

Fire Test Report

ANSI/API Standard 607, 7th Edition, 2016

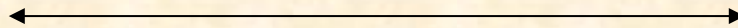
ISO 10497: 2010

API Standard 6FA, Fifth Edition, May 2020

Performed for

Guide Valve Limited

www.gvs-vci.com



4 inch Class 900 GVS Welded Body
Trunnion Mounted Ball Valve
Valve Code: Model GW

Project Number: 221052

Test Date: April 21, 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: 4/21/2021

Specifications: ANSI/API Standard 607, Seventh Edition, 2016 ISO 10497: 2010

API Standard 6FA, Fifth Edition, May 2020

Product Description: 4 inch Class 900 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:	11:42:00	
Average Pressure During Burn:	1663	psig
Seat Leak Rate During Burn:	0	ml/min
Allowable Seat Leak Rate:	1600	ml/min
External Leak Rate During Burn/Cool Down:	0.4	ml/min
Allowable External Leak Rate:	400	ml/min
Amount of Time of Avg. Cal. Blocks > 650 deg. C:	19.8	minutes
Were Test Conditions Within Compliance?	Yes	
Were the Valve Leakages Below the Allowables?	Yes	

Operational Test

Average Pressure During Test:	1638	psig
External Leak Rate After Operating:	0	ml/min
API 607 7th Edition Allowable External Leak Rate:	100	ml/min
API 6FA 5th Edition Allowable External Leak Rate:	800	ml/min
Was the Leakage Below the Allowables?	Yes	
Does Valve Pass or Fail the Test Standards?	PASS	

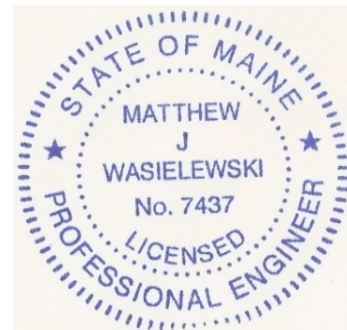
Certified by



Matthew J. Wasielewski, PE

President and Manager

Yarmouth Research and Technology, LLC

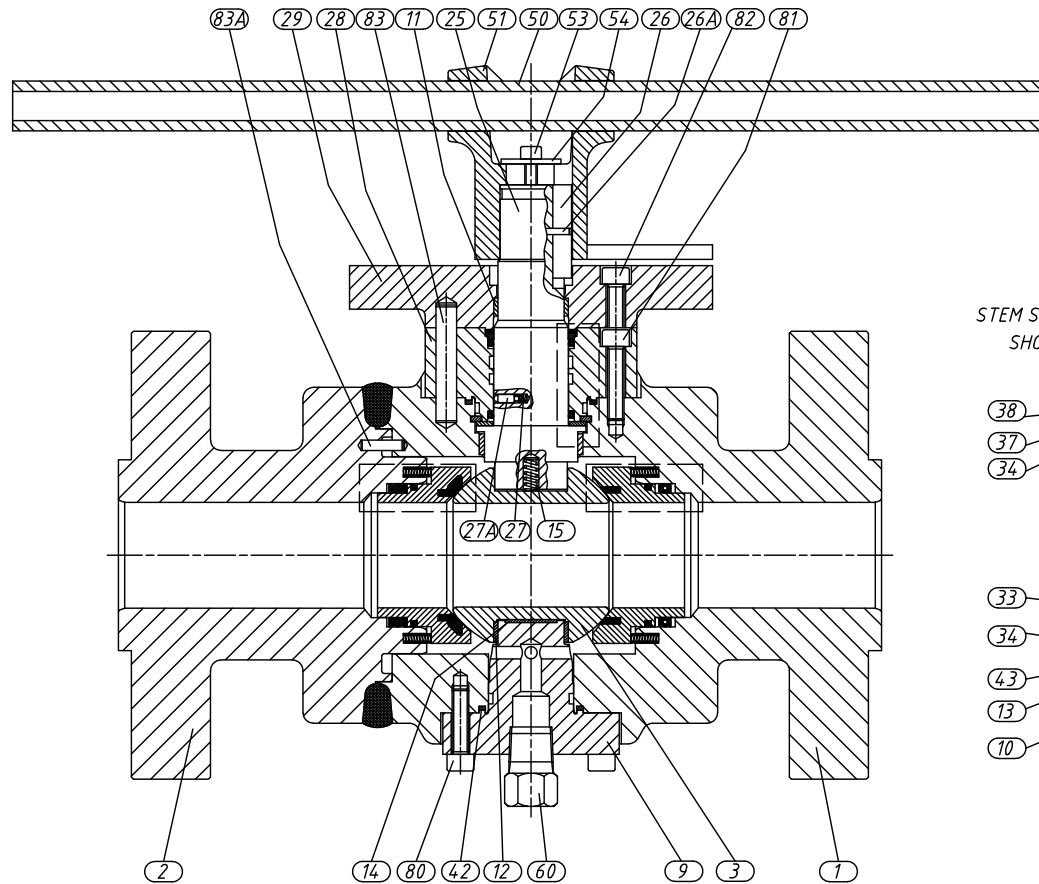


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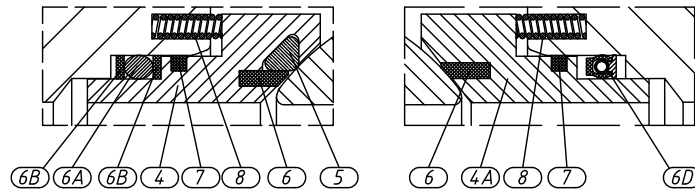
Fire Test Information Sheet

4" ANSI 900 welded body trunnion mounted

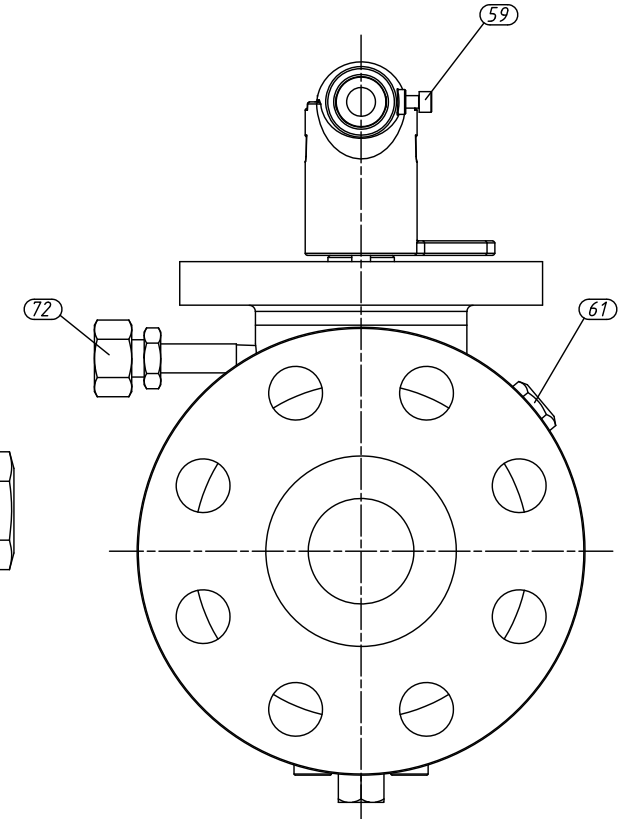
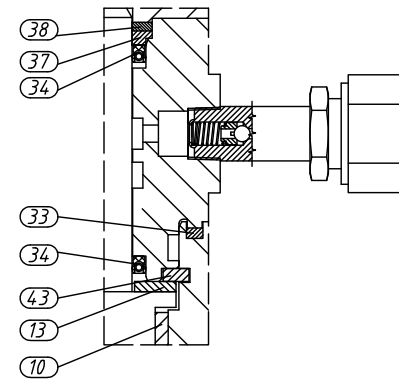
Fire Test Specification and Revision: (ie. API 607 7th, API 6FA 5th, etc)	API 607 and 6FA Dual Certification according to latest edition
Yarmouth Proposal Number:	
Customer Purchase Order Number:	8947
Customer's Contact Name:	Kevin Yazdi
Customer's Name (used in test report as specified):	Guide Valve 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:	GVS Welded Body Trunnion Mounted Ball Valve
Valve Product Code:	Model GW
Valve Description	
Size:	4"
Pressure Rating/Class:	900
Pressure Rating at 100F:	2220 psi
Type:	Trunnion mounted ball valve
Weight:	350 lb
Reduced or Full Bore:	Full
Body/Bonnet Material:	ASTM A350 LF2 Cl. 2
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:	5500
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 16,2021



SEAT SUB-ASSEMBLY DETAIL



STEM SEAL SUB-ASSEMBLY DETAIL
SHOWN ROTATED AT 90°

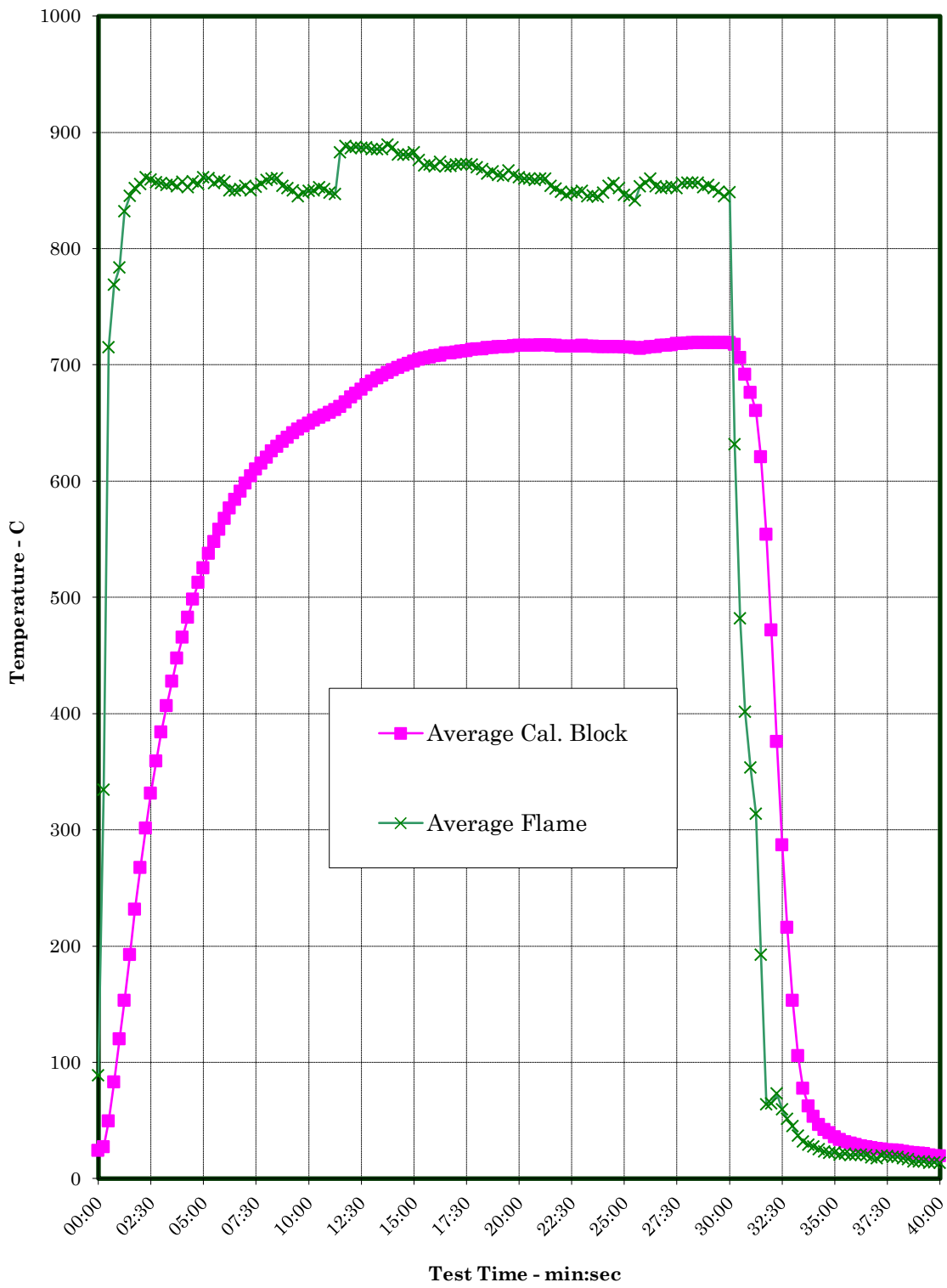


NOTES:

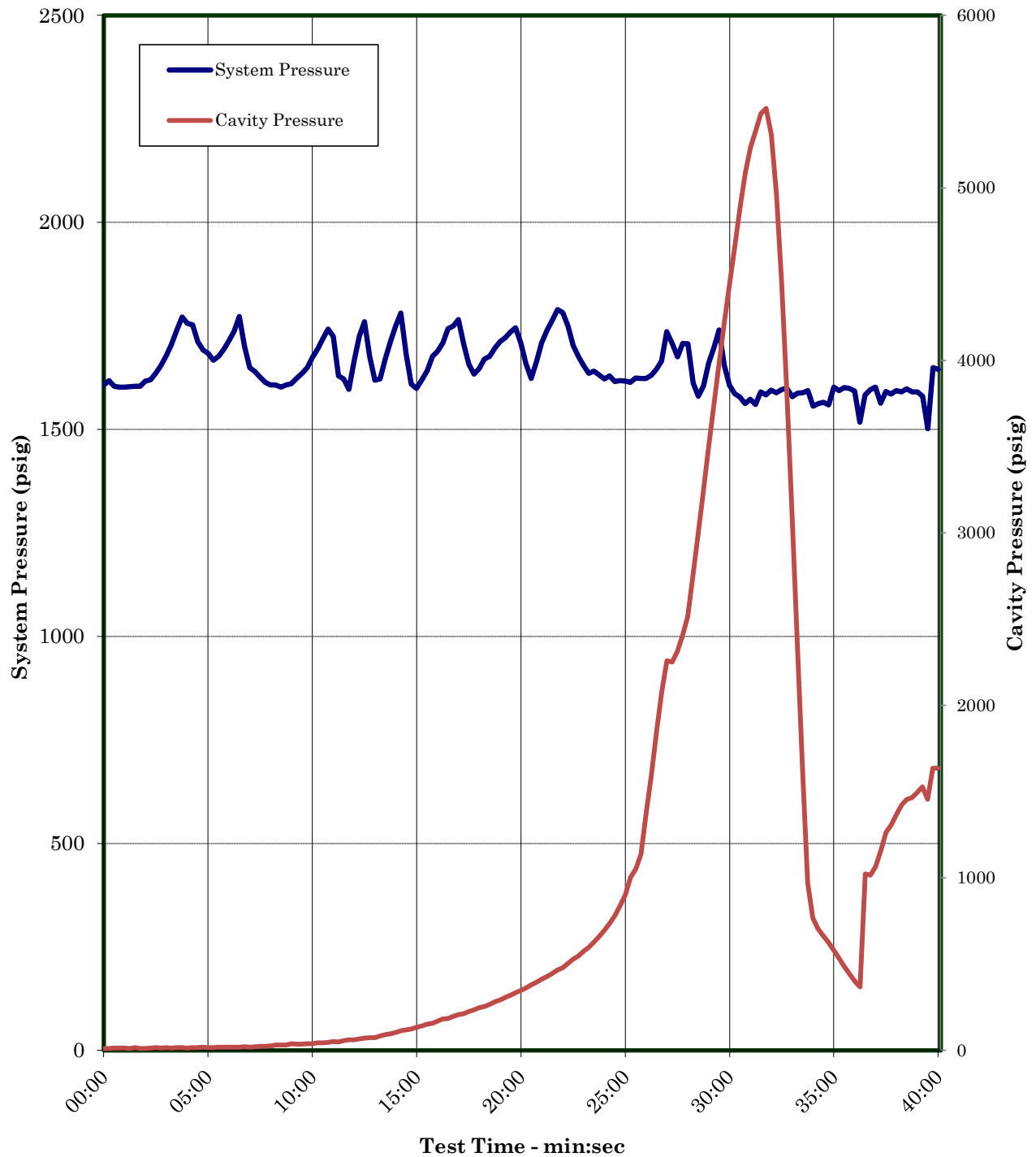
- ITEMS 90 & 100 ARE NOT SHOWN.
- VALVE DESIGN TO API 6D, CSA Z245.15
- PRESSURE / TEMP RATINGS TO ASME B16.34
- MINIMUM WALL THICKNESS TO ASME B16.34
- NACE MR0175 SOUR
- IMPACT TESTED AT -46°C OR LOWER
- FLANGED ENDS TO ASME B16.5
- STEM AND BALL ANTI-STATIC DEVICE
- EMERGENCY STEM SEALING SYSTEM

0	First issue	N/A	Y.Z.	Y.Z.	E.L.	2021/04/13			
REV.	REVISIONS	ECN	PREP'D	CHK'D	APPR'D	DATE			
TITLE: CROSS-SECTION			DRAWING / PART NUMBER			REV.			
GVS® VALVES W/ 2" ANSI 1500 & 4" ANSI 900, RF, FULLY WELDED			STD-21-0052			0			
GENERAL MACHINING TOLERANCES									
DIMENSIONS GROUP		UP TO 6	OVER 6 UP TO 30	OVER 30 UP TO 120	OVER 120	DRAWN		Y.Z.	
SHAFTS		±0.1	±0.2	±0.3	±0.4	CHECKED		Y.Z.	
HOLES		±0.1	±0.2	±0.3	±0.4	APPROVED		E.L.	
LENGTH		±0.1	±0.4	±0.6	±0.8	ANSI A			
ALL SHARPS & EDGES NOT INDICATED 0.5 MAX ANGULAR ALLOWANCES NOT INDICATED ±0.5°					SCALE				
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE					1:2.5				
UNSPECIFIED SURFACE FINISH: 12.5					SHEET				
					1 of 2				
									

Temperature verses Time Chart



Pressure verses Time Chart



Yarmouth Research and Technology, LLC



Valve Tag Information



Test Setup Prior to Burn



Test Valve During Burn

Yarmouth Research and Technology, LLC

Fire Test Information

Customer: Guide Valve Limited

Date: 4/21/2021

Product Code: 4 inch Class 900 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
11:42:00	1607	12	37564	25	23	24	90	88	89
11:42:15	1617	11	37570	28	26	27	306	363	334
11:42:30	1604	14	37534	60	39	49	748	682	715
11:42:45	1602	14	37557	103	63	83	843	695	769
11:43:00	1602	14	37523	142	97	120	852	715	784
11:43:15	1603	12	37514	179	127	153	853	811	832
11:43:30	1604	16	37524	213	172	193	838	853	845
11:43:45	1604	11	37555	245	218	231	843	861	852
11:44:00	1616	11	37517	275	260	268	844	867	856
11:44:15	1620	13	37546	304	299	301	850	872	861
11:44:30	1636	15	37559	330	333	331	846	872	859
11:44:45	1654	14	37548	355	363	359	843	871	857
11:45:00	1677	15	37547	378	390	384	842	870	856
11:45:15	1705	14	37522	399	414	406	840	869	854
11:45:30	1738	16	37569	419	436	428	839	873	856
11:45:45	1771	15	37527	438	457	448	831	876	854
11:46:00	1756	14	37589	455	476	466	836	879	858
11:46:15	1752	15	37539	471	494	483	830	875	853
11:46:30	1712	16	37571	486	510	498	833	883	858
11:46:45	1692	18	37568	499	526	513	829	882	856
11:47:00	1684	17	37545	511	539	525	835	887	861
11:47:15	1667	15	37536	523	552	538	835	886	861
11:47:30	1677	18	37578	533	563	548	825	887	856
11:47:45	1693	18	37561	543	574	558	831	886	859
11:48:00	1714	19	37576	552	583	568	832	883	858
11:48:15	1737	19	37588	561	592	577	815	885	850
11:48:30	1773	19	37567	568	600	584	818	882	850
11:48:45	1700	22	37574	575	607	591	816	886	851
11:49:00	1649	19	37557	581	615	598	818	890	854
11:49:15	1640	22	37568	587	621	604	814	886	850
11:49:30	1626	24	37579	593	627	610	816	890	853
11:49:45	1614	23	37575	598	633	615	823	889	856
11:50:00	1607	26	37543	603	638	620	824	894	859

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Fire Test Data - continued

11:50:15	1608	31	37566	607	644	626	824	896	860
11:50:30	1602	30	37502	611	648	629	824	897	861
11:50:45	1607	32	37551	615	653	634	820	888	854
11:51:00	1611	38	37597	619	656	638	811	893	852
11:51:15	1623	35	37571	622	660	641	807	892	850
11:51:30	1635	37	37563	625	664	644	803	887	845
11:51:45	1649	38	37542	627	667	647	810	886	848
11:52:00	1674	39	37581	630	669	649	808	891	849
11:52:15	1694	44	37558	632	672	652	811	889	850
11:52:30	1719	43	37571	634	675	654	813	892	853
11:52:45	1742	46	37587	636	677	657	807	895	851
11:53:00	1725	51	37546	638	680	659	805	891	848
11:53:15	1629	48	37585	640	682	661	802	891	847
11:53:30	1621	57	37569	643	685	664	870	895	883
11:53:45	1597	60	37547	648	688	668	879	897	888
11:54:00	1665	62	37533	653	691	672	880	892	886
11:54:15	1725	67	37559	658	693	675	884	891	888
11:54:30	1760	70	37545	663	695	679	878	895	886
11:54:45	1676	73	37574	667	698	683	881	893	887
11:55:00	1619	74	37556	671	700	686	880	891	886
11:55:15	1622	83	37550	675	702	689	880	891	886
11:55:30	1670	91	37531	678	704	691	882	889	886
11:55:45	1712	95	37565	681	705	693	882	896	889
11:56:00	1749	105	37580	684	707	696	878	896	887
11:56:15	1781	114	37541	687	708	698	873	889	881
11:56:30	1683	118	37548	689	710	699	873	889	881
11:56:45	1609	125	37584	691	711	701	870	891	881
11:57:00	1599	134	37536	693	713	703	870	895	883
11:57:15	1619	141	37574	695	714	704	867	885	876
11:57:30	1642	151	37573	697	714	706	859	884	871
11:57:45	1676	156	37599	698	715	706	863	881	872
11:58:00	1689	169	37514	699	716	708	859	882	871
11:58:15	1709	182	37513	700	716	708	866	883	874
11:58:30	1744	183	37588	702	717	710	860	881	871
11:58:45	1749	196	37580	703	717	710	864	878	871
11:59:00	1765	208	37546	704	717	711	863	881	872
11:59:15	1707	212	37619	705	718	711	861	884	873
11:59:30	1657	224	37548	706	718	712	863	882	873
11:59:45	1633	235	37577	707	719	713	866	878	872
12:00:00	1647	246	37550	708	719	713	862	877	870
12:00:15	1670	255	37573	708	719	713	864	873	868
12:00:30	1676	268	37537	709	720	714	856	872	864
12:00:45	1696	282	37559	709	720	714	856	876	866

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Fire Test Data - continued

12:01:00	1712	292	37557	710	721	716	852	874	863
12:01:15	1721	306	37553	710	721	716	852	872	862
12:01:30	1735	320	37548	710	721	716	855	879	867
12:01:45	1745	334	37568	710	722	716	853	874	863
12:02:00	1709	348	37557	711	722	717	847	875	861
12:02:15	1658	363	37567	711	722	717	849	871	860
12:02:30	1622	379	37536	711	722	717	851	869	860
12:02:45	1663	396	37537	711	722	717	850	868	859
12:03:00	1709	413	37578	711	723	717	846	874	860
12:03:15	1740	429	37543	711	723	717	850	870	860
12:03:30	1764	446	37583	710	723	716	843	865	854
12:03:45	1789	466	37548	710	723	716	843	860	851
12:04:00	1782	479	37549	709	723	716	836	861	849
12:04:15	1749	503	37555	709	723	716	839	853	846
12:04:30	1703	527	37556	709	723	716	843	854	848
12:04:45	1676	547	37570	709	723	716	839	857	848
12:05:00	1655	574	37536	709	724	716	838	861	849
12:05:15	1636	597	37559	708	724	716	836	854	845
12:05:30	1640	626	37578	708	724	716	835	856	846
12:05:45	1632	659	37564	707	724	716	829	860	844
12:06:00	1622	694	37560	707	724	716	831	865	848
12:06:15	1630	737	37635	706	725	716	834	874	854
12:06:30	1616	781	37562	706	725	716	841	871	856
12:06:45	1618	840	37570	706	725	716	836	867	852
12:07:00	1617	903	37545	705	725	715	837	855	846
12:07:15	1614	1003	37579	705	725	715	834	856	845
12:07:30	1624	1050	37550	704	725	714	829	854	841
12:07:45	1623	1135	37558	704	724	714	843	864	853
12:08:00	1623	1374	37595	704	725	714	849	864	856
12:08:15	1630	1592	37550	705	726	716	856	864	860
12:08:30	1644	1848	37555	705	726	716	847	860	854
12:08:45	1665	2077	37557	706	727	717	841	862	852
12:09:00	1736	2259	37539	706	727	717	841	864	853
12:09:15	1707	2250	37562	706	728	717	846	861	854
12:09:30	1676	2312	37552	707	729	718	841	862	852
12:09:45	1708	2404	37540	707	729	718	847	865	856
12:10:00	1706	2515	37563	708	729	718	847	866	857
12:10:15	1612	2750	37568	708	730	719	848	865	856
12:10:30	1580	2993	37555	708	730	719	845	868	856
12:10:45	1605	3237	37564	708	730	719	844	861	853
12:11:00	1661	3493	37569	708	730	719	849	860	854
12:11:15	1697	3734	37582	708	730	719	843	861	852
12:11:30	1741	3975	37566	708	730	719	840	858	849

Yarmouth Research and Technology, LLC

Fire Test Data - continued

12:11:45	1655	4209	37510	708	730	719	834	856	845
12:12:00	1606	4450	37548	708	730	719	838	859	848
12:12:15	1586	4666	37558	707	728	718	601	662	632
12:12:30	1578	4889	37569	696	716	706	448	516	482
12:12:45	1562	5088	37584	682	701	692	365	438	401
12:13:00	1573	5235	37521	667	685	676	310	397	354
12:13:15	1560	5330	37553	653	668	660	254	374	314
12:13:30	1591	5430	37569	632	609	621	48	337	193
12:13:45	1584	5462	37517	593	515	554	45	82	64
12:14:00	1595	5311	37539	542	401	472	45	84	64
12:14:15	1588	4962	37525	464	287	376	57	89	73
12:14:30	1596	4446	37510	375	199	287	53	66	59
12:14:45	1600	3810	37508	289	143	216	47	55	51
12:15:00	1579	3105	37419	199	107	153	43	47	45
12:15:15	1587	2365	37452	127	84	106	35	39	37
12:15:30	1589	1638	37443	87	68	78	31	33	32
12:15:45	1593	971	37405	67	57	62	27	31	29
12:16:00	1556	768	37404	56	50	53	26	29	28
12:16:15	1562	705	37367	49	44	46	23	28	25
12:16:30	1565	665	37367	44	40	42	21	25	23
12:16:45	1559	626	37378	41	37	39	18	26	22
12:17:00	1602	582	37375	37	34	36	18	27	23
12:17:15	1594	535	37357	34	33	33	19	22	21
12:17:30	1601	487	37329	33	30	31	21	21	21
12:17:45	1598	445	37334	33	28	30	19	21	20
12:18:00	1592	400	37354	31	27	29	20	21	21
12:18:15	1518	368	37275	30	26	28	19	22	21
12:18:30	1583	1022	37197	29	25	27	18	22	20
12:18:45	1596	1016	37119	28	25	26	16	20	18
12:19:00	1602	1066	37134	27	24	26	16	19	18
12:19:15	1564	1159	37137	26	24	25	17	22	20
12:19:30	1591	1265	37086	25	24	24	17	21	19
12:19:45	1586	1307	37090	25	24	24	16	21	19
12:20:00	1593	1368	37088	24	24	24	16	21	19
12:20:15	1590	1422	37093	23	24	23	15	20	18
12:20:30	1598	1456	37017	22	23	23	15	18	16
12:20:45	1591	1464	37015	22	22	22	13	16	14
12:21:00	1590	1495	37032	21	22	22	13	16	14
12:21:15	1580	1529	36988	21	21	21	13	16	14
12:21:30	1501	1454	36957	20	20	20	12	15	14
12:21:45	1649	1637	36974	20	19	19	13	15	14
12:22:00	1645	1637	36950	20	19	19	12	15	14

Yarmouth Research and Technology, LLC

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:	1600	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:	614	mls
Water Collected in System Relief Valve:	600	mls
Calculated External Leakage During 40 Minute Duration:	14	mls
Average External Leak Rate Over 40 Minute Duration:	0.4	ml/min
API 607 7th Edition, API 6FA 5th Edition Allowable External Leak Rate:	400	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:	1789	psig
Average Pressure During Burn/Cool Down:	1649	psig
Minimum Pressure During Burn/Cool Down:	1501	psig
Amount of Time of Avg. Cal Block > 650 deg.C:	19.8	minutes
Minimum Allowable Time at Temperature:	15.0	minutes
Maximum Avg Cal Block Temperature:	719	deg. C
Average Cal Block Temperature:	509	deg. C
Lowest Avg Cal. Block Temperature:	19.4	deg. C
Maximum Body Flame Temperature During Burn:	897	deg. C
Average Body Flame Temperature During Burn:	863	deg. C
Maximum Bonnet Flame Temperature During Burn:	884	deg. C
Average Bonnet Flame Temperature During Burn:	833	deg. C
Average of Both Flame Temperatures During Burn:	848	deg. C

Notes

Were Test Conditions Within Compliance?	Yes

Yarmouth Research and Technology, LLC

Post-Burn Seat Test Information

Customer: Guide Valve Limited

Date: 4/21/2021

Product Code: 4 inch Class 900 Welded Body Trunnion Mounted Ball Valve

Project Number: 221052

API 6FA 5th Edition Test Data

This test is not required for this pressure class.

Yarmouth Research and Technology, LLC

Post-Burn Seat Test Information

Customer: Guide Valve Limited

Date: 4/21/2021

Product Code: 4 inch Class 900 Welded Body Trunnion Mounted Ball Valve

Project Number: 221052

API 607 7th Edition Test Data

This test is not required for this pressure class.

Yarmouth Research and Technology, LLC

Operational Test Information

Customer: Guide Valve Limited

Date: 4/21/2021

Product Code: 4 inch Class 900 Welded Body Trunnion Mounted Ball Valve

Project Number: 221052

Test Data after Operating Valve

Time	Pressure (psig)	Cal Block Temp - C
12:26:16	1647	19
12:26:31	1648	19
12:26:46	1647	19
12:27:01	1638	19
12:27:16	1637	19
12:27:31	1641	19
12:27:46	1636	19
12:28:01	1643	19
12:28:16	1636	19
12:28:31	1637	19
12:28:46	1635	19
12:29:01	1640	19
12:29:16	1641	19
12:29:31	1635	19
12:29:46	1643	20
12:30:01	1633	20
12:30:16	1640	20
12:30:31	1632	20
12:30:46	1632	20
12:31:01	1634	20
12:31:16	1633	20

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:	100	ml/min
API 6FA 5th Edition Allowable External Leak Rate:	800	ml/min

Was the Valve Leakage Below the Allowable?	Yes
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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: 221052A

Test Start Date: 4/21/2021

Customer Information

Customer: Guide Valve Limited

Web Address: www.gvs-vci.com

Valve Information

Valve Description: 4 inch Class 900 GVS Welded Body Trunnion Mounted Ball Valve

Product Code: Model GW

Body/Bonnet Material: ASTM A350 LF2 Cl. 2

Valve Size: 4"

Seat Material: PEEK+20%PTFE x Dual Seat ANSI Pressure Class: 900

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



Matthew J. Wasielewski, PE

President and Manager

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