Fire Test Report

ANSI/API Standard 607, 7th Edition, 2016
ISO 10497: 2010
API Standard 6FA, Fifth Edition, May 2020

Performed for

Guide Valve Limited

www.gvs-vci.com

2 inch Class 1500 GVS Welded
Body Trunnion Mounted Ball Valve
Valve Code: Model GW

Project Number: 221052
Test Date: April 23, 2021

Performed by

YARMOUTH RESEARCH AND TECHNOLOGY, LLC

434 Walnut Hill Road
North Yarmouth, ME 04097 USA
(207) 829-5359
info@yarmouthresearch.com
www.yarmouthresearch.com

Yarmouth Research and Technology, LLC

Customer: Guide Valve Limited	**Date:** 4/23/2021
Specifications: ANSI/API Standard 607, Seventh Edition, 2016 ISO 10497: 2010	
API Standard 6FA, Fifth Edition, May 2020	
Product Description: 2 inch Class 1500 GVS Welded Body Trunnion Mounted Ball Valve	
Project Number: 221052	

Equipment Confirmed to be in Calibration to NIST Standards: Yes

Burn and Cool Down Test

Burn Start Time:	8:52:00	
Average Pressure During Burn:	2789	psig
Seat Leak Rate During Burn:	0	ml/min
Allowable Seat Leak Rate:	800	ml/min
External Leak Rate During Burn/Cool Down:	2.1	ml/min
Allowable External Leak Rate:	200	ml/min
Amount of Time of Avg. Cal. Blocks > 650 deg. C:	22.0	minutes
Were Test Conditions Within Compliance?	Yes	
Were the Valve Leakages Below the Allowables?	Yes	

Operational Test

Average Pressure During Test:	2709	psig
External Leak Rate After Operating:	0	ml/min
API 607 7th Edition Allowable External Leak Rate:	50	ml/min
API 6FA 5th Edition Allowable External Leak Rate:	400	ml/min
Was the Leakage Below the Allowables?	Yes	
Does Valve Pass or Fail the Test Standards?	**PASS**	

Certified by

Matthew J. Wasielewski, PE
President and Manager
Yarmouth Research and Technology, LLC

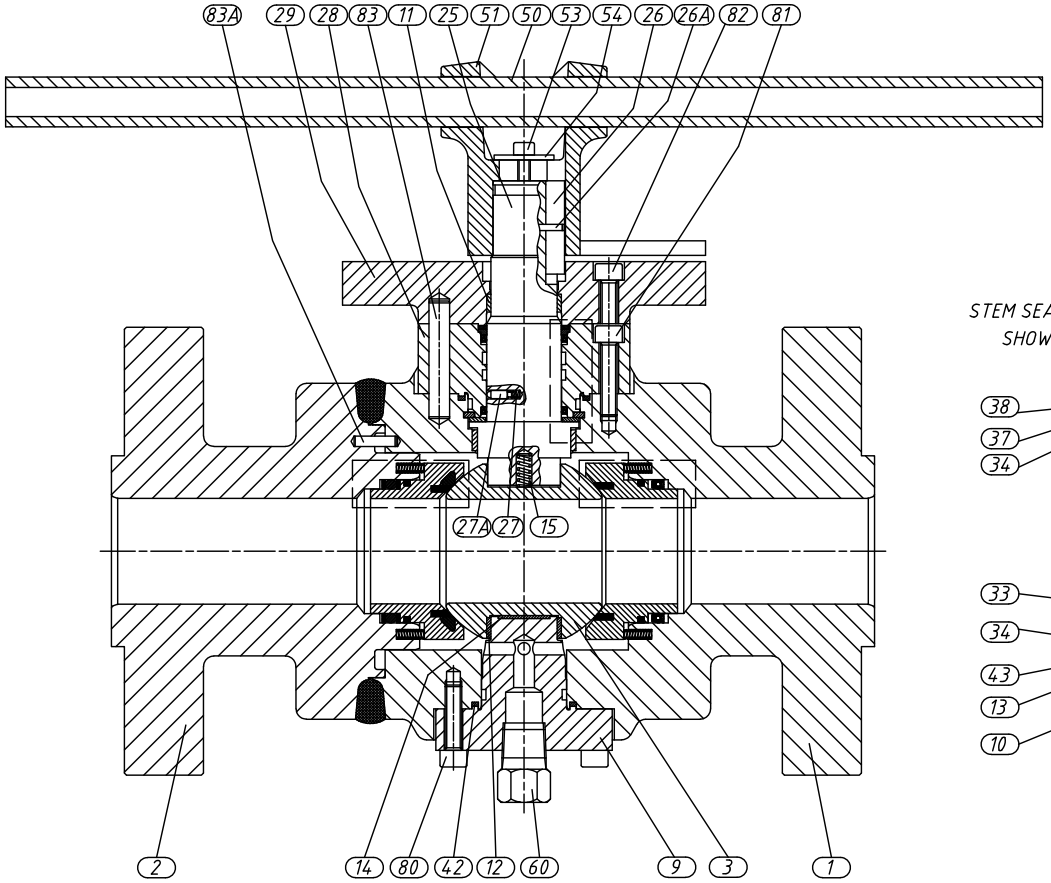
YARMOUTH RESEARCH AND TECHNOLOGY, LLC

Fire Test Information Sheet

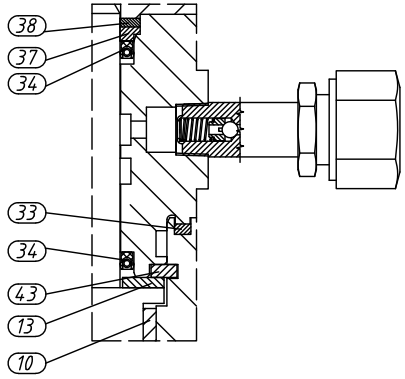
2" ANSI 1500 welded body trunnion mounted

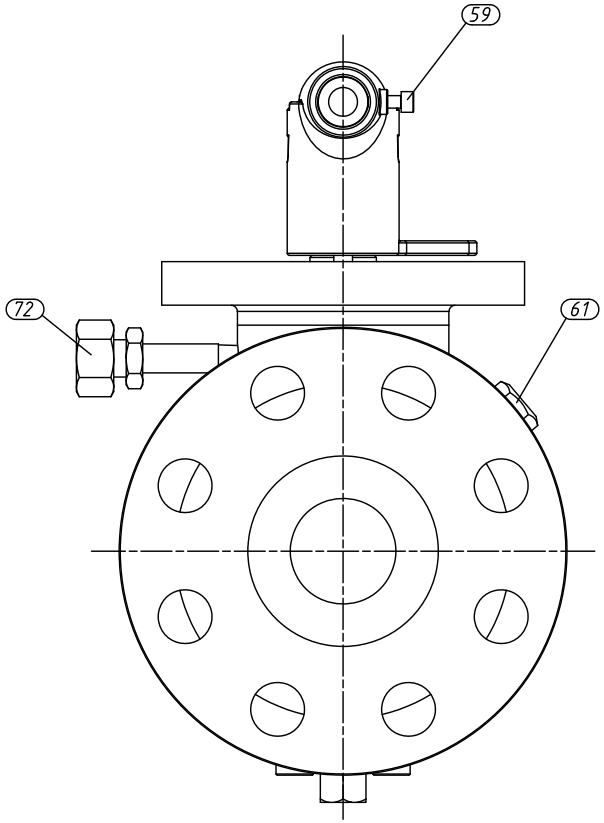
Fire Test Specification and Revision: (ie. API 607 7th, API 6FA 5th, etc)	API 607 and 6FA Dual Certification according to latest edition
Yarmouth Proposal Number:	
Customer Purchase Order Number:	8946
Customer's Contact Name:	Kevin Yazdi
Customer's Name (used in test report as specified):	Guide Valve Limited
Company Web Address to be listed on report cover:	www.gvs-vci.com
Valve Manufacturer's Address:	51 Terecar Drive, Woodbridge, Ontario, Canada L4L 0B5
Did valve meet all required hydrostatic, leakage and other production pressure tests?	Yes
Valve Description for Report Cover:	2 inch Class 1500 GVS Welded Body Trunnion Mounted Ball Valve
Valve Product Code:	Model GW
Valve Description	
Size:	2"
Pressure Rating/Class:	1500
Pressure Rating at 100F:	3705 psi
Type:	Trunnion mounted ball valve
Weight:	200 lb
Reduced or Full Bore:	Full
Body/Bonnet Material:	ASTM A350 LF2 Cl. 1
Trim Material:	ASTM A350 LF2 Cl. 1 + 3 mil. ENP
Seat Material:	PEEK+20%PTFE x Dual Seat PEEK+20%PTFE + FKM Delta
Stem Seal Material:	Lip Seals PTFE+Elgiloy + Graphite
Body Seal Material:	welded body - body to bonnet: Spiral Wound gasket
Bolting Material:	ASTM A320 L7M for the bonnet bolting - welded body
Is valve considered "Soft-Seated"?	Yes
If valve is fitted with gearbox, state gearbox manufacturer, model # and mech. advantage:	Lever
State if valve is symmetric or non-symmetric: If non, state direction of flow for test:	bi-directional
IMPORTANT - Cavity pressure tap is required for ALL dual-seated valves. Please refer to quote	
For double-seated valves, state maximum allowable cavity pressure:	5575
Is there a reason that test should not measure and record through (seat) leakage?	No
Pre-Test Adjustments, if any:	No
Valve Markings	
Nameplate Information:	GVS Model GW
Casting Markings:	NA
Assembly Drawing Number / Revision / Date:	STD-21-0052
Emailed (PDF) to Yarmouth: Date:	April 16,2021
Form Submission Date:	April 16,2022

PLEASE RETURN AS AN EXCEL DOCUMENT

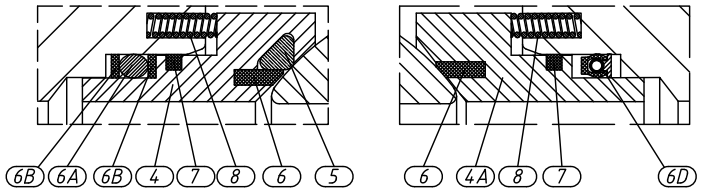


STEM SEAL SUB-ASSEMBLY DETAIL
SHOWN ROTATED AT 90°





SEAT SUB-ASSEMBLY DETAIL



NOTES:
1. ITEMS 90 & 100 ARE NOT SHOWN.
2. VALVE DESIGN TO API 6D, CSA Z245.15
3. PRESSURE / TEMP RATINGS TO ASME B16.34
4. MINIMUM WALL THICKNESS TO ASME B16.34
5. NACE MR0175 SOUR
6. IMPACT TESTED AT -46°C OR LOWER
7. FLANGED ENDS TO ASME B16.5
8. STEM AND BALL ANTI-STATIC DEVIC-
9. EMERGENCY STEM SEALING SYSTEM

REV.	REVISIONS	ECN	PREP'D	CHK'D	APPR'D	DATE
0	First issue	N/A	Y.Z.	Y.Z.	E.L.	2021/04/13

TITLE: CROSS-SECTION
GVS® VALVES W1, 2" ANSI 1500 & 4" ANSI 900, RF, FULLY WELDED

DRAWING / PART NUMBER: STD-21-0052 REV.: 0

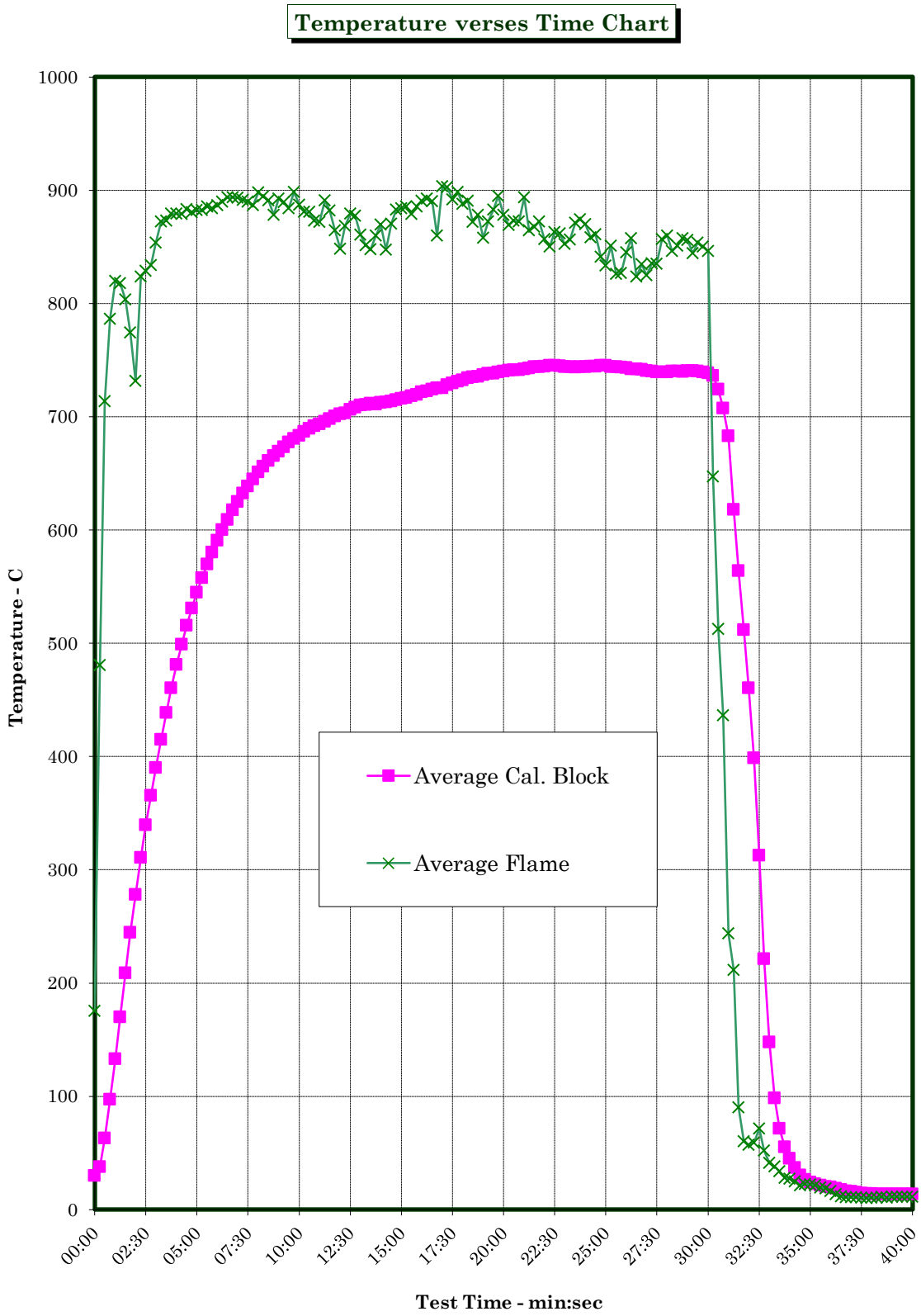
GENERAL MACHINING TOLERANCES

DIMENSIONS GROUP	UP TO 6	OVER 6 UP TO 30	OVER 30 UP TO 120	OVER 120
SHAFTS	±0.1	±0.2	±0.3	±0.4
HOLES	±0.1	±0.2	±0.3	±0.4
LENGTH	±0.1	±0.4	±0.6	±0.8

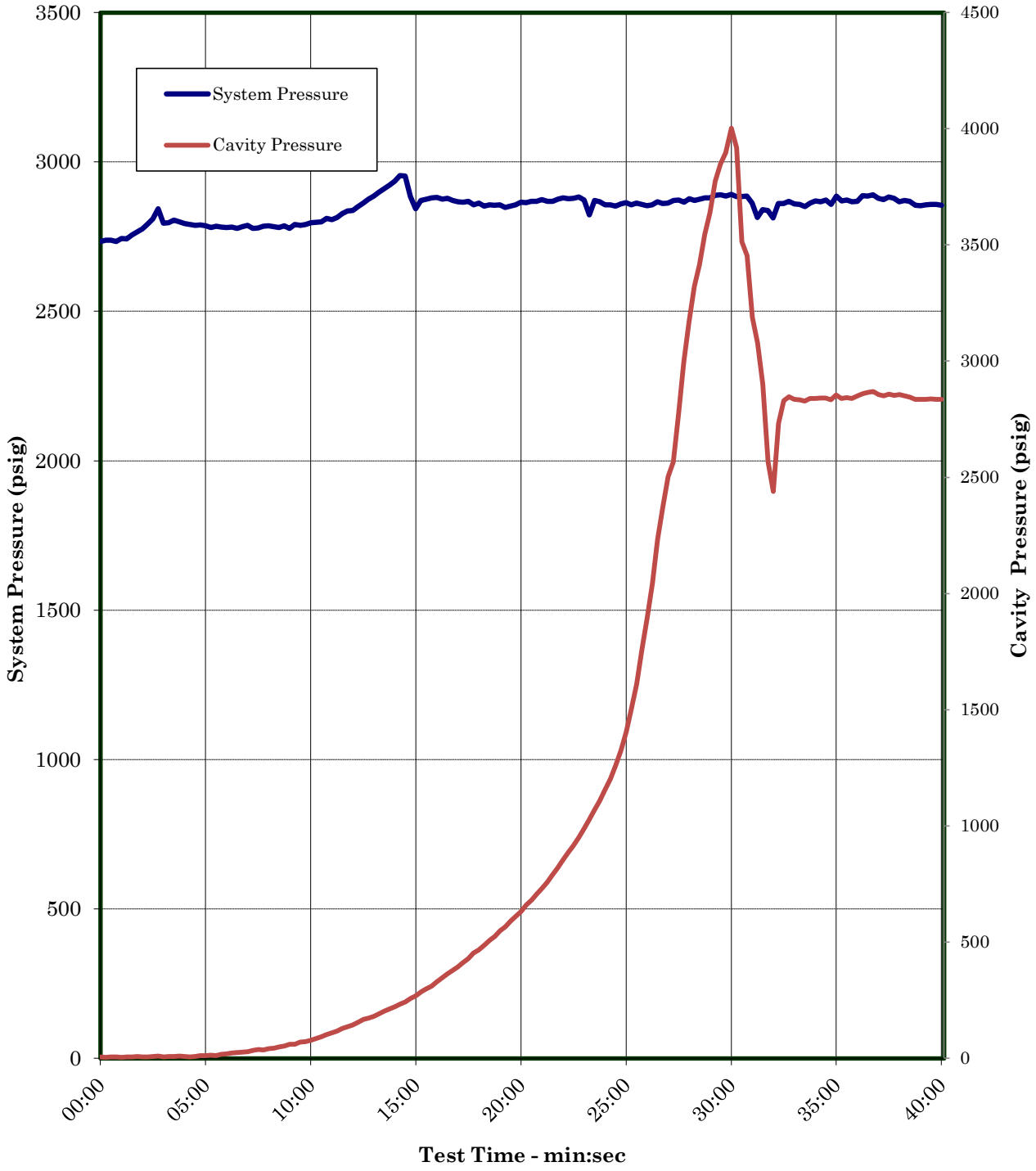
MATERIAL:
WEIGHT:
DRAWN Y.Z.
CHECKED Y.Z.
APPROVED E.L.
ANSI A
SCALE 1:2.5
SHEET 1 of 2

ALL SHARPS & EDGES NOT INDICATED 0.5 MAX
ANGULAR ALLOWANCES NOT INDICATED ±0.5°
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
UNSPECIFIED SURFACE FINISH: ♦3/

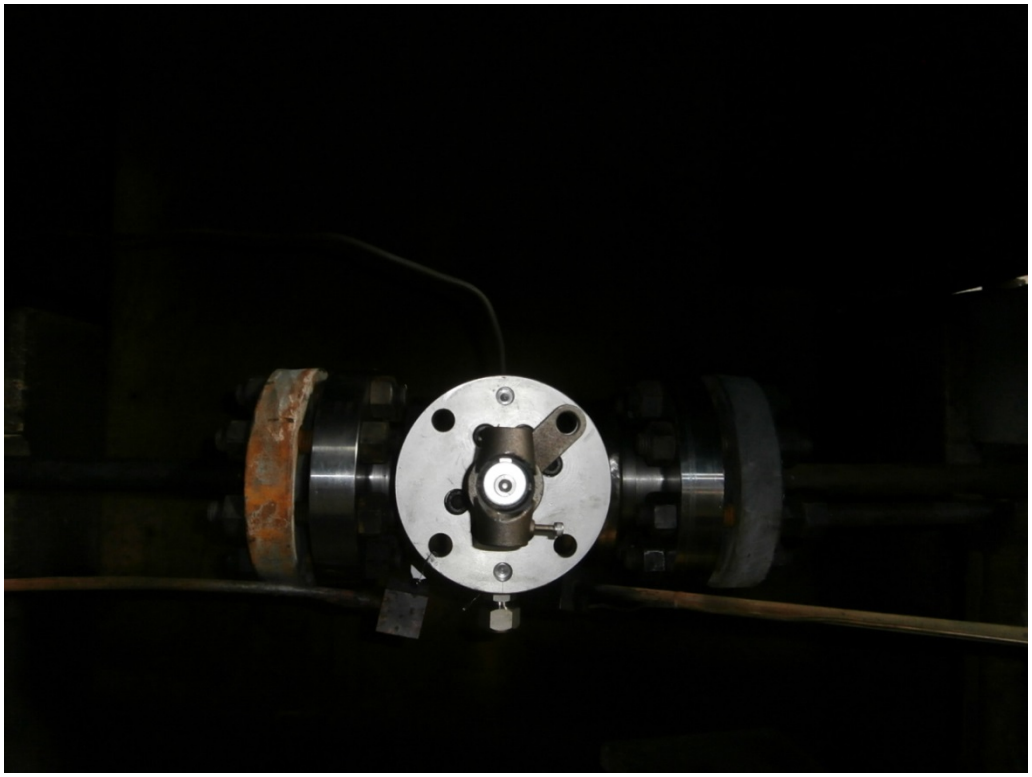
FIRST ANGLE PROJECTION


Temperature verses Time Chart
1000
900
800
700
600
500
400
300
200
100
0
Temperature - C
Average Cal. Block
Average Flame
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

Pressure verses Time Chart



Valve Markings


Test Setup Prior to Burn

Test Valve During Burn

Fire Test Information

Customer: Guide Valve Limited **Date:** 4/23/2021

Product Code: 2 inch Class 1500 GVS Welded Body Trunnion Mounted Ball Valve

Project Number: 221052

Fire Test Raw Data

Time	Pressure (psig)	Cavity 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
8:52:00	2733	6	35238	37	22	30	278	73	175
8:52:15	2739	4	35163	48	28	38	589	372	481
8:52:30	2738	5	35276	83	43	63	822	605	714
8:52:45	2734	6	35244	125	69	97	885	688	786
8:53:00	2744	3	35173	166	100	133	910	730	820
8:53:15	2743	6	35233	204	136	170	912	724	818
8:53:30	2756	6	35293	240	177	209	903	704	803
8:53:45	2766	7	35283	273	216	244	885	664	774
8:54:00	2776	6	35276	301	255	278	864	599	731
8:54:15	2792	6	35277	329	292	311	883	765	824
8:54:30	2810	8	35267	353	326	339	848	810	829
8:54:45	2843	9	35222	374	357	366	849	819	834
8:55:00	2795	6	35261	394	386	390	881	826	854
8:55:15	2797	8	35232	416	414	415	912	833	873
8:55:30	2805	7	35228	437	440	439	909	838	873
8:55:45	2799	9	35273	457	464	461	916	843	879
8:56:00	2794	8	35292	476	486	481	914	845	879
8:56:15	2791	5	35267	493	505	499	916	842	879
8:56:30	2788	8	35237	509	522	516	918	849	883
8:56:45	2789	12	35142	524	538	531	911	850	881
8:57:00	2786	12	35240	538	552	545	909	856	883
8:57:15	2780	13	35285	550	565	558	907	858	883
8:57:30	2784	11	35242	562	577	570	910	861	886
8:57:45	2782	17	35187	573	588	580	907	861	884
8:58:00	2780	18	35201	583	599	591	906	868	887
8:58:15	2781	22	35239	592	608	600	910	870	890
8:58:30	2778	24	35219	601	617	609	914	874	894
8:58:45	2784	27	35206	609	626	618	913	875	894
8:59:00	2788	28	35241	617	633	625	908	879	893
8:59:15	2778	33	35170	624	641	633	903	880	891
8:59:30	2779	38	35256	630	647	639	899	881	890
8:59:45	2785	36	35262	636	654	645	891	883	887
9:00:00	2787	41	35222	642	660	651	909	887	898

Fire Test Data - continued

9:00:15	2783	43	35218	647	665	656	899	890	894
9:00:30	2780	49	35249	652	670	661	891	891	891
9:00:45	2787	52	35218	656	675	666	867	889	878
9:01:00	2777	60	35127	659	680	669	894	891	893
9:01:15	2790	61	35225	663	684	673	884	895	889
9:01:30	2788	69	35197	667	688	678	869	899	884
9:01:45	2791	71	35292	670	691	681	897	900	899
9:02:00	2796	77	35290	673	694	683	872	902	887
9:02:15	2798	85	35245	676	698	687	857	905	881
9:02:30	2799	92	35285	678	701	689	859	903	881
9:02:45	2811	102	35269	680	704	692	843	904	873
9:03:00	2807	109	35165	681	706	694	840	904	872
9:03:15	2814	117	35262	683	709	696	875	907	891
9:03:30	2827	127	35273	685	711	698	853	911	882
9:03:45	2836	136	35270	688	713	700	849	880	864
9:04:00	2838	142	35272	689	716	703	821	875	848
9:04:15	2850	155	35309	689	718	703	862	875	869
9:04:30	2863	167	35165	691	721	706	883	876	879
9:04:45	2875	173	35281	694	722	708	876	879	878
9:05:00	2885	180	35251	697	723	710	841	880	861
9:05:15	2899	191	35212	697	724	711	818	885	851
9:05:30	2910	203	35252	697	726	712	818	878	848
9:05:45	2921	212	35258	696	726	711	837	882	860
9:06:00	2935	222	35266	698	727	713	852	887	870
9:06:15	2954	233	35192	699	727	713	808	887	848
9:06:30	2953	242	35183	700	727	714	856	885	871
9:06:45	2884	258	35271	703	727	715	889	877	883
9:07:00	2844	268	35208	705	727	716	883	885	884
9:07:15	2871	286	35184	706	728	717	881	890	886
9:07:30	2875	298	35217	708	729	718	872	886	879
9:07:45	2880	310	35274	709	730	719	886	885	886
9:08:00	2881	329	35214	712	731	722	889	892	891
9:08:15	2876	346	35209	714	731	723	896	889	893
9:08:30	2878	363	35263	716	732	724	893	888	890
9:08:45	2872	377	35296	718	733	725	831	889	860
9:09:00	2866	393	35224	718	733	725	921	886	904
9:09:15	2865	412	35243	722	734	728	923	883	903
9:09:30	2867	428	35249	725	734	729	893	891	892
9:09:45	2857	453	35189	727	735	731	907	890	899
9:10:00	2862	466	35177	730	735	733	886	890	888
9:10:15	2853	486	35213	732	736	734	889	892	891
9:10:30	2856	508	35236	733	737	735	854	890	872
9:10:45	2855	524	35175	733	738	735	883	874	878

Fire Test Data - continued

9:11:00	2857	548	35231	734	740	737	851	865	858
9:11:15	2848	566	35237	734	742	738	872	872	872
9:11:30	2852	591	35186	734	742	738	900	866	883
9:11:45	2856	611	35181	736	742	739	921	869	895
9:12:00	2865	632	35159	738	742	740	884	872	878
9:12:15	2864	659	35226	739	743	741	861	878	869
9:12:30	2867	680	35179	740	743	741	861	885	873
9:12:45	2868	706	35155	740	743	741	860	885	873
9:13:00	2873	731	35236	741	743	742	908	880	894
9:13:15	2868	758	35160	743	743	743	865	864	864
9:13:30	2868	789	35172	743	745	744	864	871	868
9:13:45	2876	819	35170	743	745	744	881	864	873
9:14:00	2880	853	35180	744	745	744	845	869	857
9:14:15	2877	886	35151	743	747	745	838	863	850
9:14:30	2878	916	35223	742	748	745	850	876	863
9:14:45	2882	949	35272	742	747	745	849	875	862
9:15:00	2873	987	35248	741	747	744	837	868	853
9:15:15	2823	1026	35154	741	747	744	835	878	856
9:15:30	2871	1067	35248	741	746	744	866	876	871
9:15:45	2866	1107	35185	743	745	744	876	872	874
9:16:00	2856	1154	35218	744	744	744	865	875	870
9:16:15	2857	1202	35194	745	744	744	849	868	858
9:16:30	2851	1261	35198	746	743	744	861	861	861
9:16:45	2859	1324	35170	747	743	745	827	855	841
9:17:00	2863	1403	35255	745	745	745	805	862	834
9:17:15	2856	1505	35154	744	744	744	822	880	851
9:17:30	2862	1610	35248	743	745	744	800	852	826
9:17:45	2858	1758	35145	741	746	744	787	866	827
9:18:00	2854	1894	35188	739	747	743	822	868	845
9:18:15	2856	2043	35202	738	746	742	853	862	858
9:18:30	2866	2235	35168	739	745	742	795	853	824
9:18:45	2861	2374	35150	737	746	742	820	849	834
9:19:00	2862	2502	35142	736	745	741	813	837	825
9:19:15	2872	2566	35080	734	746	740	812	859	836
9:19:30	2873	2773	35181	733	746	739	817	853	835
9:19:45	2865	2998	35150	733	746	739	855	859	857
9:20:00	2877	3169	35178	734	745	739	857	862	860
9:20:15	2871	3320	35215	736	744	740	837	855	846
9:20:30	2876	3417	35157	736	744	740	843	859	851
9:20:45	2880	3545	35130	737	742	740	853	862	858
9:21:00	2881	3639	35132	739	742	741	849	863	856
9:21:15	2889	3775	35195	740	741	741	841	847	844
9:21:30	2890	3849	35147	740	740	740	856	851	854

Fire Test Data - continued

9:21:45	2886	3898	35130	741	737	739	857	843	850
9:22:00	2891	4003	35146	742	735	739	847	845	846
9:22:15	2884	3918	35195	741	731	736	622	672	647
9:22:30	2884	3514	35212	731	717	724	474	551	513
9:22:45	2886	3453	35158	715	700	708	390	483	436
9:23:00	2862	3188	35158	695	671	683	60	428	244
9:23:15	2813	3078	35202	659	577	618	42	381	212
9:23:30	2840	2899	35075	619	509	564	36	144	90
9:23:45	2838	2567	35183	572	451	512	32	88	60
9:24:00	2813	2439	35160	523	398	460	32	82	57
9:24:15	2861	2733	35040	471	326	399	31	87	59
9:24:30	2861	2830	35054	398	228	313	50	93	71
9:24:45	2867	2846	35059	287	155	221	29	75	52
9:25:00	2859	2835	35045	185	110	148	20	62	41
9:25:15	2858	2834	35034	114	83	98	17	59	38
9:25:30	2851	2828	34986	78	65	71	15	52	34
9:25:45	2862	2839	34970	58	53	55	13	43	28
9:26:00	2869	2839	35021	45	45	45	11	43	27
9:26:15	2866	2841	35020	36	38	37	12	37	25
9:26:30	2873	2842	35001	28	33	30	11	31	21
9:26:45	2858	2834	34981	23	30	26	12	33	23
9:27:00	2885	2855	34887	21	27	24	12	32	22
9:27:15	2870	2839	34951	20	25	23	12	30	21
9:27:30	2872	2843	34939	19	24	21	11	27	19
9:27:45	2866	2840	34945	17	23	20	11	26	19
9:28:00	2869	2850	34924	17	22	20	10	23	16
9:28:15	2887	2859	34899	16	21	19	9	18	13
9:28:30	2885	2865	34854	15	20	18	8	15	11
9:28:45	2890	2869	34855	14	19	16	8	14	11
9:29:00	2878	2857	34902	14	18	16	9	13	11
9:29:15	2873	2851	34904	13	17	15	9	13	11
9:29:30	2883	2858	34839	13	16	14	8	13	10
9:29:45	2879	2852	34917	13	15	14	8	12	10
9:30:00	2867	2856	34847	13	15	14	9	12	11
9:30:15	2871	2850	34895	13	14	13	9	12	11
9:30:30	2868	2844	34835	13	14	13	10	12	11
9:30:45	2856	2836	34864	13	14	13	10	11	11
9:31:00	2854	2835	34831	13	14	13	11	11	11
9:31:15	2857	2836	34901	13	14	13	11	11	11
9:31:30	2857	2838	34895	13	14	13	11	11	11
9:31:45	2858	2836	34867	13	14	13	11	11	11
9:32:00	2855	2835	34804	13	14	13	11	11	11

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:	0	mls
Average Leak Rate Over 30 Minute Duration:	0	ml/min
API 607 7th Edition, API 6FA 5th Edition Allowable Seat Leak Rate:	800	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:	434	mls
Water Collected in System Relief Valve:	350	mls
Calculated External Leakage During 40 Minute Duration:	84	mls
Average External Leak Rate Over 40 Minute Duration:	2.1	ml/min
API 607 7th Edition, API 6FA 5th Edition Allowable External Leak Rate:	200	ml/min

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

Yarmouth Research and Technology, LLC

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:	2954	psig
Average Pressure During Burn/Cool Down:	2844	psig
Minimum Pressure During Burn/Cool Down:	2733	psig
Amount of Time of Avg. Cal Block > 650 deg.C:	22.0	minutes
Minimum Allowable Time at Temperature:	15.0	minutes
Maximum Avg Cal Block Temperature:	745	deg. C
Average Cal Block Temperature:	524	deg. C
Lowest Avg Cal. Block Temperature:	13.3	deg. C
Maximum Body Flame Temperature During Burn:	911	deg. C
Average Body Flame Temperature During Burn:	852	deg. C
Maximum Bonnet Flame Temperature During Burn:	923	deg. C
Average Bonnet Flame Temperature During Burn:	861	deg. C
Average of Both Flame Temperatures During Burn:	856	deg. C

Notes

Were Test Conditions Within Compliance?	**Yes**

Post-Burn Seat Test Information

Customer: Guide Valve Limited	**Date:** 4/23/2021
Product Code: 2 inch Class 1500 GVS Welded Body Trunnion Mounted Ball Valve	
Project Number: 221052	

API 6FA 5th Edition Test Data

This test is not required for this pressure class.

Post-Burn Seat Test Information

Customer: Guide Valve Limited	**Date:** 4/23/2021
Product Code: 2 inch Class 1500 GVS Welded Body Trunnion Mounted Ball Valve	
Project Number: 221052	

API 607 7th Edition Test Data

This test is not required for this pressure class.

Operational Test Information

Customer: Guide Valve Limited **Date:** 4/23/2021

Product Code: 2 inch Class 1500 GVS Welded Body Trunnion Mounted Ball Valve

Project Number: 221052

Test Data after Operating Valve

Time	Pressure (psig)	Cal Block Temp - C
9:39:25	2757	15
9:39:40	2747	15
9:39:55	2729	15
9:40:10	2701	15
9:40:25	2675	15
9:40:40	2704	15
9:40:55	2667	15
9:41:10	2661	15
9:41:25	2728	15
9:41:40	2719	15
9:41:55	2716	15
9:42:10	2714	15
9:42:25	2714	16
9:42:40	2714	16
9:42:55	2716	16
9:43:10	2719	16
9:43:25	2700	16
9:43:40	2704	16
9:43:55	2700	16
9:44:10	2708	16
9:44:25	2702	16

Leakages were collected manually.

Total External Leakage Collected Over 5 Minute Duration:	0	mls
Average Leak Rate Over 5 Minute Duration:	0	ml/min
API 607 7th Edition Allowable External Leak Rate:	50	ml/min
API 6FA 5th Edition Allowable External Leak Rate:	400	ml/min

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

Yarmouth Research and Technology, LLC

ANSI/API Standard 607 Seventh Edition - 2016
ISO 10497:2010
API 6FA, Fifth Edition, May 2020
Fire Test Certificate

Certificate Number:	221052B	***Test Start Date:***	4/23/2021

Customer Information	
Customer:	Guide Valve Limited
Web Address:	www.gvs-vci.com

Valve Information			
Valve Description:	2 inch Class 1500 GVS Welded Body Trunnion Mounted Ball Valv		
Product Code:	Model GW		
Body/Bonnet Material:	ASTM A350 LF2 Cl. 1	Valve Size:	2"
Seat Material:	PEEK+20%PTFE x Dual Seat	ANSI Pressure Class:	1500
	PEEK+20%PTFE + FKM Delta		
Stem Seal Material:	Lip Seals PTFE+Elgiloy + Graphite		
Body Seal Material:	welded body - body to bonnet: Spiral Wound gasket		

The above valve was tested in accordance with the above stated fire test procedure in one flow direction. All of the applicable test parameters were met and external and through leakage measurements were below the allowable limits. Other valves of the same construction may also be qualified according to the requirements of Section 7 of the test specification.

Test Results

This certificate refers to the above mentioned product. This is to certify that the test specimen provided is in conformity with the standard mentioned above. This certificate does not imply assessment of the production of the product.

Certified By

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