Matthew J. Wasielewski



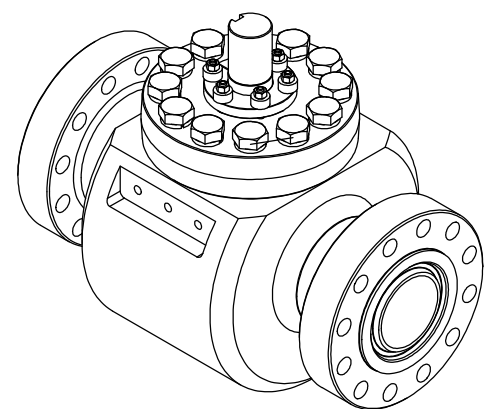
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Fire Test Information Sheet

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:	API 6A
Valve Description	Size: 5.125" Pressure Rating: 10,000 psi Type: Top Entry Trunnion Weight: 1,225 lb Reduced or Full Bore: Full Bore Body/Bonnet Material: SA29 4130/ SA29 4130 Trim Material: SA29 4130/RAM1 Seat Material: SA564 type 630 Stem / Body Seal Material: SA564 type 630/Grafoil Bolting Material: SA193 B7 Is valve considered "Soft-Seated"? No
Valve Markings	Nameplate Information: Casting Markings:
Assembly Drawing Number / Revision / Date of Issue:	NACXT-RJ-FP-BS-5
Assembly Drawing sent to Yarmouth:	Yes
If valve is fitted with gearbox, state gearbox manufacturer, model number and mechanical advantage:	Diamond Gear, Model# 509WG610, MA 220.7
If valve is non-symmetric, state direction of flow for test:	Symmetric Design
For double-seated valves, state maximum allowable cavity pressure:	
Manufacturer's Contact Name /Date:	Jonathan Jones/ 08/27/09



ITEM NO.	DESCRIPTION	MATERIAL	QTY.
1	BODY	SA29 4130	1
2	BALL	SA29 4130	1
3	COVER	SA29 4130	1
4	STEM	SA29 4130/BORON	1
5	SEAT	SA29 4130	2
6	WAVE SPRING	INC X750	2
7	GLAND	SA29 4130	1
8	PACKING	INC 718/GRAF OIL	1
9	BEARING SLEEVE	GARLOCK DU	2
10	COVER GASKET	GRAF OIL	1
11	THRUST BEARING	SA564 630/BORON	1
12	GLAND SPRING ASSY	INC 718	6
13	GLAND BOLT	SA193 B8M	6
14	GLAND NUT	SA194 8M	6
15	COVER BOLT	SA193 B7	12
16	COVER LOCK WASHER	CS	12
17	STEM BACKUP RING	PEEK	1
18	SEAT BACKUP RING	PEEK	2
19	SEAT O-RING	KALREZ 9162	2
20	STEM O-RING	KALREZ 9162	1
21	COVER BACKUP RING	PEEK	1
22	COVER O-RING	KALREZ 9162	1



A-A (1:5)

 THIRD ANGLE PROJECTION	-	-	-	-	-	-	-	DIMENSIONS ARE IN INCHES REMOVE BURRS AND BREAK EDGES UNLESS OTHERWISE SPECIFIED	SCALE 1:10	WHEEL FILE NACXT-RJ-FP-BS-5	REV B
	-	-	-	-	-	-	-		CORNER RADII .03 MAX .X= ±.030 .XX= ±.015 .XXX= ±.005	DRAWN BY REM DATE 1/15/09	3004 BINGLE ROAD, HOUSTON TEXAS 77092 PH: (713) 860-0400 FAX: (713) 860-0499
THIS DRAWING AND THE INFORMATION CONTAINED WITHIN IS CONSIDERED TO BE CONFIDENTIAL AND THE SOLE PROPERTY OF VALVTECHNOLOGIES. THE CONTENTS OF THIS DRAWING MAY NOT BE REPRODUCED OR DISCLOSED VERBALLY OR OTHERWISE OUTSIDE THE HOLDING OFFICE WITHOUT THE WRITTEN APPROVAL OF VALVTECHNOLOGIES.	REV	DATE	DESCRIPTION	ECN	BY	CHK	APR	CONCENTRICITY .010 T.I.R. ANGULAR= ±1/2° SURFACE TEXTURE 125 RMS MIN. INTERNAL FILLETS .015	CHECKED BY JDJ DATE 2/17/09 ENGINEER VK DATE 05/04/09 APPROVED BY VK DATE 05/04/09	TITLE 5-1/8 10K Assy TOP ENTRY TRUNNION - NACXT-RJ-FP-BS-5	SHEET NO. 1 OF 1 A

VALVTECHNOLOGIES

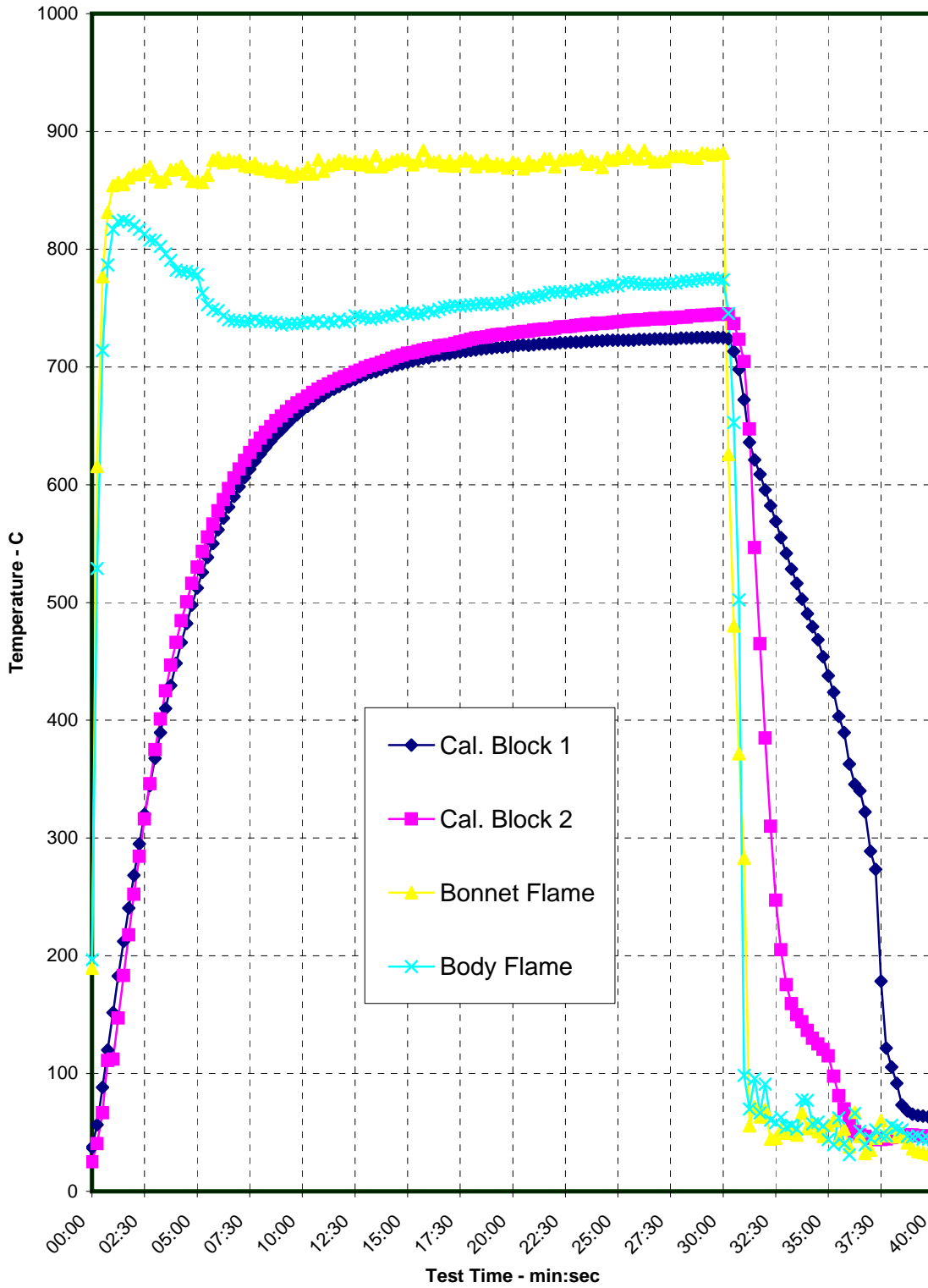
3004 BINGLE ROAD, HOUSTON TEXAS 77092
 PH: (713) 860-0400 FAX: (713) 860-0499

5-1/8 10K Assy
 TOP ENTRY TRUNNION

NACXT-RJ-FP-BS-5

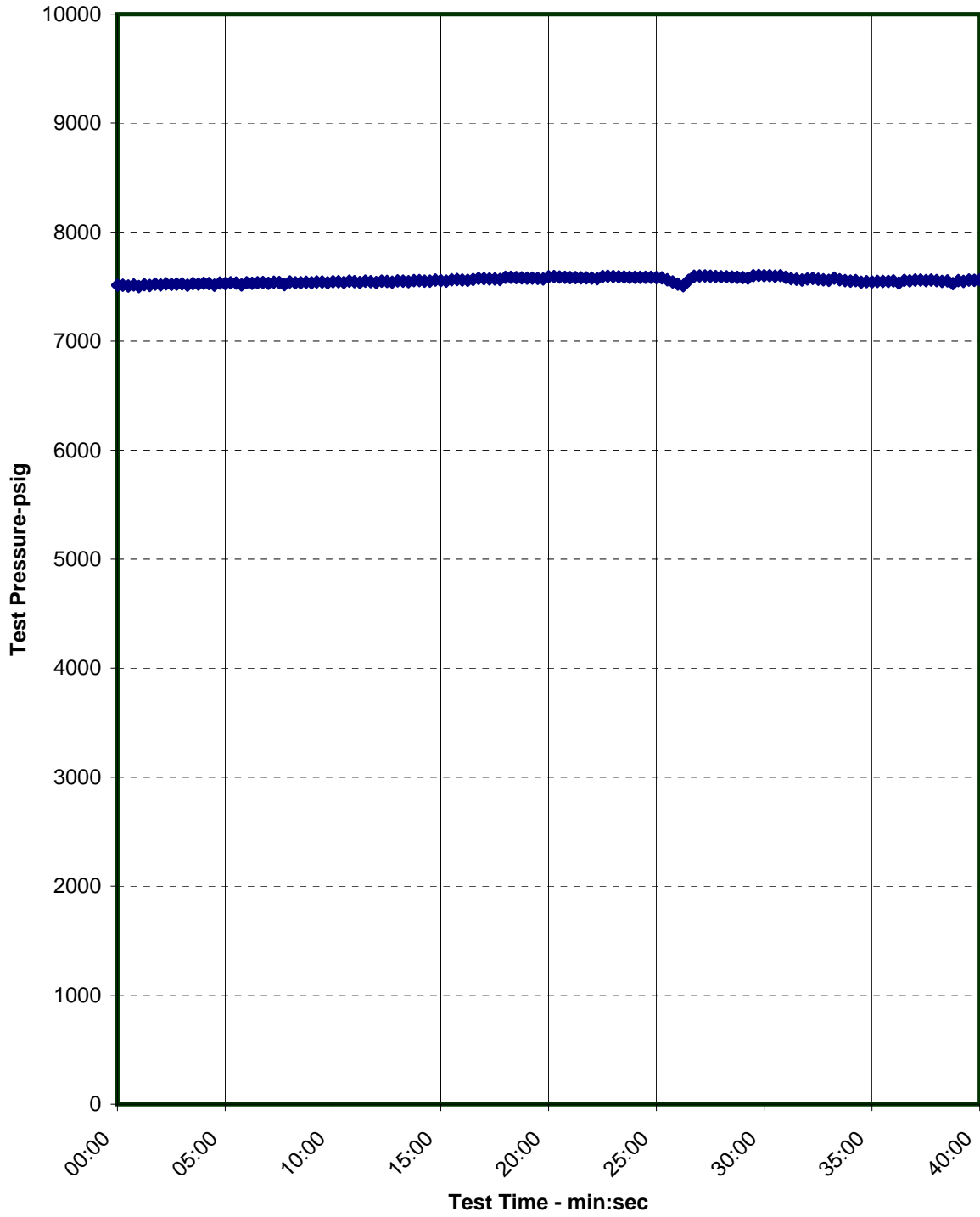
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Temperature verses Time Chart



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Pressure verses Time Chart



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Valve prior to Test

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Valve During Burn

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Fire Test Information

Customer: ValvTechnologies

Date: 9/1/2009

Product Code: 5 1/8 inch 10000 psi Top-Entry Ball Valve

Project Number: PN20991

Fire Test Raw Data

Time	Pressure (psig)	Water Volume (mls)	Cal. Block 1 Temp-C	Cal. Block 2 Temp-C	Avg. Cal Block Temp-C	Bonnet Flame Temp-C	Body Flame Temp-C	Average Flame Temp-C
10:41:00	7513	41311	37.2	25.0	31.1	189.4	196.7	193.1
10:41:15	7513	41321	56.7	40.6	48.6	615.6	528.9	572.2
10:41:30	7507	41297	88.3	66.7	77.5	776.7	713.9	745.3
10:41:45	7516	41303	120.0	111.1	115.6	831.1	786.7	808.9
10:42:00	7502	41279	151.7	112.2	131.9	853.9	816.7	835.3
10:42:15	7519	41295	182.8	147.2	165.0	856.7	823.3	840.0
10:42:30	7512	41289	212.2	183.3	197.8	855.0	824.4	839.7
10:42:45	7522	41285	240.6	217.8	229.2	860.6	823.3	841.9
10:43:00	7517	41279	268.3	252.2	260.3	863.3	820.0	841.7
10:43:15	7525	41255	295.0	284.4	289.7	863.3	816.7	840.0
10:43:30	7522	41272	320.0	316.1	318.1	867.2	812.8	840.0
10:43:45	7523	41241	344.4	346.1	345.3	870.0	807.8	838.9
10:45:30	7514	41202	482.2	500.6	491.4	863.9	781.1	822.5
10:45:45	7534	41211	497.8	516.1	506.9	857.8	779.4	818.6
10:46:00	7528	41220	512.2	530.0	521.1	857.8	778.3	818.1
10:46:15	7535	41196	525.6	543.3	534.4	856.7	762.8	809.7
10:46:30	7533	41207	538.3	555.6	546.9	862.8	752.8	807.8
10:46:45	7516	41101	550.0	566.7	558.3	875.6	748.9	812.2
10:47:00	7537	41186	561.7	577.8	569.7	877.8	747.8	812.8
10:47:15	7532	41196	571.7	587.2	579.4	873.3	743.3	808.3
10:47:30	7536	41175	581.1	596.7	588.9	876.1	740.0	808.1
10:47:45	7538	41170	590.0	605.6	597.8	874.4	739.4	806.9
10:48:00	7530	41182	598.3	613.3	605.8	875.6	738.9	807.2
10:48:15	7541	41169	606.1	620.6	613.3	871.1	738.3	804.7
10:48:30	7538	41179	613.3	627.2	620.3	870.0	738.9	804.4
10:48:45	7518	41150	620.0	633.3	626.7	872.8	741.1	806.9
10:49:00	7543	41149	626.1	639.4	632.8	868.3	738.9	803.6

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Fire Test Data - continued

10:49:15	7537	41157	631.7	644.4	638.1	868.3	738.9	803.6
10:49:30	7536	41135	637.2	649.4	643.3	866.1	737.8	801.9
10:49:45	7542	41142	642.2	654.4	648.3	870.0	737.8	803.9
10:50:00	7537	41146	646.7	658.3	652.5	865.0	735.6	800.3
10:50:15	7543	41121	651.1	662.2	656.7	866.1	736.7	801.4
10:50:30	7543	41124	655.6	666.1	660.8	861.7	736.7	799.2
10:50:45	7536	41130	659.4	669.4	664.4	864.4	736.7	800.6
10:51:00	7547	41113	663.3	672.2	667.8	863.9	737.2	800.6
10:51:15	7546	41119	666.7	675.0	670.8	869.4	738.9	804.2
10:51:30	7538	41123	669.4	678.3	673.9	863.9	737.8	800.8
10:51:45	7550	41101	673.3	681.1	677.2	876.1	739.4	807.8
10:52:00	7545	41108	675.6	683.3	679.4	866.1	736.7	801.4
10:52:15	7539	41118	678.9	685.6	682.2	871.1	738.9	805.0
10:52:30	7551	41100	681.1	687.8	684.4	872.2	737.8	805.0
10:52:45	7547	41102	683.3	690.0	686.7	875.6	740.6	808.1
10:53:00	7540	41108	685.6	691.7	688.6	875.0	738.3	806.7
10:53:15	7552	41078	687.8	693.3	690.6	872.8	739.4	806.1
10:53:30	7548	41088	689.4	695.6	692.5	874.4	743.3	808.9
10:53:45	7541	41085	691.7	697.2	694.4	871.7	742.8	807.2
10:54:00	7553	41074	693.3	699.4	696.4	874.4	741.7	808.1
10:54:15	7550	41081	695.0	701.1	698.1	870.0	740.6	805.3
10:54:30	7545	41084	696.1	702.2	699.2	879.4	741.7	810.6
10:54:45	7555	41064	697.8	703.9	700.8	870.0	742.2	806.1
10:55:00	7555	41063	699.4	705.6	702.5	872.2	743.9	808.1
10:55:15	7550	41076	700.6	707.2	703.9	874.4	743.3	808.9
10:55:30	7552	41054	701.7	708.9	705.3	876.1	745.0	810.6
10:55:45	7560	41053	702.8	710.0	706.4	876.7	747.2	811.9
10:56:00	7556	41067	703.9	711.7	707.8	875.6	745.6	810.6
10:56:15	7552	41074	705.0	712.2	708.6	871.7	745.6	808.6
10:56:30	7563	41049	706.1	713.3	709.7	875.0	744.4	809.7
10:56:45	7565	41065	707.2	714.4	710.8	883.9	745.6	814.7
10:57:00	7561	41070	707.8	715.6	711.7	875.6	747.8	811.7
10:57:15	7559	41074	709.4	716.1	712.8	873.9	746.7	810.3
10:57:30	7567	41044	710.0	717.8	713.9	875.0	748.9	811.9
10:57:45	7575	41054	710.6	718.3	714.4	871.1	750.6	810.8
10:58:00	7573	41066	711.1	718.9	715.0	875.0	751.1	813.1
10:58:15	7571	41073	712.2	720.0	716.1	870.6	752.2	811.4
10:58:30	7570	41080	712.8	721.1	716.9	875.0	751.7	813.3
10:58:45	7566	41077	713.3	722.2	717.8	877.2	752.2	814.7
10:59:00	7585	41054	713.9	723.3	718.6	875.0	752.8	813.9
10:59:15	7585	41046	714.4	724.4	719.4	870.0	752.8	811.4
10:59:30	7583	41066	715.0	725.0	720.0	872.8	753.9	813.3
10:59:45	7580	41057	715.6	725.6	720.6	875.6	753.9	814.7

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Fire Test Data - continued

11:00:00	7578	41056	716.1	726.7	721.4	870.6	752.8	811.7
11:00:15	7577	41060	716.7	727.2	721.9	872.8	753.9	813.3
11:00:30	7575	41069	716.7	727.8	722.2	871.7	753.9	812.8
11:00:45	7571	41069	717.2	727.8	722.5	868.9	755.0	811.9
11:01:00	7591	41043	717.8	728.9	723.3	873.9	756.7	815.3
11:01:15	7594	41052	718.3	729.4	723.9	872.8	758.3	815.6
11:01:30	7589	41057	718.9	730.0	724.4	868.3	758.9	813.6
11:01:45	7586	41062	718.3	730.0	724.2	874.4	758.3	816.4
11:02:00	7584	41075	718.9	731.1	725.0	871.1	759.4	815.3
11:02:15	7583	41076	719.4	731.7	725.6	871.7	760.6	816.1
11:02:30	7581	41070	719.4	732.2	725.8	876.7	761.1	818.9
11:02:45	7581	41070	720.0	732.2	726.1	876.7	763.3	820.0
11:03:00	7578	41068	720.0	732.8	726.4	870.0	763.3	816.7
11:03:15	7575	41083	720.6	733.9	727.2	875.6	763.9	819.7
11:03:30	7593	41048	720.6	733.9	727.2	876.7	763.9	820.3
11:03:45	7596	41063	721.1	734.4	727.8	876.1	762.8	819.4
11:04:00	7594	41072	721.1	735.0	728.1	876.7	764.4	820.6
11:04:15	7591	41083	721.1	735.6	728.3	879.4	765.0	822.2
11:04:30	7589	41072	721.7	736.1	728.9	872.2	766.1	819.2
11:04:45	7587	41076	721.7	736.1	728.9	875.0	765.6	820.3
11:05:00	7586	41076	722.2	737.2	729.7	873.9	767.8	820.8
11:05:15	7586	41070	722.2	736.7	729.4	869.4	767.8	818.6
11:05:30	7586	41070	722.8	737.2	730.0	877.8	768.9	823.3
11:05:45	7586	41080	722.8	737.8	730.3	875.6	770.0	822.8
11:06:00	7583	41079	722.8	738.3	730.6	878.9	768.9	823.9
11:06:15	7581	41090	722.8	738.9	730.8	877.2	771.7	824.4
11:06:30	7564	41071	722.8	739.4	731.1	883.9	772.2	828.1
11:06:45	7544	41099	722.8	739.4	731.1	878.9	771.7	825.3
11:07:00	7525	41107	723.3	740.0	731.7	876.7	770.6	823.6
11:07:15	7508	41113	723.3	740.0	731.7	883.9	770.6	827.2
11:07:30	7558	41065	723.3	740.6	731.9	877.2	770.0	823.6
11:07:45	7596	41090	723.9	741.1	732.5	873.9	770.0	821.9
11:08:00	7598	41104	723.9	740.6	732.2	874.4	770.6	822.5
11:08:15	7598	41057	723.9	741.7	732.8	874.4	770.6	822.5
11:08:30	7595	41061	723.9	741.1	732.5	878.9	771.1	825.0
11:08:45	7593	41073	723.9	741.7	732.8	878.9	771.1	825.0
11:09:00	7592	41067	724.4	742.2	733.3	878.9	772.8	825.8
11:09:15	7590	41052	724.4	742.2	733.3	879.4	772.8	826.1
11:09:30	7589	41067	724.4	743.3	733.9	877.8	772.8	825.3
11:09:45	7586	41074	725.0	743.3	734.2	877.2	773.9	825.6
11:10:00	7584	41089	725.0	743.9	734.4	881.7	774.4	828.1
11:10:15	7579	41094	725.0	743.9	734.4	881.7	775.0	828.3
11:10:30	7600	41091	725.0	744.4	734.7	880.0	775.6	827.8

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Fire Test Data - continued

11:10:45	7604	41050	725.0	744.4	734.7	881.1	774.4	827.8
11:11:00	7601	41087	725.0	745.0	735.0	881.7	773.9	827.8
11:11:15	7600	41063	723.9	744.4	734.2	625.6	745.6	685.6
11:11:30	7596	41082	713.3	736.7	725.0	480.0	652.8	566.4
11:11:45	7601	41078	697.8	723.3	710.6	371.7	502.2	436.9
11:12:00	7586	41065	672.2	704.4	688.3	282.8	98.3	190.6
11:12:15	7573	41078	636.1	647.2	641.7	55.6	70.0	62.8
11:12:30	7569	41090	621.1	546.7	583.9	71.7	95.6	83.6
11:12:45	7562	41083	608.9	465.0	536.9	63.3	66.7	65.0
11:13:00	7572	41055	595.6	385.0	490.3	69.4	91.1	80.3
11:13:15	7575	41076	582.2	310.0	446.1	44.4	60.6	52.5
11:13:30	7568	41079	568.9	247.2	408.1	45.0	58.3	51.7
11:13:45	7564	41078	555.0	205.0	380.0	52.2	62.8	57.5
11:14:00	7558	40903	541.7	175.6	358.6	49.4	54.4	51.9
11:14:15	7578	41069	528.3	159.4	343.9	51.1	56.1	53.6
11:14:30	7564	41074	516.1	150.0	333.1	47.8	52.8	50.3
11:14:45	7556	41072	502.8	143.9	323.3	66.7	77.8	72.2
11:15:00	7551	41043	490.6	136.7	313.6	53.3	77.2	65.3
11:15:15	7555	41065	479.4	130.0	304.7	57.8	57.2	57.5
11:15:30	7542	41070	468.3	125.0	296.7	50.6	58.9	54.7
11:15:45	7547	41038	453.9	120.6	287.2	46.7	55.6	51.1
11:16:00	7543	41050	437.8	115.0	276.4	56.1	43.9	50.0
11:16:15	7548	41021	423.9	97.8	260.8	60.0	39.4	49.7
11:16:30	7548	41028	403.3	81.1	242.2	43.9	62.2	53.1
11:16:45	7549	41003	389.4	70.0	229.7	52.8	40.6	46.7
11:17:00	7554	41004	362.8	59.4	211.1	37.8	31.1	34.4
11:17:15	7533	41072	345.6	50.6	198.1	67.2	66.1	66.7
11:17:30	7558	40993	340.0	47.8	193.9	46.7	51.1	48.9
11:17:45	7554	41008	322.2	46.7	184.4	32.2	39.4	35.8
11:18:00	7561	40989	288.9	45.0	166.9	35.0	45.0	40.0
11:18:15	7561	40996	273.3	43.9	158.6	45.0	52.2	48.6
11:18:30	7557	41013	178.3	43.9	111.1	60.0	47.2	53.6
11:18:45	7562	40980	121.7	44.4	83.1	47.2	47.2	47.2
11:19:00	7556	40983	105.6	45.6	75.6	53.9	56.1	55.0
11:19:15	7549	40957	91.7	46.7	69.2	46.1	53.9	50.0
11:19:30	7553	40973	73.3	47.2	60.3	48.9	52.2	50.6
11:19:45	7529	40940	68.3	47.8	58.1	41.1	46.7	43.9
11:20:00	7557	40959	65.6	47.8	56.7	36.1	46.1	41.1
11:20:15	7550	40956	64.4	47.2	55.8	33.9	47.2	40.6
11:20:30	7562	40925	63.9	47.2	55.6	32.8	44.4	38.6
11:20:45	7558	40932	63.3	46.7	55.0	31.7	44.4	38.1
11:21:00	7563	40905	62.8	46.1	54.4	30.6	43.9	37.2

Yarmouth Research and Technology

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:	180	mls
Average Leak Rate Over 30 Minute Duration:	6.0	ml/min
Allowable Leak Rate:	2050	ml/min
Total Through Seat Leakage Collected Over 10 Minute Cool Down:	0	mls
Total Water Volume Lost Over 40 Minute Burn and Cool Down:	406	mls
Water Collected in System Relief Valve:	0	mls
Calculated External Leakage During 40 Minute Duration:	226	mls
Average Leak Rate Over 40 Minute Duration:	6	ml/min
Allowable Leak Rate:	513	ml/min
Were the Valve Leakages Below the Allowables?	Yes	
Maximum Cavity Pressure During Burn:	0	

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:	7603.7	psig
Average Pressure During Burn/Cool Down:	7559.0	psig
Minimum Pressure During Burn/Cool Down:	7501.9	psig
Amount of Time of Avg. Cal Block > 650 deg.C:	21.0	minutes
Minimum Allowable Time at Temperature:	15.0	minutes
Maximum Avg Cal Block Temperature:	725.0	deg. C
Average Cal Block Temperature:	570.3	deg. C
Lowest Avg Cal. Block Temperature:	37.2	deg. C
Maximum Body Flame Temperature During Burn:	824.4	deg. C
Average Body Flame Temperature During Burn:	756.1	deg. C
Maximum Bonnet Flame Temperature During Burn:	883.9	deg. C
Average Bonnet Flame Temperature During Burn:	863.6	deg. C
Average of Both Flame Temperatures During Burn:	809.9	deg. C

Note

Were Test Conditions Within Compliance?	Yes
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Yarmouth Research and Technology

Post-Burn Seat Test Information

Customer: ValvTechnologies

Date: 9/1/2009

Product Code: 5 1/8 inch 10000 psi Top-Entry Ball Valve

Project Number: PN20991

Test Data

This test not required for this pressure valve.

Yarmouth Research and Technology

Operational Test Information

Customer: ValvTechnologies

Date: 9/1/2009

Product Code: 5 1/8 inch 10000 psi Top-Entry Ball Valve

Project Number: PN20991

Test Data

Time	Pressure (psig)	Cal Block Temp - C
11:37:05	7520	23.9
11:37:20	7524	23.9
11:37:35	7510	24.4
11:37:50	7487	25.0
11:38:05	7493	26.7
11:38:20	7478	27.2
11:38:35	7479	28.3
11:38:50	7474	29.4
11:39:05	7441	30.0
11:39:20	7435	30.6
11:39:35	7436	31.1
11:39:50	7439	31.1
11:40:05	7436	31.1
11:40:20	7422	31.7
11:40:35	7418	31.7
11:40:50	7390	32.2
11:41:05	7594	32.8
11:41:20	7582	32.8
11:41:35	7544	32.8
11:41:50	7538	32.2
11:42:05	7530	32.2

Leakages were 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:	1025	ml/min

Was the Valve Leakage Below the Allowable?	Yes
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