

# **Fire Test Report**

**ANSI/API Standard 607, Sixth Edition, 2010**

**ISO 10497:2010**

*Performed for*

**TEADIT North America, Inc.**

**[www.TEADIT.com](http://www.TEADIT.com)**



**Style 2236 Packing**

**Tested in a 6 inch Class 300 Gate Valve**

**Project Number: 210229**

**February 7, 2011**



*Performed by*

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**YARMOUTH RESEARCH AND TECHNOLOGY, LLC**

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# Yarmouth Research and Technology, LLC

**Customer:** TEADIT North America, Inc.

**Date:** 2/7/2011

**Specification:** ANSI/API Standard 607, Sixth Edition, 2010

ISO 10497-5:2010

**Product Description:** Style 2236 Packing

**Project Number:** PN210229

**Comments:** Test conducted in 6 inch CI300 gate valve

Packing nuts torqued to 35 ft-lb at start of test.

**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:	11:21:00	
Average Pressure During Burn:	571	psig
External Leak Rate During Burn/Cool Down:	0.5	ml/min
Allowable External Leak Rate:	600	ml/min
Amount of Time of Avg. Cal. Blocks > 650 deg. C:	20.5	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:	561	psig
External Leak Rate After Operating:	24.4	ml/min
Allowable External Leak Rate:	150	ml/min
Was the Leakage Below the Allowable?	Yes	

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

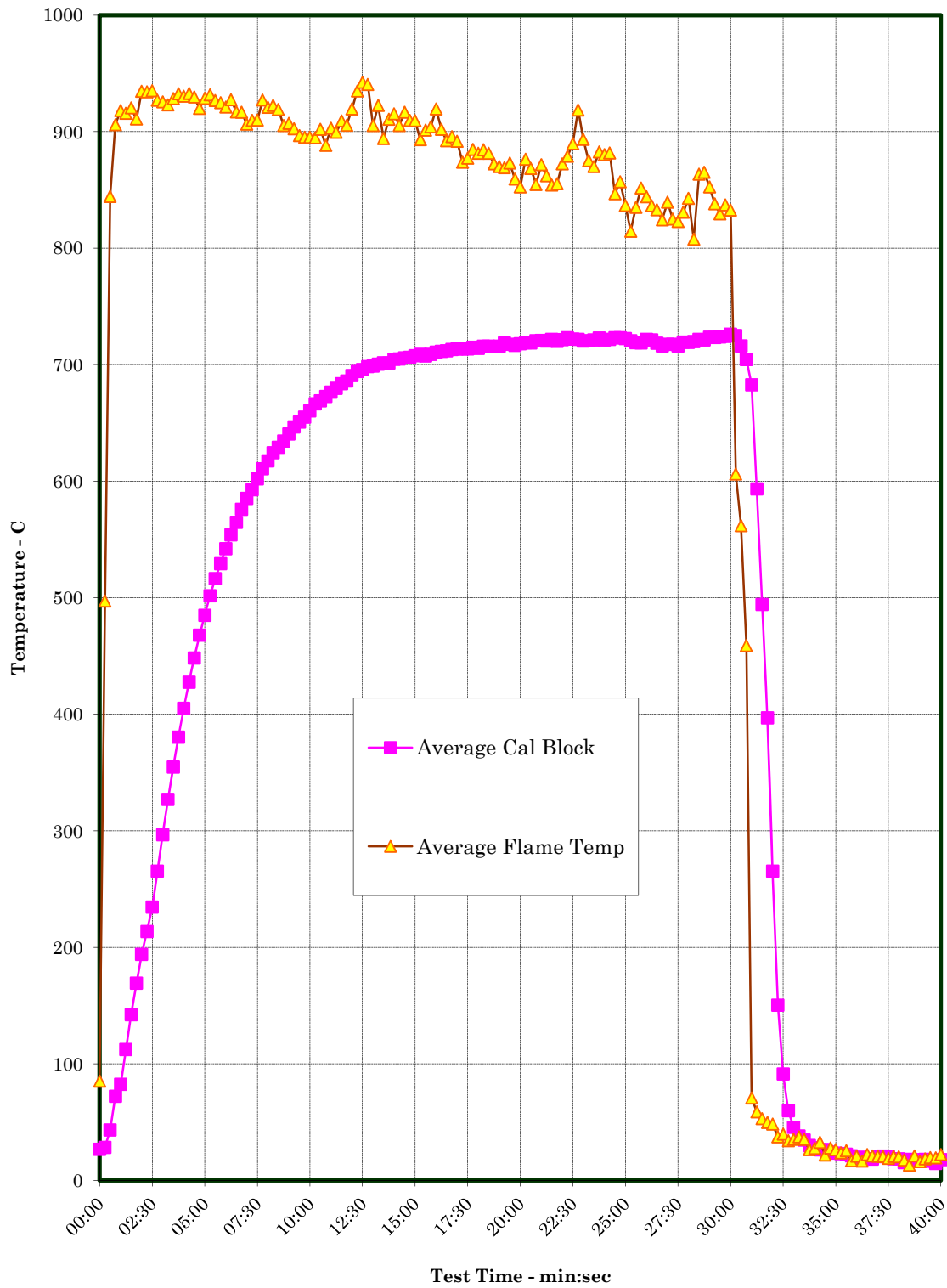
**PASS**

**Witnesses**

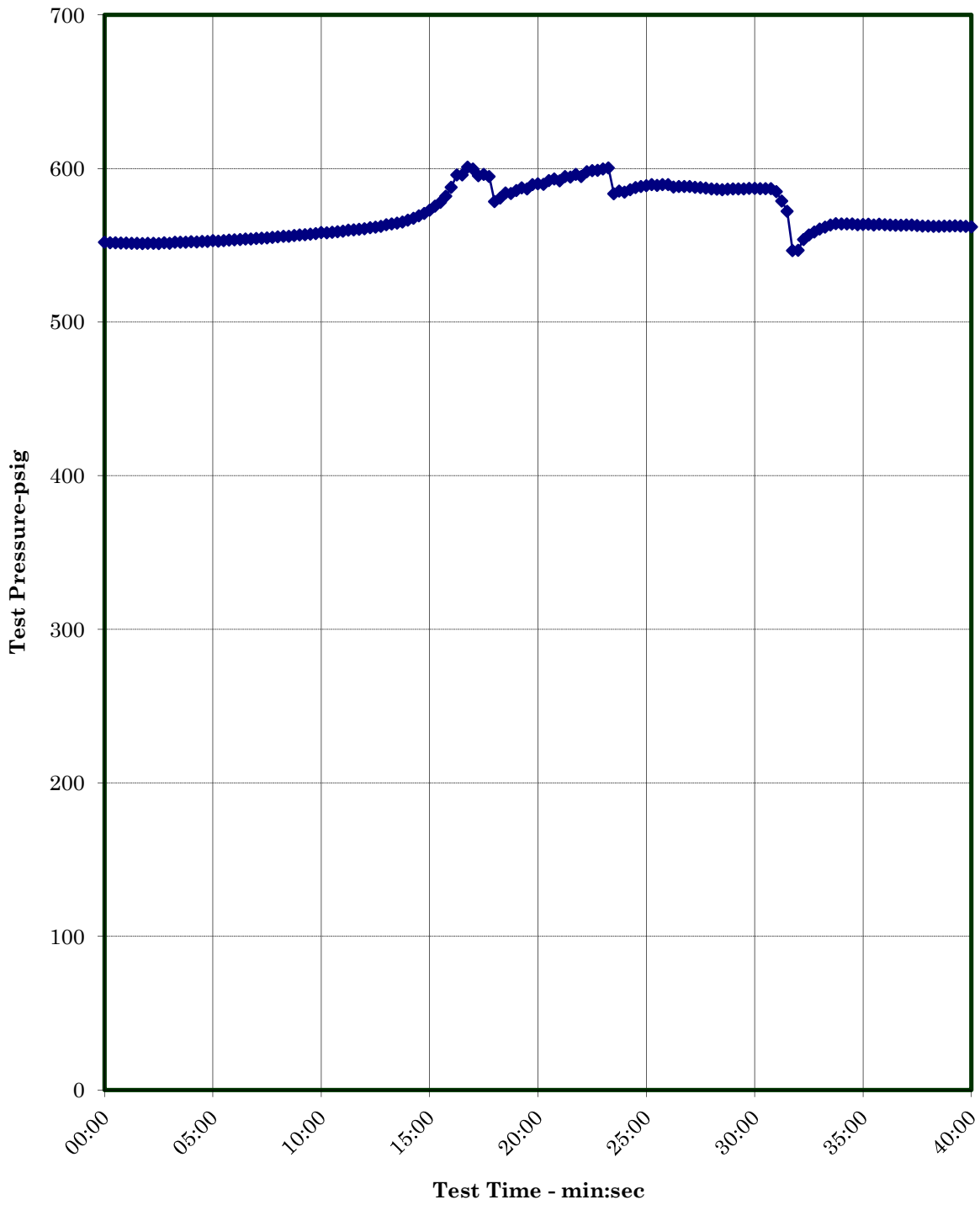
*Matthew J. Wasielewski*



**Temperature verses Time Chart**



**Pressure verses Time Chart**



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Packing Prior to Test



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Valve During Burn.

## Yarmouth Research and Technology, LLC

### Fire Test Information

Customer: TEADIT North America, Inc.

Date: 2/7/2011

Product Code: Style 2236 Packing

Project Number: PN210229

### *Fire Test Raw Data*

Time (EST)	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
11:21:00	552	35834	24	29	27	87	84	85
11:21:15	552	35849	24	32	28	484	510	497
11:21:30	552	35825	29	57	43	841	848	844
11:21:45	551	35844	39	106	72	913	899	906
11:22:00	551	35841	52	113	83	924	912	918
11:22:15	551	35836	67	158	112	918	914	916
11:22:30	551	35867	80	204	142	923	918	921
11:22:45	551	35877	89	249	169	916	906	911
11:23:00	551	35867	102	286	194	940	929	935
11:23:15	551	35896	108	319	214	942	926	934
11:23:30	551	35907	122	347	234	937	934	935
11:23:45	552	35916	157	373	265	933	921	927
11:24:00	551	35936	197	397	297	933	918	926
11:24:15	552	35918	236	418	327	924	922	923
11:24:30	552	35938	272	437	355	932	924	928
11:24:45	552	35977	305	456	380	936	929	933
11:25:00	552	35945	337	473	405	938	923	931
11:25:15	552	35985	366	489	428	937	928	933
11:25:30	553	35995	391	506	448	936	924	930
11:25:45	553	35999	416	520	468	921	919	920
11:26:00	553	36040	439	531	485	929	928	929
11:26:15	553	36062	458	545	502	937	926	932
11:26:30	553	36050	477	556	516	932	921	927
11:26:45	553	36103	493	565	529	927	923	925
11:27:00	554	36100	510	574	542	926	916	921
11:27:15	554	36117	524	583	554	933	922	928
11:27:30	554	36173	537	593	565	921	913	917
11:27:45	554	36155	551	601	576	921	912	917
11:28:00	554	36202	562	608	585	909	904	906
11:28:15	555	36214	571	615	593	916	904	910
11:28:30	555	36269	582	622	602	916	904	910
11:28:45	555	36281	594	627	611	932	923	927
11:29:00	556	36305	602	633	618	927	915	921

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## *Fire Test Data - continued*

11:29:15	556	36318	611	638	624	926	919	923
11:29:30	556	36330	613	646	629	925	913	919
11:29:45	556	36396	619	649	634	909	901	905
11:30:00	557	36416	627	654	641	909	905	907
11:30:15	557	36444	633	661	647	912	893	903
11:30:30	557	36425	637	665	651	906	887	897
11:30:45	558	36481	643	667	655	906	884	895
11:31:00	558	36592	648	672	660	901	890	895
11:31:15	558	36498	656	677	666	898	891	895
11:31:30	558	36573	658	680	669	909	895	902
11:31:45	559	36634	664	682	673	890	887	888
11:32:00	559	36638	667	686	676	911	896	903
11:32:15	560	36664	670	689	680	907	892	899
11:32:30	560	36660	676	692	684	909	909	909
11:32:45	560	36694	677	695	686	902	909	906
11:33:00	561	36926	683	698	691	932	907	919
11:33:15	561	36652	687	702	694	971	899	935
11:33:30	562	36771	686	706	696	985	900	943
11:33:45	562	36849	689	708	698	986	895	941
11:34:00	563	36852	688	709	699	923	887	905
11:34:15	564	36820	692	709	701	943	902	923
11:34:30	565	37206	692	711	702	899	889	894
11:34:45	565	37322	693	710	701	926	896	911
11:35:00	566	37346	697	713	705	923	907	915
11:35:15	568	37344	699	711	705	912	899	905
11:35:30	569	37502	699	713	706	921	912	917
11:35:45	571	37654	699	714	706	917	902	910
11:36:00	573	37771	700	716	708	913	906	909
11:36:15	575	37925	702	716	709	902	884	893
11:36:30	578	38151	700	715	708	910	893	901
11:36:45	582	38476	703	715	709	910	898	904
11:37:00	588	38920	706	716	711	924	914	919
11:37:15	596	39415	706	717	711	911	893	902
11:37:30	596	39838	706	718	712	898	886	892
11:37:45	601	40219	707	719	713	911	881	896
11:38:00	600	40415	708	719	714	899	884	892
11:38:15	595	40444	706	722	714	882	866	874
11:38:30	596	41786	707	721	714	882	872	877
11:38:45	595	39896	707	723	715	891	879	885
11:39:00	578	39896	704	724	714	883	879	881
11:39:15	581	41464	709	723	716	892	877	884
11:39:30	584	42215	707	724	716	885	878	881
11:39:45	584	40152	709	722	716	877	868	873



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### *Fire Test Data - continued*

11:40:00	586	41992	706	726	716	868	872	870
11:40:15	587	41594	712	726	719	874	864	869
11:40:30	587	40521	710	725	718	878	868	873
11:40:45	590	42784	708	725	717	866	853	859
11:41:00	590	41019	710	726	718	861	844	853
11:41:15	590	40769	711	727	719	882	871	876
11:41:30	592	42978	712	725	719	873	863	868
11:41:45	593	41575	714	727	721	859	850	855
11:42:00	592	40500	713	729	721	879	864	872
11:42:15	595	43340	713	728	720	864	860	862
11:42:30	594	40821	713	731	722	861	847	854
11:42:45	596	43394	711	729	720	856	855	855
11:43:00	595	40524	714	729	721	877	868	873
11:43:15	598	42242	715	731	723	883	874	879
11:43:30	599	43341	713	731	722	894	886	890
11:43:45	599	43524	713	730	722	937	901	919
11:44:00	600	43403	708	732	720	902	885	893
11:44:15	600	43278	708	733	721	878	873	875
11:44:30	584	43671	709	733	721	873	867	870
11:44:45	585	42834	713	733	723	889	877	883
11:45:00	585	42294	708	734	721	884	876	880
11:45:15	586	41302	708	735	722	886	877	882
11:45:30	588	42262	711	736	723	852	842	847
11:45:45	588	42940	709	737	723	867	847	857
11:46:00	589	43195	708	737	723	844	829	837
11:46:15	590	42752	705	736	721	816	813	814
11:46:30	589	41558	702	736	719	841	829	835
11:46:45	589	42969	701	737	719	855	848	852
11:47:00	589	42473	704	739	722	848	840	844
11:47:15	588	42347	703	739	721	834	838	836
11:47:30	588	42382	698	739	718	839	827	833
11:47:45	588	42358	694	738	716	830	819	824
11:48:00	588	42421	695	740	718	845	834	839
11:48:15	588	42347	696	739	718	829	821	825
11:48:30	588	42322	692	741	716	827	819	823
11:48:45	587	42327	695	744	719	837	824	831
11:49:00	587	42288	694	744	719	847	838	843
11:49:15	587	42276	696	744	720	810	806	808
11:49:30	586	42251	698	745	722	871	856	864
11:49:45	587	42269	696	747	721	872	858	865
11:50:00	587	42274	699	748	724	856	849	853
11:50:15	587	42269	699	747	723	846	831	838
11:50:30	587	42268	701	747	724	834	824	829

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### *Fire Test Data - continued*

11:50:45	587	42272	701	748	724	838	836	837
11:51:00	587	42254	701	751	726	836	829	833
11:51:15	587	42239	697	753	725	612	601	606
11:51:30	587	42221	687	746	716	647	477	562
11:51:45	587	42266	675	734	704	514	404	459
11:52:00	585	42109	641	724	683	79	62	71
11:52:15	579	42142	503	683	593	55	63	59
11:52:30	572	41412	365	623	494	58	48	53
11:52:45	547	39218	253	541	397	46	54	50
11:53:00	547	38741	174	356	265	46	51	48
11:53:15	554	38367	118	183	150	42	33	38
11:53:30	557	37850	81	102	91	46	33	40
11:53:45	559	37490	52	67	60	39	29	34
11:54:00	561	37173	42	49	46	39	32	35
11:54:15	562	36956	36	41	38	39	36	38
11:54:30	563	36797	32	38	35	42	29	35
11:54:45	564	36715	26	34	30	28	24	26
11:55:00	564	36577	23	33	28	35	20	28
11:55:15	564	36499	22	31	26	34	32	33
11:55:30	564	36439	23	30	26	25	18	22
11:55:45	563	36363	21	28	24	34	22	28
11:56:00	564	36270	20	27	23	30	23	26
11:56:15	564	36251	19	27	23	29	18	24
11:56:30	563	36201	18	27	23	28	23	26
11:56:45	564	36207	18	24	21	17	17	17
11:57:00	563	36150	15	23	19	23	18	21
11:57:15	563	36090	17	23	20	22	12	17
11:57:30	563	36093	14	23	19	22	22	22
11:57:45	563	36062	16	21	18	21	22	21
11:58:00	563	36049	18	23	20	26	16	21
11:58:15	563	36022	19	23	21	26	16	21
11:58:30	563	35992	19	22	20	19	19	19
11:58:45	563	35945	17	21	19	24	17	21
11:59:00	563	35966	17	20	19	23	18	20
11:59:15	562	35917	12	19	15	18	17	18
11:59:30	562	35911	16	20	18	17	9	13
11:59:45	563	35909	16	20	18	27	15	21
12:00:00	563	35887	14	19	17	19	13	16
12:00:15	563	35872	17	19	18	22	15	19
12:00:30	562	35829	14	19	16	24	15	20
12:00:45	562	35828	11	18	14	21	18	19
12:01:00	562	35815	17	18	18	27	17	22

## 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.

System relief water:	0	mls
Total Water Volume Lost Over 40 Minute Burn and Cool Down:	19	mls
Water Collected in System Relief Valve:	0	mls
Calculated External Leakage During 40 Minute Duration:	19	mls
Average Leak Rate Over 40 Minute Duration:	0.5	ml/min
Allowable Leak Rate:	600	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:	600.9	psig
Average Pressure During Burn/Cool Down:	570.8	psig
Minimum Pressure During Burn/Cool Down:	546.6	psig
Amount of Time of Avg. Cal Block > 650 deg.C:	20.5	minutes
Minimum Allowable Time at Temperature:	15.0	minutes
Maximum Avg Cal Block Temperature:	726.1	deg. C
Average Cal Block Temperature:	494.4	deg. C
Lowest Avg Cal. Block Temperature:	14.4	deg. C
Maximum Body Flame Temperature During Burn:	933.9	deg. C
Average Body Flame Temperature During Burn:	874.4	deg. C
Maximum Bonnet Flame Temperature During Burn:	986.1	deg. C
Average Bonnet Flame Temperature During Burn:	888.1	deg. C
Average of Both Flame Temperatures During Burn:	881.2	deg. C

*Note*

Were Test Conditions Within Compliance?	No
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## Yarmouth Research and Technology, LLC

### Operational Test Information

Customer: TEADIT North America, Inc.

Date: 2/7/2011

Product Code: Style 2236 Packing

Project Number: PN210229

*Valve stroked 1 time prior to leakage test.*

#### *Test Data*

Time	Pressure (psig)	Cal Block Temp - C
12:03:48	561	22
12:04:03	561	22
12:04:18	562	22
12:04:33	562	22
12:04:48	561	21
12:05:03	561	21
12:05:18	561	21
12:05:33	561	21
12:05:48	561	21
12:06:03	561	21
12:06:18	561	21
12:06:33	561	21
12:06:48	561	21
12:07:03	561	21
12:07:18	561	22
12:07:33	561	22
12:07:48	561	22
12:08:03	561	23
12:08:18	561	23
12:08:33	561	23
12:08:48	561	23

*Leakages were collected manually.*

Total External Leakage Collected Over 5 Minute Duration:	122	mls
Average Leak Rate Over 5 Minute Duration:	24.4	ml/min
Allowable Leak Rate:	150	ml/min

Was the Valve Leakage Below the Allowable?	Yes
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