

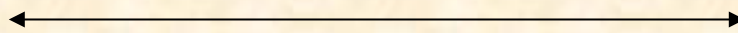
Fire Test Report

API Standard 6FA, Fourth Edition, June 2018
“Specification for Fire Testing of Valves”

Performed for

Guide Valve Limited

www.gvs-vci.com



2 1/16 inch Class 5000 API 6A
Trunnion Mounted Ball Valve
Product Code: GVS-6A-5

Project Number: 219530
Test Date: December 6, 2019

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: 12/6/2019

Specification: API Standard 6FA, Fourth Edition, June 2018

Product Description: GVS 2 1/16" API 6A 5000 psi Trunnion Mounted Ball Valve

Product Code: GVS-6A-5

Project Number: 219530

Equipment Confirmed to be in Calibration to NIST Standards: Yes

Burn and Cool Down Test

Burn Start Time:	13:36:00	
Average Pressure During Burn:	3715	psig
Seat Leak Rate During Burn:	0	ml/min
Allowable Seat Leak Rate:	825	ml/min
External Leak Rate During Burn/Cool Down:	0	ml/min
Allowable External Leak Rate:	206	ml/min
Amount of Time of Avg. Cal. Blocks > 650 deg. C:	18.5	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:	3822	psig
External Leak Rate After Operating:	0	ml/min
Allowable External Leak Rate:	413	ml/min
Was the Leakage Below the Allowable?	Yes	
Does Valve Pass or Fail the Test Standard?	PASS	

Certified By:



Matthew Wasielewski, PE

President and Manager

Yarmouth Research and Technology, LLC



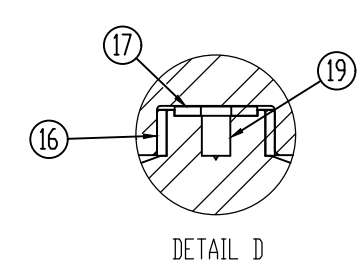
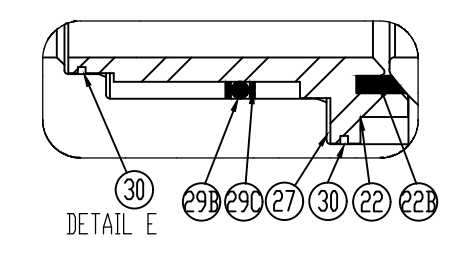
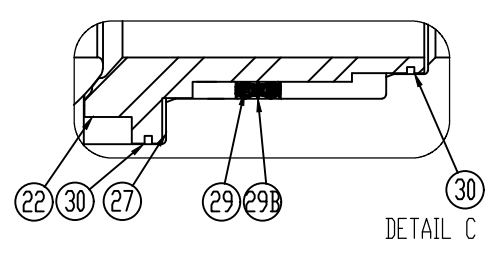
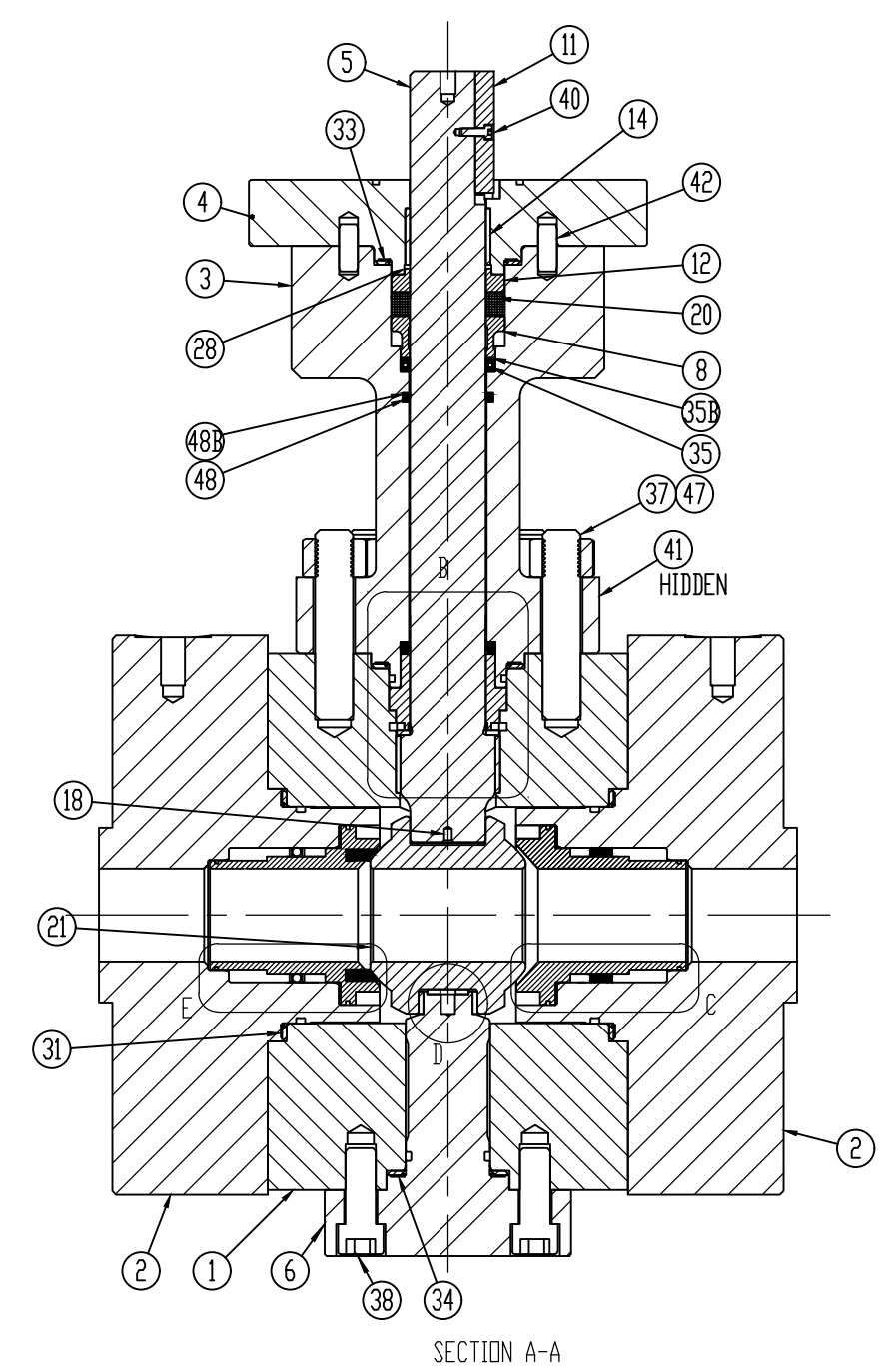
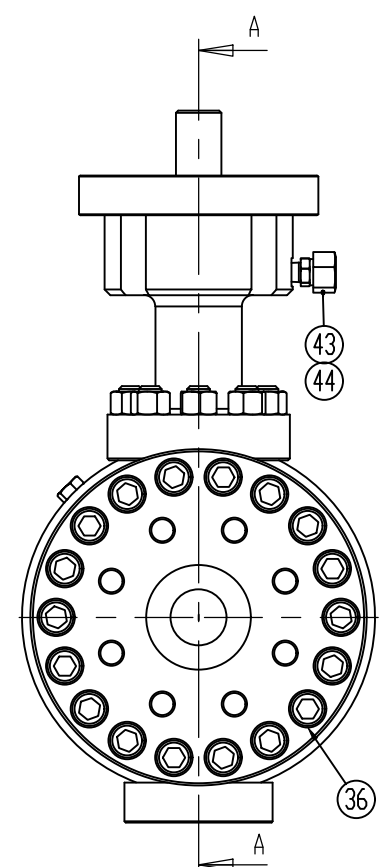
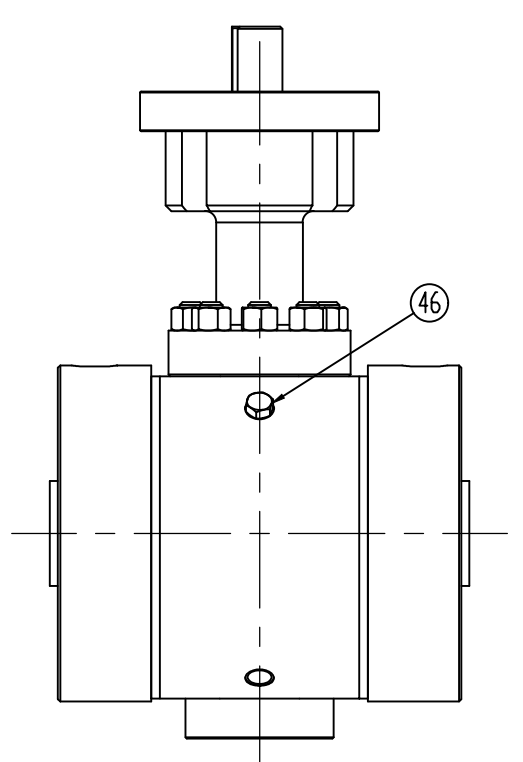
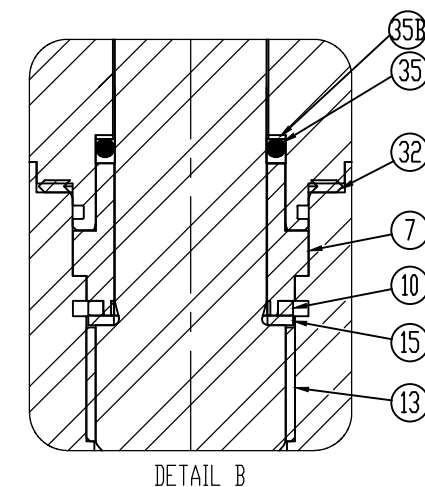
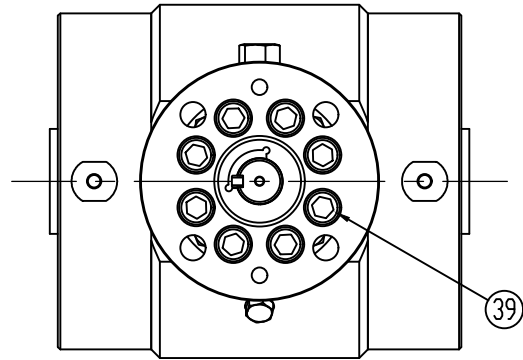
YARMOUTH RESEARCH AND TECHNOLOGY, LLC

Fire Test Information Sheet

Fire Test Specification and Revision: (ie. API 607 7th, API 6FA 4th, etc)	API 6FA latest edition
Yarmouth Proposal Number:	219530A
Customer Purchase Order Number:	7977
Customer's Contact Name:	Kevin Yazdi
Customer's Name (used in test report as specified):	Guide Valve Limited
Company Web Address for Report Cover:	www.gvs-vci.com
Valve Manufacturer's Address:	Unit 1, 51 Terecar drive, Woodbridge, Ontario
Did valve meet all required hydrostatic, leakage and other production pressure tests?	Yes
Valve Description for Report Cover:	GVS 2 1/16" API 6A 5000 psi
Valve Product Code:	GVS-6A-5
Valve Description	
Size:	2 1/16"
Pressure Rating/Class:	5000 psi
Pressure Rating at 100F:	5000 psi
Type:	API 6A Trunnion Mounted Ball Valve
Weight:	250 Kgs
Reduced or Full Bore:	Full
Body/Bonnet Material:	4130 alloy steel
Trim Material:	Inconel + TC coating / Alloy steel + cladding / CRA alloys
Seat Material:	Inconel + TC coating / PEEK
Stem Seal Material:	FKM AED / Elastomeric O-ring / PTFE + Elgiloy / Graphite
Body Seal Material:	Metalic ring seal/ Spiral wound gasket/ Graphite / Elastomeric o-ring / PTFE + Elgiloy
Bolting Material:	A320 L7M
Is valve considered "Soft-Seated"?	valves is soft seated by metal seated
If valve is fitted with gearbox, state gearbox manufacturer, model # and mech. advantage:	Yes, Rotork AB model
State if valve is symmetric or non-symmetric: If non, state direction of flow for test:	Symmetric
IMPORTANT - Cavity pressure tap is required for ALL dual-seated valves. Please refer to quote	
For double-seated valves, state maximum allowable cavity pressure:	6500 psi
Is there a reason that test should not measure and record through (seat) leakage?	No
Pre-Test Adjustments, if any:	None
Valve Markings	
Nameplate Information:	GVS 2 1/16" API 6A 5000 psi
Casting Markings:	
Assembly Drawing Number / Revision / Date:	100598
Emailed (PDF) to Yarmouth: Date:	12/3/2019
Form Submission Date:	12/4/2019

PLEASE RETURN AS AN EXCEL DOCUMENT

ITEM	DESCRIPTION	MATERIAL
1	BODY	AISI 4130
2	END ADAPTOR, RAISED FACE	AISI 4130
3	LOWER STEM FLANGE	AISI 4130
4	TOP MOUNTING PLATE	AISI 4130
5	STEM	UNS N07750
6	TRUNNION	AISI 4130
7	LOWER STEM PACKING RING	A479 GR 316
8	LANTERN RING	A479 GR 316
10	ANTI BLOW OUT RING	A479 GR 316
11	STEM KEY	ASTM A29 GR 1040
12	STEM GREASE SPACER RING	A479 GR 316
13	LOWER STEM BUSHING	SS 316 + PMT
14	UPPER STEM BUSHING	SS 316 + PMT
15	STEM THRUST WASHER	SS 316 + PMT
16	TRUNNION BUSHING	SS 316 + PMT
17	TRUNNION THRUST WASHER	SS 316 + PMT
18	STEM ANTI STATIC SPRING	X750
19	BALL ANTISTATIC SPRING	X750
20	STEM PACKING	GRAPHITE WEDGE, 40X50X25
21	BALL	INCONEL 625
22	SEAT	INCONEL 625 + TC
22B	SEAT INSERT	PEEK + 20% PTFE
27	SPRING, SEAT	X-750
28	FILTER SEAL	GRAPHITE WOUND ROPE, 3MM
29	SEAT LIPSEAL	PTFE + ELGILOY SPRING
29B	SEAT O-RING SEAL	FKM LT AED
29C	SEAT O-RING BACK-UP RING	RPTFE
30	SEAT FILTER SEAL	GRAPHITE WOUND ROPE, 2MM
31	GASKET, BODY	TYPE R, 316SS WINDING/GRAPHITE FILLER / METTALIC RING
32	GASKET, LOWER STEM FLANGE	TYPE R, 316SS WINDING/GRAPHITE FILLER / METTALIC RING
33	GASKET, TOP MOUNTING PLATE	TYPE R, 316SS WINDING/GRAPHITE FILLER
34	GASKET, TRUNNION	TYPE R, 316SS WINDING/GRAPHITE FILLER
35	STEM LOWER O-RING	FKM LT AED
35B	STEM LOWER O-RING BACK-UP RING	RPTFE
36	SHCS, BODY	A320 L7M, M20-2.5 X 95MM, ISO 4762
37	STUD, LOWER STEM FLANGE	A320 L7M, M20-2.5 X 100MM
38	SHCS, TRUNNION	A320 L7M, M16-2 X 40MM, ISO 4762
39	SHCS, ISO MOUNTING FLANGE	A320 L7M, M20-2.5 X 45MM, ISO 4762
40	SHCS, STEM KEY	316SS, M4-0.7 X 12MM
41	DOWEL, LOWER STEM FLANGE	4140, DIAM 12 X 25MM
42	DOWEL, ISO MOUNTING PLATE	4140, DIAM 10 X 25MM
43	CHECK VALVE, STEM INJECTION	1/4" , SS
44	GREASE INJECTION FITTING	3/8" , SS
45	DRAIN VALVE	1/2" NPT, SS
46	VENT PLUG	1/2" NPT, SS
47	HEX NUT	A194 7M, M20-2.5 ISO 4033
48	STEM O-RING	FKM ELT AED
48B	STEM O-RING BACK-UP RING	PEEK

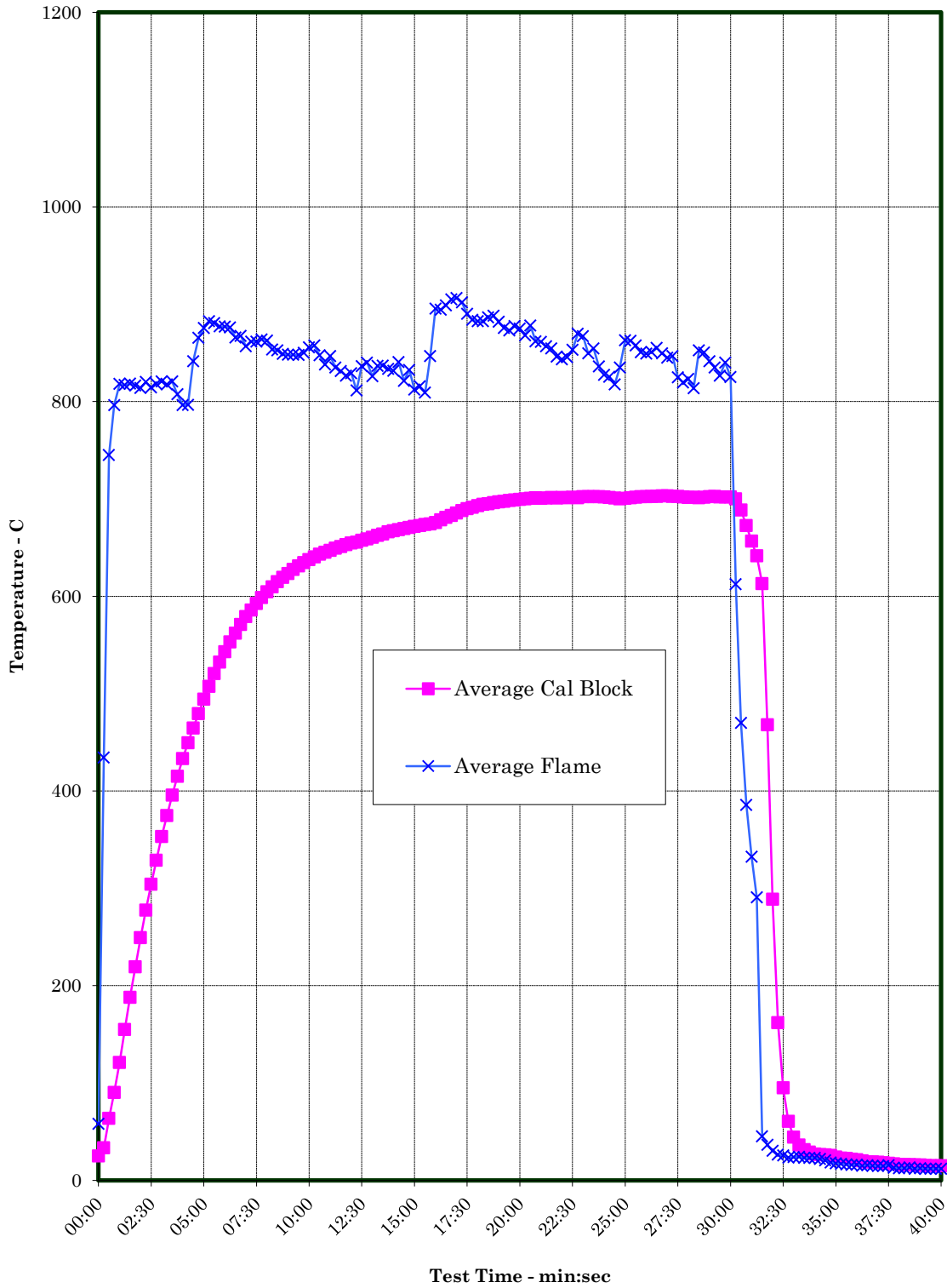


REV.	REVISIONS	ECN	PREP'D	CHK'D	APPR'D	DATE	
TITLE:						DRAWING / PART NUMBER	REV.
GVS, API 6A VALVE, 2 1/16" 5000						100598	0
GENERAL MACHINING TOLERANCES				MATERIAL:		DRAWN	
DIMENSIONS GROUP	UP TO 6	OVER 6 UP TO 30	OVER 30 UP TO 120	OVER 120	AS SPECIFIED	CHECKED	
SHAFTS	±0.1	±0.2	±0.3	±0.4	WEIGHT:	APPROVED	
HOLES	±0.1	±0.2	±0.3	±0.4	9		
LENGTH	±0.1	±0.4	±0.6	±0.8	ANSI B	SCALE	
ALL SHARPS & EDGES NOT INDICATED 0.5 MAX						FIRST ANGLE PROJECTION	1:10
ANGULAR ALLOWANCES NOT INDICATED ±0.5°							SHEET
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.							1 OF 1
UNSPECIFIED SURFACE FINISH: 6.3							

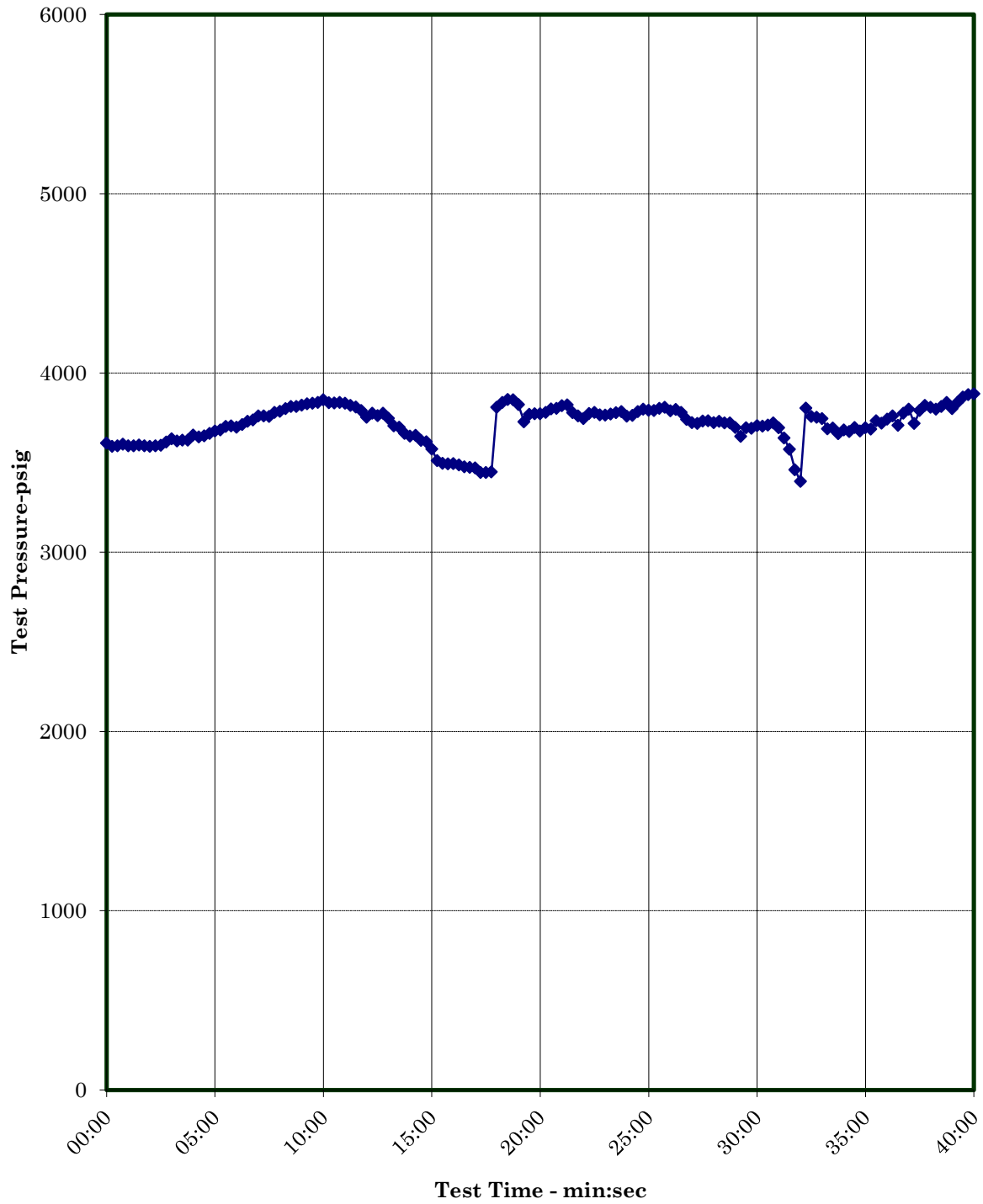
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Temperature verses Time Chart



Pressure verses Time Chart



Yarmouth Research and Technology, LLC



Valve Markings



Test Valve Prior to Burn

Yarmouth Research and Technology, LLC



Test Valve During Burn

Yarmouth Research and Technology, LLC

Fire Test Information

Customer: Guide Valve Limited

Date: 12/6/2019

Product Code: GVS 2 1/16" API 6A 5000 psi Trunnion Mounted Ball Valve

Project Number: 219530

Fire Test Raw Data

Time (EST)	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
13:36:00	3609	11	37794	22	28	25	35	81	58
13:36:15	3590	5	37881	29	38	33	323	546	434
13:36:30	3594	10	37873	62	65	64	724	766	745
13:36:45	3602	10	37911	88	93	90	783	810	796
13:37:00	3594	3	37872	122	120	121	807	829	818
13:37:15	3594	8	37920	160	150	155	804	830	817
13:37:30	3598	7	37930	196	180	188	799	838	818
13:37:45	3593	5	37899	230	209	219	800	833	816
13:38:00	3591	10	37919	262	236	249	788	840	814
13:38:15	3593	8	37909	293	262	278	793	847	820
13:38:30	3596	10	37898	321	287	304	784	845	814
13:38:45	3614	10	37889	348	310	329	786	850	818
13:39:00	3633	0	37832	374	332	353	795	846	821
13:39:15	3621	16	37961	397	352	375	790	845	818
13:39:30	3625	15	37895	419	372	396	796	845	821
13:39:45	3626	14	37894	440	390	415	778	837	808
13:40:00	3654	14	37914	459	408	433	753	840	796
13:40:15	3644	12	37901	475	424	449	752	841	797
13:40:30	3649	12	37919	490	439	464	855	828	841
13:40:45	3662	8	37901	506	453	479	896	835	866
13:41:00	3676	18	37892	522	466	494	911	840	876
13:41:15	3682	3	37955	536	479	508	928	837	883
13:41:30	3702	16	37900	550	491	521	921	840	881
13:41:45	3705	15	37851	562	502	532	912	842	877
13:42:00	3697	14	37931	574	512	543	915	839	877
13:42:15	3713	14	37924	584	522	553	921	831	876
13:42:30	3730	15	37952	594	530	562	899	833	866
13:42:45	3737	12	37995	603	539	571	904	831	868
13:43:00	3761	14	37925	611	547	579	892	821	857
13:43:15	3761	15	37957	618	554	586	891	832	862
13:43:30	3758	10	37955	624	561	593	901	822	862
13:43:45	3780	14	37912	630	567	599	895	833	864
13:44:00	3787	12	37954	636	573	604	893	833	863

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Fire Test Data - continued

13:44:15	3801	15	37986	641	578	609	888	819	853
13:44:30	3812	15	37957	646	584	615	878	827	853
13:44:45	3813	18	37880	650	589	619	869	829	849
13:45:00	3821	21	37938	654	593	623	877	819	848
13:45:15	3828	18	37905	657	598	628	870	826	848
13:45:30	3830	23	37998	660	602	631	873	823	848
13:45:45	3836	25	37970	663	606	634	862	838	850
13:46:00	3851	21	37973	665	610	638	874	837	856
13:46:15	3834	24	37946	668	613	640	873	842	858
13:46:30	3832	19	37948	670	616	643	859	836	848
13:46:45	3835	20	37945	671	619	645	845	831	838
13:47:00	3830	20	37894	672	622	647	852	841	847
13:47:15	3819	29	37932	674	625	649	852	818	835
13:47:30	3811	24	37954	675	627	651	835	828	831
13:47:45	3790	22	37931	676	630	653	827	826	827
13:48:00	3752	26	37952	677	632	655	837	821	829
13:48:15	3776	33	37918	677	634	656	808	815	811
13:48:30	3761	32	37950	678	637	658	854	819	836
13:48:45	3775	35	37980	679	639	659	855	825	840
13:49:00	3747	41	37937	681	640	661	851	801	826
13:49:15	3704	34	37987	683	642	663	856	817	837
13:49:30	3697	41	37946	684	644	664	855	819	837
13:49:45	3662	38	37961	686	646	666	855	812	834
13:50:00	3648	42	37964	687	647	667	852	811	832
13:50:15	3653	42	37965	688	649	668	865	816	841
13:50:30	3623	43	37958	689	650	669	841	801	821
13:50:45	3615	35	37978	690	651	671	858	807	833
13:51:00	3576	41	37927	691	652	672	832	792	812
13:51:15	3511	51	38007	692	653	673	831	800	816
13:51:30	3496	51	37962	692	655	674	821	797	809
13:51:45	3493	55	37929	692	656	674	861	832	847
13:52:00	3494	54	37897	694	657	676	931	860	896
13:52:15	3487	57	37923	699	658	678	933	856	894
13:52:30	3477	61	37920	703	659	681	935	863	899
13:52:45	3474	68	37953	706	660	683	950	860	905
13:53:00	3471	69	37908	710	661	686	948	865	906
13:53:15	3444	76	37955	714	662	688	943	861	902
13:53:30	3445	71	37948	717	663	690	927	853	890
13:53:45	3448	68	37877	719	664	691	923	845	884
13:54:00	3808	71	37926	721	665	693	915	850	883
13:54:15	3835	79	37966	723	666	694	912	853	883
13:54:30	3853	84	37986	724	666	695	914	859	886
13:54:45	3850	81	37972	725	667	696	917	859	888

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Fire Test Data - continued

13:55:00	3823	86	37924	726	668	697	908	856	882
13:55:15	3727	94	37938	727	668	698	906	845	876
13:55:30	3769	101	37921	728	669	698	904	842	873
13:55:45	3772	94	37984	728	670	699	913	842	878
13:56:00	3772	97	37988	729	670	699	907	843	875
13:56:15	3780	100	37941	729	671	700	896	840	868
13:56:30	3800	97	37914	729	672	701	901	855	878
13:56:45	3802	109	37945	730	672	701	883	841	862
13:57:00	3817	108	37976	729	672	701	889	834	861
13:57:15	3822	111	37904	729	673	701	887	826	857
13:57:30	3778	106	37943	729	674	701	866	843	854
13:57:45	3760	111	37944	728	674	701	861	831	846
13:58:00	3745	106	37913	728	675	701	858	829	843
13:58:15	3774	112	37965	727	675	701	852	839	846
13:58:30	3780	111	37911	727	676	702	864	842	853
13:58:45	3766	109	37930	726	676	701	897	842	870
13:59:00	3765	115	37971	727	677	702	887	847	867
13:59:15	3772	119	37933	727	677	702	865	834	849
13:59:30	3778	112	37937	727	677	702	874	835	854
13:59:45	3785	119	37932	727	677	702	855	817	836
14:00:00	3759	116	37956	726	678	702	836	819	828
14:00:15	3764	119	37919	725	678	701	832	819	826
14:00:30	3784	118	37967	723	679	701	820	815	818
14:00:45	3798	118	37933	721	679	700	851	819	835
14:01:00	3792	114	37921	721	680	701	891	835	863
14:01:15	3790	111	37912	721	681	701	882	843	863
14:01:30	3803	118	37904	722	681	702	881	834	858
14:01:45	3809	114	37948	722	682	702	877	824	851
14:02:00	3789	124	37949	722	682	702	876	822	849
14:02:15	3797	119	37942	722	683	703	873	829	851
14:02:30	3780	116	37959	722	683	703	873	837	855
14:02:45	3741	120	37910	722	684	703	868	831	849
14:03:00	3722	120	37976	722	684	703	859	831	845
14:03:15	3718	121	37893	721	684	703	861	832	847
14:03:30	3732	125	37956	720	685	703	839	811	825
14:03:45	3734	126	37939	719	685	702	824	815	819
14:04:00	3722	123	37918	718	685	701	840	806	823
14:04:15	3731	126	37900	717	686	702	827	800	814
14:04:30	3722	127	37944	716	686	701	878	827	853
14:04:45	3721	136	37909	716	687	702	868	833	850
14:05:00	3695	134	37914	717	687	702	850	833	841
14:05:15	3646	141	37922	717	688	703	837	833	835
14:05:30	3694	140	37858	716	688	702	837	816	827

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Fire Test Data - continued

14:05:45	3691	142	37941	716	688	702	854	826	840
14:06:00	3706	142	37941	715	689	702	828	823	825
14:06:15	3703	151	37949	713	687	700	620	605	613
14:06:30	3709	151	37964	700	677	689	481	459	470
14:06:45	3722	158	37907	683	662	673	397	374	386
14:07:00	3694	157	37913	666	647	657	345	320	333
14:07:15	3637	162	37902	650	633	641	304	278	291
14:07:30	3573	152	37896	630	596	613	43	48	45
14:07:45	3460	158	37925	562	374	468	35	38	36
14:08:00	3396	159	37912	412	165	289	28	33	30
14:08:15	3804	168	37857	243	81	162	19	34	26
14:08:30	3757	163	37941	137	53	95	19	32	26
14:08:45	3754	165	37897	81	40	61	18	29	23
14:09:00	3746	162	37875	55	34	44	18	30	24
14:09:15	3688	165	37825	41	31	36	17	31	24
14:09:30	3692	159	37865	33	30	31	17	29	23
14:09:45	3661	152	37911	28	30	29	16	30	23
14:10:00	3682	142	37893	25	29	27	17	29	23
14:10:15	3673	138	37835	23	30	26	18	26	22
14:10:30	3695	134	37878	22	30	26	17	24	21
14:10:45	3676	129	37810	21	30	26	14	23	18
14:11:00	3694	126	37846	19	29	24	13	22	18
14:11:15	3686	123	37811	18	28	23	13	21	17
14:11:30	3733	117	37855	18	27	23	13	20	16
14:11:45	3719	107	37836	17	26	22	13	19	16
14:12:00	3742	104	37814	17	25	21	12	20	16
14:12:15	3760	100	37819	16	24	20	12	18	15
14:12:30	3708	97	37809	15	23	19	12	19	16
14:12:45	3775	90	37833	15	23	19	12	18	15
14:13:00	3798	85	37804	15	22	19	12	17	15
14:13:15	3718	83	37806	15	21	18	12	17	15
14:13:30	3790	78	37806	15	20	18	16	15	16
14:13:45	3820	72	37779	15	19	17	12	14	13
14:14:00	3808	66	37808	15	18	16	12	13	13
14:14:15	3798	61	37821	15	17	16	11	14	13
14:14:30	3814	62	37762	15	17	16	13	14	13
14:14:45	3836	58	37807	14	18	16	10	14	12
14:15:00	3801	57	37824	14	18	16	10	15	13
14:15:15	3835	49	37785	13	18	15	10	14	12
14:15:30	3865	48	37745	13	17	15	10	14	12
14:15:45	3880	45	37744	13	17	15	10	14	12
14:16:00	3884	43	37781	13	17	15	10	14	12

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
Allowable Leak Rate:	825	ml/min

Total Through Seat Leakage Collected Over 10 Minute Cool Down:	0	mls
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Total Water Volume Lost Over 40 Minute Burn and Cool Down:	13	mls
Water Collected in System Relief Valve:	50	mls
Calculated External Leakage During 40 Minute Duration:	-37	mls
Average Leak Rate Over 40 Minute Duration:	0	ml/min
Allowable Leak Rate:	206	ml/min

Were the Valve Leakages Below the Allowables?	Yes
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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:	3884	psig
Average Pressure During Burn/Cool Down:	3715	psig
Minimum Pressure During Burn/Cool Down:	3396	psig
Amount of Time of Avg. Cal Block > 650 deg.C:	18.5	minutes
Minimum Allowable Time at Temperature:	15.0	minutes
Maximum Avg Cal Block Temperature:	703	deg. C
Average Cal Block Temperature:	486	deg. C
Lowest Avg Cal. Block Temperature:	15	deg. C
Maximum Body Flame Temperature During Burn:	865	deg. C
Average Body Flame Temperature During Burn:	824	deg. C
Maximum Bonnet Flame Temperature During Burn:	950	deg. C
Average Bonnet Flame Temperature During Burn:	854	deg. C
Average of Both Flame Temperatures During Burn:	839	deg. C

Note

Were Test Conditions Within Compliance?	Yes
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Yarmouth Research and Technology, LLC

Post-Burn Seat Test Information

Customer: Guide Valve Limited

Date: 12/6/2019

Product Code: GVS 2 1/16" API 6A 5000 psi Trunion Mounted Ball Valve

Project Number: 219530

This test not required for this pressure class

Yarmouth Research and Technology, LLC

Operational Test Information

Customer: Guide Valve Limited

Date: 12/6/2019

Product Code: GVS 2 1/16" API 6A 5000 psi Trunnion Mounted Ball Valve

Project Number: 219530

Test Data

Time	Pressure (psig)	Cal Block Temp - C
14:25:10	3858	13
14:25:25	3945	13
14:25:40	3303	13
14:25:55	3854	13
14:26:10	3934	13
14:26:25	3830	13
14:26:40	3885	13
14:26:55	3872	13
14:27:10	3843	13
14:27:25	3887	13
14:27:40	3823	13
14:27:55	3870	13
14:28:10	3892	13
14:28:25	3816	13
14:28:40	3818	12
14:28:55	3829	12
14:29:10	3809	12
14:29:25	3800	12
14:29:40	3837	12
14:29:55	3773	12
14:30:10	3794	12

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:	413	ml/min

Was the Valve Leakage Below the Allowable?	Yes
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