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VALVTECHNOLOGIES, INC.

**PARALLEL SLIDE GATE
VALVE AND ACTUATOR
INSTALLATION, OPERATIONS
MAINTENANCE MANUAL**

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Introduction

This manual describes special cautions that must be adhered to, in order to assure a long, trouble-free service life and Valvtechnologies warranty.

Valvtechnologies, Inc., as the leading manufacturer of metal-seated ball valves, manufactures Parallel Slide Gate Valves. Valvtechnologies valves are used in severe service applications by the world's leading power, petrochemical and refining companies.

Every valve is tested prior to shipping and is certified to have zero leakage.

Important

The following procedures are written for the purpose of providing the customer with general information required for the proper operation and maintenance of its products.

Any difficulties encountered in the operation or maintenance of Valvtechnologies, Inc. valves should be directed to an authorized distributor or to the factory in Houston, Texas.

Failure to do so may void the warranty.

II. Installation

A. Receiving and Preparation

Valvtechnologies metal-seated Parallel Slide Gate Valves are shown in Appendix A, Figures 1, 2 and 3 (Fig. 1 is a full drawing POL1BWH1-1; Fig. 2 is an enlarged end view & Fig. 3 is an enlarged side view with P/N balloons. The valves are shipped in a box or on a pallet in the open position (except fail close systems). Prior to installation, the actuator and valve should be inspected to ensure there has been no shipping damage. All shipping materials should be removed to allow a thorough inspection. Verify that no debris is in the valve bore. The valve should be cycled closed, then back to the open position, to ensure that the actuator is operational. Also observe the gates from each end to verify that there has been no damage to the coating.

B. Operators

1. Actuators

The valve will normally be configured with one of three types of powered actuator: hydraulic, pneumatic, or electric. The actuator will be factory mounted and adjusted on the valve. Manual gear drives are also used on some Parallel Slide Gates Valves.

CAUTION: Actuators should not be removed, adjusted (including limit switches or stops) or reinstalled except be Valvtechnologies, Inc. factory-trained personnel. Valve must be retested for zero leakage after installation of actuator.

IMPORTANT: On electric operator valves, the valve should be manually cycled to the mid stroke position before cycling under power.

2. Manual Operators

Manually operated valves may be fitted with gear operators. They should be cycled and checked as above.

C. Orientation

Any orientation of the stem is acceptable and will depend solely on the user's piping or vessel configuration.

D. Thermal Concerns

CAUTION: Excessive temperature, improper stress relieving techniques, or improper use in insulation may damage the valve and/or void the warranty. See Appendix C: Welding and Stress Relieving Considerations. If actuator damage from excessive temperature (either operationally or during welding or stress relieving) is a concern, radiation shields are recommended. Valvtechnologies can recommend and provide a suitable design that is compatible with any specific valve/actuator design.

1. Welding

CAUTION: Valve should be open during welding operation.

Care should be taken to minimize weld slag and splatter inside the valve and piping bore. Arc strikes should not be made on the valve. Localized stress relief is acceptable. Oven (I recommend this versus furnace, which implies direct flame) stress relief is not recommended without consulting Valvtechnologies, Inc.

2. Insulation

a) Stress Relieving

The valve must not be insulated during stress relieving. This is critical to the valve warranty and service life.

b) Installation and Operation

Insulation is recommended for valves that will experience operation temperatures in excess of 400 degrees F.

CAUTION: Insulation must not be applied above the bonnet flat, which is below the packing gland. See Appendix A, Figure 4.

E. Initial Test

After installation, the piping system should be cleaned and flushed. This will ensure weld slag; tools and other debris are removed before cycling the valve. After this process, the valve should be fully closed. It is good practice to cycle the valve several times to verify proper operation and to check the proper alignment of all automatic switched and valve position indicators.

III. Operation

A. Valve

1. Lubrication and Adjustments

The Valvtechnologies Parallel Slide Gate Valve requires NO routine lubrication or maintenance. It is designed for severe service and long life. It is also designed to operate without requiring bonnet (where applicable: only 600 class) bolt or packing gland bolt re-tightening. However, should leakage occur from either the bonnet joint or stem packing as a result of unusual service conditions, re-tightening is permissible. In the case of bonnet bolts 600#, it is recommended that this procedure be performed while the system is depressurized. The required torque values for these bolts are given in Charts 1091 and 1092 in Appendix B.

CAUTION: All torque values listed assume that Sweeney 505 (N1000), or equivalent, is applied to nut face and threads. Other materials may result in as much as a 75% loss in bolt tension.

Valve Position Indication

All Valvtechnologies, Inc. products, unless specifically stated, are designed for clockwise rotation to close and counter-clockwise rotation to open. Open & Closed direction is indicated by the Bridge (19).

B. Actuator

The actuator on the Valvtechnologies Parallel Slide Gate Valve requires periodic maintenance. For electric, hydraulic and pneumatic systems, separate instructions accompanying these procedures will be provided with the original sales order depending on the actuator type and manufacturer. For worm gear actuators, the lubricant in the gearbox must be checked every three (3) months and replaced if oxidized or replenished should that be required. Proper gearbox lubrication will minimize hand wheel torque requirements.

IV. Maintenance

A. Disassembly Procedure: Parallel Slide Gate Valve

Note: See Fig. 1 & 3 for part identification

1. Loosen the gland nuts (item 12). Remove the nuts and springs (11).
2. Loosen the bonnet bolts (17).
3. Place 2 equal length bars under the bridge (14) and atop the bonnet (7) between the plate (14) & gland (6) with out touching the plate.
4. Use the actuator (25) to drive the bonnet down enough to relieve the pressure on the segment rings (9).
5. Insert a drift pan into the holes in the side of the bonnet neck of the body (1) and the drive of the segment rings inward toward the stem (5). See segment rings in Fig. 5 of Appendix A. Note the ring segments that have parallel ends must be removed first.
6. **CAUTION:** Monitor the stem threads during the actuator operation during the following procedure. If screwed into the actuator, they can jam very tightly. Removal may not be possible.
 - a. Use the actuator to raise the gates (3) until they begin lifting the bonnet. The bonnet should be raised enough that it may be easily removed.
 - b. If the stem threads approach the actuator, remove the actuator bolts (yoke cap screw – 23).
 - c. Rotate the actuator about the stem until a sizable gap appears between the actuator and mounting plate (22).
 - d. Insert the blocks between the actuator and the mounting plate.
 - e. Repeat steps (a), & if necessary (c) & (d) until the bonnet is free to lift clear on the body.
7. Remove the actuator, yoke posts (21), and gland plate & bonnet.
8. Pull the gates up enough to permit installing 2 C-clamps (with padding to protect the coating) to squeeze the gates together. This is to preclude dropping the gates.
9. Raise the stem further & install 2 more C-clamps in the vicinity of the main spring (4).
10. Fully remove the stem and gates.

B. Re-assembly Procedure: Parallel Slide Gate Valve

NOTE: See Fig. 1 & 3 for part identification

1. Position the Valve in a suitable stand & verify that it is stable & secure.
2. Place the Belleville Spring (Item 4) between the 2 gates (3).
3. Provide supports that result in parallel gates.
4. Measure the overall thickness of the sub-assembly.
5. Measure the seat (2) spacing in the body (1).
6. Subtract the measurements of step 5 from the measurements of step 6. The result is the "Stand-Off". The correct Stand-Off range value is obtained from the Stand-Off tables for the same sized ball valve as the spring that is was taken from. The 8" gate valve uses a spring from a 4" Valvtechnologies ball valve. Thus the Stand-Off is the same as for a 4" bore Valvtechnologies ball valve.
7. Place the stem (5) between the gates & use 2 C-clamps (with padding to protect the coating) to squeeze them together.
8. Lower the stem/gate assembly into the body.
9. Slide the bonnet (7) over the stem & into the body (1).
10. Screw 2 pulling studs (18; only applicable on 600 class valves) into the bonnet.
11. Slide the bonnet pressure seal (10) onto the bonnet.
12. Slide the pressure seal spacer ring (8) onto the bonnet.
13. Place the segment ring (9) pieces into the body. Note that the 4 shorter pieces must be installed first, arranged as shown in Fig. 5 of Appendix A. The longer pieces with parallel ends must be installed last. It is essential that they be arranged so that they are all accessible through the "knock-out" holes in the valve neck.
14. In the case of the 600-class valve, replace the pulling studs with the bonnet bolts; & add the remaining 2 bolts.

15. Slide the gland packing (26) over the stem & into the bonnet.
16. Slide the gland flange (6) over the stem & atop the bonnet.
17. Install the gland studs (13), 6 gland springs (11) per stud & gland nuts (12). Note that the gland springs must be arranged in alternating orientation, per Fig. 7 of Appendix A to assure the correct balance between force & travel. Tighten in a star pattern to the value given in Chart 1092 (Gland Torque).
18. Install the 4 yoke posts (21), torque per VTI bolting torque specification per Chart 1091.
19. Install 2 stop collars, if provided, onto the 2 yoke posts that will also guide the bridge (19). These will be used to establish the upper travel limit, if necessary.
20. Install the bridge around the 2 yoke posts & clamp together.
21. Install the mounting plate (22) onto the yoke posts.
22. Screw the nut onto the stem until it reaches the mounting plate.
23. Place the actuator atop the mounting plate & bolt it securely.
24. Cycle the valve while monitoring all aspects of clearance & operation.

IV. Trouble Shooting

Malfunction**Possible Cause****Remedial Action**Valve won't *cycle*

- | | |
|-----------------------------|---|
| a) Actuator has failed | a) Replace or repair actuator |
| b) Valve packed with debris | b) Cycle & flush valve to remove debris |
| c) Stem key has sheared | c) Determine cause of shearing & correct/replace keys |
| d) Gate gap incorrect | d) Call factory |

Stem Packing Leaking

- | | |
|-------------------------------|---------------------------------------|
| a) Gland bolts loose | a) Tighten gland bolts |
| b) Packing damaged or missing | b) Shut down system & replace packing |
| c) Seal mis-aligned | c) Replace & properly align |

Bonnet Gasket Leaking

- | | |
|---|--|
| a) Bonnet Bolts loose | a) Tighten body bolts |
| b) Body gasket damaged | b) Remove valve from service & replace body gasket |
| c) Bonnet gasket seating faces in body or end piece damaged | c) Return parts to Valvtechnologies for rework |

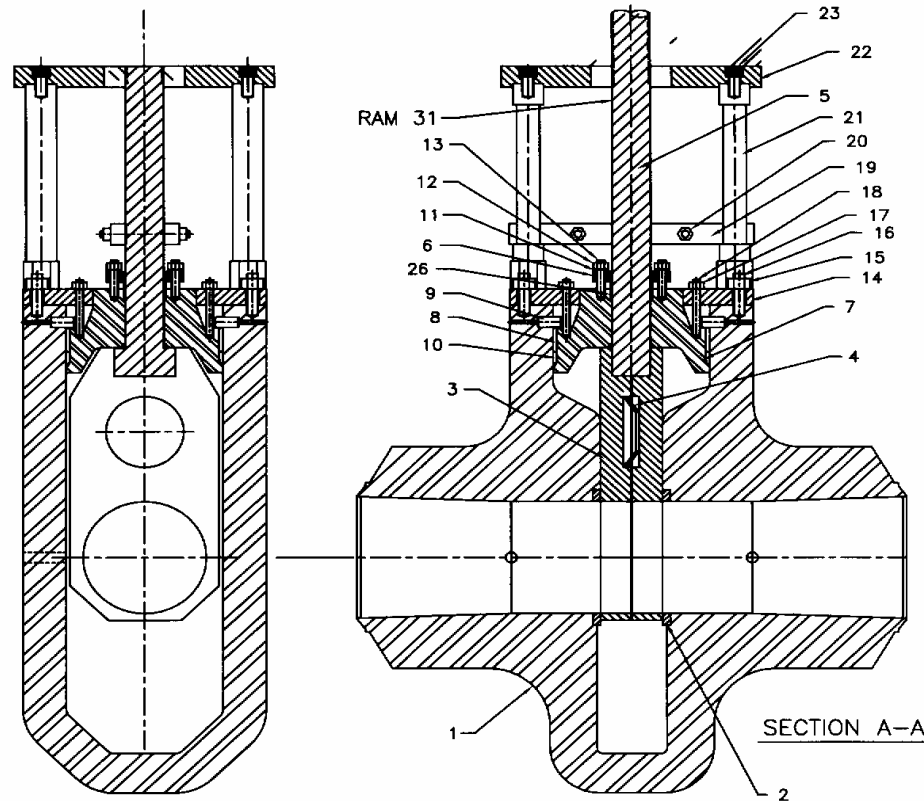
Valve Gates Leaking

- | | |
|----------------------------|---|
| a) Valve no fully closed | a) Close the valve |
| b) Debris trapped in valve | b) Cycle & flush to remove debris |
| c) Seat or ball damaged | c) Remove valve from service & repair or replace ball and/or seat |

**APPENDIX A
ALL FIGURES**

SIZE	A	B	C	D	Weight	Cv
10"	8"	10.75	16.88	36.0	2980	8100
12"	8"	12.75	16.88	41.0	3100	6100
14"	8"	14.00	17.13	44.0	3240	5200
16"	11 3/4"	16.00	24.44	49.0	4750	16,300
18"	11 3/4"	18.00	24.44	55.0	5100	14,600
20"	13 1/4"	20.00	26.50	58.0	8300	18,200
24"	15"	24.00	30.25	60.0	11,200	21,200

VALVE IS SHOWN IN OPEN POSITION



PARTS LIST		
ITEM	DESCRIPTION	MATERIAL
1	BODY	A217 WC9
2	SEAT	A182-410/RAM31
3	DISC	A182-410/RAM31
4	SPRING	INC X750
5	STEM	A638 Gr. 660/RAM31
6	GLAND	A182-410/QPQ
7	BONNET	A182-F22
8	SPACER RING	A638 Gr. 660
9	SEGMENT RING	A638 Gr. 660
10	PRESSURE SEAL	COMPOSITE GRAPHITE
11	GLAND SPRING	304 S.S.
12	GLAND NUT	A193 Gr. B8M
13	GLAND STUD	A193 Gr. B8M
14	PLATE	A36
15	PLATE NUT	A193 Gr. B8M
16	PLATE STUD	A193 Gr. B8M
17	PULLING NUT	A193 Gr. B8M
18	PULLING STUD	A193 Gr. B8M
19	BRIDGE	A36/QPQ
20	BRIDGE BOLTING	A193 Gr. 5
21	YOKE POST	1018/QPQ
22	MONTING PLATE	A36
23	YOKE CAP SCREW	A574-67
24	DRIVE SLEEVE	4130
25	ACTUATOR	HYDRAULIC
26	GLAND PACKING	GRAFOIL/316 S.S.

PROPRIETARY INFORMATION				VALVTECHNOLOGIES		HOUSTON TEXAS	
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REV. _____ REVISION DATE: _____				2500# FLOW REVERSAL PREVENTION AND ISOLATION VALVE			
SCALE N.T.S.	APPROVED BY	DRAWN BY DP	MATERIAL				
DATE 9-18-98		CHECKED XX					

Figure 2

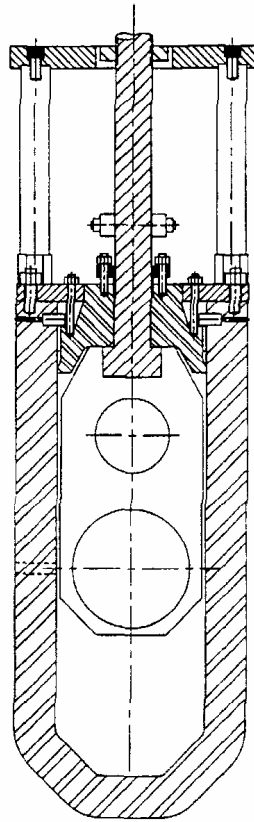


Figure 3

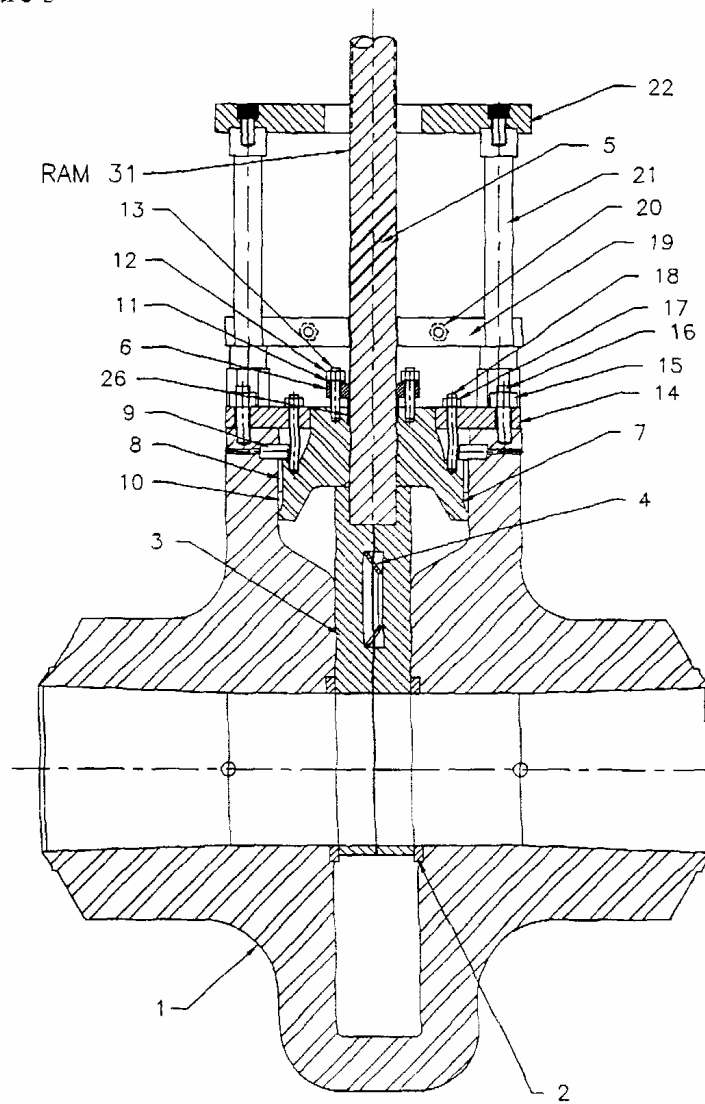


Figure 4

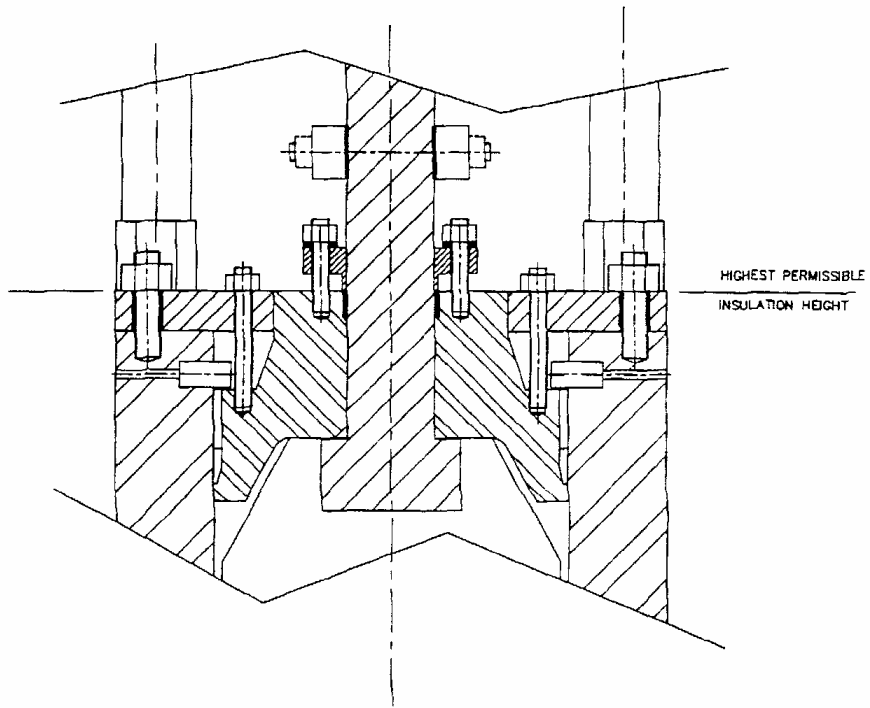


Figure 5

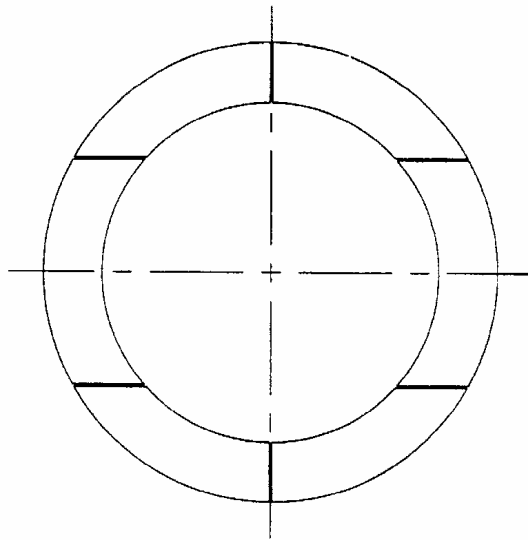


Figure 6

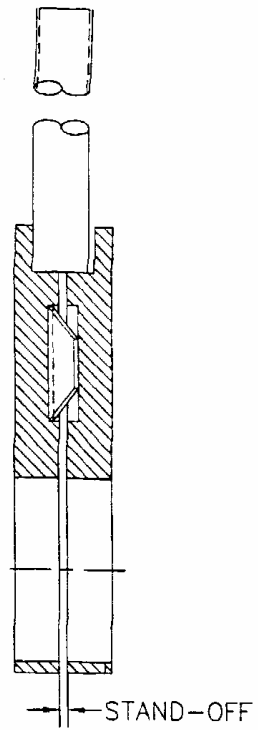
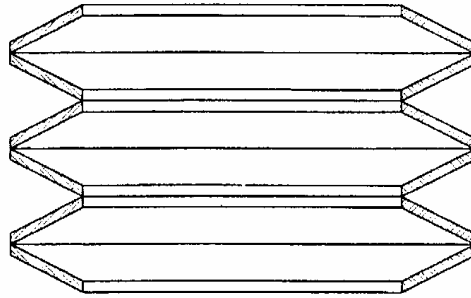


Figure 7



APPENDIX B
ALL CHARTS

**Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
8" Seat I.D.**

		Line Pressure									
		250	500	750	1000	1250	1500	1750	2000	2250	2500
P R E S S U R E D I F F E R E N T I A L	250	14997	16224	17451	18679	19906	21133	22360	23587	24815	26042
	500		19994	21221	22449	23676	24903	26130	27357	28584	29812
	750			24991	26218	27446	28673	29900	31127	32354	33582
	1000				29988	31216	32443	33670	34897	36124	37351
	1250					34985	36213	37440	38667	39894	41121
	1500						39983	41210	42437	43664	44891
	1750							44980	46207	47434	48661
	2000								49977	51204	52431
	2250									54974	56201
	2500										59971
	2750										
	3000										
	3250										
	3500										
	3750										
	4000										
	4250										
	4500										
	4750										
	5000										
5250											
5500											
5750											
6000											

**Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
8" Seat I.D.**

		Line Pressure									
		2750	3000	3250	3500	3750	4000	4250	4500	4750	5000
P R E S S U R E D I F F E R E N T I A L	250	27269	28496	29723	30950	32178	33405	34632	35859	37086	38314
	500	31039	32266	33493	34720	35948	37175	38402	39629	40856	42084
	750	34809	36036	37263	38490	39718	40945	42172	43399	44626	45853
	1000	38579	39806	41033	42260	43487	44715	45942	47169	48396	49623
	1250	42349	43576	44803	46030	47257	48485	49712	50939	52166	53393
	1500	46118	47346	48573	49800	51027	52254	53482	54709	55936	57163
	1750	49888	51116	52343	53570	54797	56024	57252	58479	59706	60933
	2000	53658	54886	56113	57340	58567	59794	61021	62249	63476	64703
	2250	57428	58655	59883	61110	62337	63564	64791	66019	67246	68473
	2500	61198	62425	63653	64880	66107	67334	68561	69788	71016	72243
	2750	64968	66195	67422	68650	69877	71104	72331	73558	74786	76013
	3000		69965	71192	72420	73647	74874	76101	77328	78555	79783
	3250			74962	76189	77417	78644	79871	81098	82325	83553
	3500				79959	81187	82414	83641	84868	86095	87322
	3750					84956	86184	87411	88638	89865	91092
	4000						89954	91181	92408	93635	94862
	4250							94951	96178	97405	98632
	4500								99948	101175	102402
	4750									104945	106172
	5000										109942
5250											
5500											
5750											
6000											

**Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
8" Seat I.D.**

		Line Pressure									
		5250	5500	5750	6000	6250	6500	6750	7000	7250	7500
P R E S S U R E D I F F E R E N T I A L	250	39541	40768	41995	43222	44450	45677	46904	48131	49358	50585
	500	43311	44538	45765	46992	48219	49447	50674	51901	53128	54355
	750	47081	48308	49535	50762	51989	53217	54444	55671	56898	58125
	1000	50851	52078	53305	54532	55759	56986	58214	59441	60668	61895
	1250	54620	55848	57075	58302	59529	60756	61984	63211	64438	65665
	1500	58390	59618	60845	62072	63299	64526	65753	66981	68208	69435
	1750	62160	63387	64615	65842	67069	68296	69523	70751	71978	73205
	2000	65930	67157	68385	69612	70839	72066	72393	74520	75748	76975
	2250	69700	70927	72154	73382	74609	75836	77063	78290	79518	80745
	2500	73470	74697	75924	77152	78379	79606	80833	82060	83287	84515
	2750	77240	78467	79694	80921	82149	83376	84603	85830	87057	88285
	3000	81010	82237	83464	84691	85919	87146	88373	89600	90827	92054
	3250	84780	86007	87234	88461	89688	90916	92143	93370	94597	95824
	3500	88550	89777	91004	92231	93458	94686	95913	97140	98367	99594
	3750	92320	93547	94774	96001	97228	98455	99683	100910	102137	103364
	4000	96089	97317	98544	99771	100998	102225	103453	104680	105907	107134
	4250	99859	101089	102314	103541	104768	105995	107222	108450	109677	110904
	4500	103629	104856	106084	107311	108538	109765	110992	112220	113447	114674
	4750	107399	108626	109854	111081	112308	113535	114762	115989	117217	118444
	5000	111169	112396	113623	114851	116078	117305	118532	119759	120987	122214
5250	114939	116166	117393	118621	119848	121075	122302	123529	124756	125984	
5500		119936	121163	122390	123618	124845	126072	127299	128526	129754	
5750			124933	126160	127338	128615	129842	131069	132296	133523	
6000				129930	131157	132385	133612	134839	136066	137293	

**Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
8" Seat I.D.**

		Line Pressure									
		7750	8000	8250	8500	8750	9000	9250	9500	9750	10000
P R E S S U R E D I F F E R E N T I A L	250	51813	53040	54267	55494	56721	57949	59176	60403	61630	62857
	500	55583	56810	58037	59264	60491	61718	62946	64173	65400	66627
	750	59352	60580	61807	63034	64261	65488	66716	67943	69170	70397
	1000	63122	64350	65577	66804	68031	69258	70485	71713	72940	74167
	1250	66892	68119	69347	70574	71801	73028	74255	75483	76710	77937
	1500	70662	71889	73117	74344	75571	76798	78025	79252	80480	81707
	1750	74432	75659	76886	78114	79341	80568	81795	83022	84250	85477
	2000	78202	79429	80656	81884	83111	84338	85565	86792	88019	89247
	2250	81972	83199	84426	85653	86881	88108	89335	90562	91789	93017
	2500	85742	86969	88196	89423	90651	91878	93105	94332	95559	96786
	2750	89512	90739	91966	93193	94420	95648	96875	98102	99329	100556
	3000	93282	94509	95736	96963	98190	99418	100645	101872	103099	104326
	3250	97052	98279	99506	100733	101960	103187	104415	105642	106869	108096
	3500	100821	102049	103276	104503	105730	106957	108185	109412	110639	111866
	3750	104591	105819	107046	108273	109500	110727	111954	113182	114409	115636
	4000	108361	109588	110816	112043	113270	114497	115724	116952	118179	119406
	4250	112131	113358	114586	115813	117040	118267	119494	120722	121949	123176
	4500	115901	117128	118355	119583	120810	122037	123264	124491	125719	126946
	4750	119671	120898	122125	123353	124580	125807	127034	128261	129489	130716
	5000	123441	124668	125895	127123	128350	129577	130804	132031	133258	134486
5250	127211	128438	129665	130892	132120	133347	134574	135801	137028	138256	
5500	130981	132208	133435	134662	135890	137117	138344	139571	140798	142025	
5750	134751	135978	137205	138432	139659	140887	142114	143341	144568	145795	
6000	138521	139748	140975	142202	143429	144657	145884	147111	148338	149565	

**Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
11 3/4" Seat I.D.**

		Line Pressure									
		250	500	750	1000	1250	1500	1750	2000	2250	2500
P R E S S U R E D I F F E R E N T I A L	250	20538	22943	25348	27754	30159	32564	34970	37375	39780	42185
	500		31076	33481	35886	38292	40697	43102	45507	47913	50318
	750			41614	44019	46424	48829	51235	53640	56045	58450
	1000				52151	54557	56962	59367	61772	64178	66583
	1250					62689	65094	67500	69905	72310	74716
	1500						73227	75632	78038	80443	82848
	1750							83765	86170	88575	90981
	2000								94303	96708	99113
	2250									104841	107246
	2500										115378
	2750										
	3000										
	3250										
	3500										
	3750										
	4000										
	4250										
	4500										
	4750										
	5000										
5250											
5500											
5750											
6000											

**Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
11 3/4" Seat I.D.**

		Line Pressure									
		2750	3000	3250	3500	3750	4000	4250	4500	4750	5000
P R E S S U R E D I F F E R E N T I A L	250	44591	46996	49401	51806	54212	56617	59022	61428	63833	66238
	500	52723	55128	57534	59939	62344	64750	67155	69560	71965	74371
	750	60856	63261	65666	68072	70477	72882	75287	77693	80098	82503
	1000	68988	71394	73799	76204	78609	81015	83420	85825	88231	90636
	1250	77121	79526	81931	84337	86742	89147	91553	93958	96363	98768
	1500	85253	87659	90064	92469	94875	97280	99685	102090	104496	106901
	1750	93386	95791	98197	100602	103007	105412	107818	110223	112628	115034
	2000	101519	103924	106329	108734	111140	113545	115950	118355	120761	123166
	2250	109651	112056	114462	116867	119272	121677	124083	126488	128893	131299
	2500	117784	120189	122594	124999	127405	129810	132215	134621	137026	139431
	2750	125916	128321	130727	133132	135537	137943	140348	142753	145158	147564
	3000		136454	138859	141265	143670	146075	148480	150886	153291	155696
	3250			146992	149397	151802	154208	156613	159018	161424	163829
	3500				157530	159935	162340	164746	167151	169556	171961
	3750					168068	170473	172878	175283	177689	180094
	4000						178605	181011	183416	185821	188226
	4250							189143	191548	193954	196359
	4500								199681	202086	204492
	4750									210219	212624
	5000										220757
5250											
5500											
5750											
6000											

**Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
11 3/4" Seat I.D.**

		Line Pressure									
		5250	5500	5750	6000	6250	6500	6750	7000	7250	7500
P R E S S U R E D I F F E R E N T I A L	250	68643	71049	73454	75859	78265	80670	83075	584480	87886	90291
	500	76776	79181	81587	83992	86397	88802	91208	93613	96018	98424
	750	84909	87314	89719	92124	97530	96935	99340	101746	104151	106556
	1000	93041	95446	97852	100257	102662	105068	107473	109878	12283	114689
	1250	101174	103579	105984	108390	110795	113200	115605	118011	120416	122821
	1500	109306	111712	114117	116522	118927	121333	123738	126143	128548	130954
	1750	117439	119844	122249	124655	127060	129465	131870	134276	136681	139086
	2000	125571	127977	130382	132787	135192	137598	140003	142408	144814	147219
	2250	133704	136109	138514	140920	143325	145730	178136	150541	152946	155351
	2500	141836	144242	146647	149052	151458	153863	156268	158683	161079	163484
	2750	149969	152374	154780	157185	159590	161995	164401	166806	169211	171617
	3000	158102	160507	162912	165317	167723	170128	172533	174939	177344	179749
	3250	166234	168639	171045	173450	175855	178261	180666	183071	185476	187882
	3500	174367	176772	179177	181583	183988	186393	188798	191204	193609	196014
	3750	182499	184904	187310	189715	192120	194526	196931	199336	201741	204147
	4000	190632	193037	195442	197848	200253	202658	205063	207469	209874	212279
	4250	198764	201170	203575	205980	208385	210791	213196	215601	218007	220412
	4500	206897	209302	211707	214113	216518	218923	221329	223734	226139	228544
	4750	215029	217435	219840	222245	224651	227056	229461	231866	234272	236677
	5000	223162	225567	227973	230378	232783	235188	237594	239999	242404	244810
5250	231295	233700	236105	238510	240916	243321	245726	248131	250537	252942	
5500		241832	244238	246643	249048	251453	253859	256264	258669	261075	
5750			252370	254775	257181	259586	261991	264397	266802	269207	
6000				262908	265313	267719	207124	272529	274934	277340	

**Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
11 3/4" Seat I.D.**

		Line Pressure									
		7750	8000	8250	8500	8750	9000	9250	9500	9750	10000
P R E S S U R E D I F F E R E N T I A L	250	92696	95102	97507	99912	102317	104723	107128	109533	111939	114344
	500	100829	103234	105639	108045	110450	112855	115261	117666	120071	122476
	750	108961	111367	113772	115177	118583	120988	123393	125798	128204	130609
	1000	117094	119499	121905	124310	126715	129120	131526	133931	136336	138741
	1250	125227	127632	130037	132442	134848	137253	139658	142063	144469	146874
	1500	133359	135764	138170	140575	142980	145385	147791	150196	152601	155007
	1750	141492	143897	146302	148707	151113	153518	155923	158329	160734	163139
	2000	149624	152029	154435	156840	159245	161651	164056	166461	168866	171272
	2250	157757	160162	162567	164973	167378	169783	172188	174594	176999	179404
	2500	165889	168295	170700	173105	175510	177916	180321	182726	185132	187537
	2750	174022	176427	178832	181238	183643	186048	188454	190859	193264	195669
	3000	182154	184560	156965	189370	191775	194181	196586	198991	201397	203802
	3250	190287	192692	195097	197503	199908	202313	204719	208124	209529	211934
	3500	198419	200825	203230	205635	208041	210446	212851	215256	217662	220067
	3750	206552	208957	211363	213768	216173	218578	220984	223389	225794	228200
	4000	214685	217090	219495	221900	224306	226711	229116	231522	233927	236332
	4250	222817	225000	227628	230033	232438	234844	237249	239654	242059	244465
	4500	230950	233355	235760	238166	240571	242976	245381	247787	280192	252597
	4750	239082	241488	243893	246298	248703	251109	253514	255919	258324	260730
	5000	247215	249620	252025	254431	256836	259241	261646	264052	266457	268862
5250	255347	257753	260158	262563	264968	267374	269779	272184	274590	276995	
5500	263480	265885	268290	270696	273101	275506	277912	280317	282722	285127	
5750	271612	274018	276423	278828	281234	283639	286044	288449	290855	293260	
6000	279745	282150	284556	286961	289366	291771	294177	296582	298987	301393	

Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
13 1/4" Seat I.D.

		Line Pressure									
		250	500	750	1000	1250	1500	1750	2000	2250	2500
P R E S S U R E D I F F E R E N T I A L	250	25250	30159	35068	39976	44885	49794	54703	59611	64520	69429
	500		40500	45409	50318	55227	60135	65044	69953	74862	79770
	750			55751	60659	65568	70477	75386	80294	85203	90112
	1000				71001	75910	80818	85727	90636	95545	100453
	1250					86251	91160	96069	100977	105886	110795
	1500						101501	106410	111319	116228	121136
	1750							116752	121660	126569	131478
	2000								132002	136911	141819
	2250									147252	152161
	2500										162502
	2750										
	3000										
	3250										
	3500										
	3750										
	4000										
	4250										
	4500										
	4750										
	5000										
5250											
5500											
5750											
6000											

**Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
13 1/4" Seat I.D.**

		Line Pressure									
		2750	3000	3250	3500	3750	4000	4250	4500	4750	5000
P R E S S U R E D I F F E R E N T I A L	250	74338	79246	84155	89064	93973	98881	103790	108699	113608	118516
	500	84679	89588	94497	99405	104314	109223	114132	119040	123949	128858
	750	95021	99929	104838	109747	114656	119564	124473	129382	134290	139199
	1000	105362	110271	115180	120088	124997	129906	134814	139723	144632	149541
	1250	115704	120612	125521	130430	135339	140247	145156	150065	154973	159882
	1500	126045	130954	135863	140771	145680	150589	155497	160406	165315	170224
	1750	136387	141295	146204	151113	156021	160930	165839	170748	175656	180565
	2000	146728	151637	156545	161454	166363	171272	176180	181089	185998	190907
	2250	157069	161978	166887	171796	176704	181613	186522	191431	196339	201248
	2500	167411	172320	177228	182137	187046	191955	196863	201772	206681	211590
	2750	177752	182661	187570	192479	197387	202296	207205	212114	217022	221931
	3000		193003	197911	202820	207729	212638	217546	222455	227364	232273
	3250			208253	213162	218070	222979	227888	232797	237705	242614
	3500				223503	228412	233321	238229	243138	248047	252956
	3750					238753	243662	248571	253480	258388	263297
	4000						254004	258912	263821	268730	273639
	4250							269254	274163	279071	283980
	4500								284504	289413	294321
	4750									299754	304663
	5000										315004
5250											
5500											
5750											
6000											

**Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
13 1/4" Seat I.D.**

		Line Pressure									
		5250	5500	5750	6000	6250	6500	6750	7000	7250	7500
P R E S S U R E D I F F E R E N T I A L	250	123425	128334	133242	138151	143060	147969	152877	157786	162695	167604
	500	133766	138675	143584	148493	153401	158310	163219	168128	173036	177945
	750	144108	149017	153925	158834	163743	168652	173560	178469	183378	188287
	1000	154449	159358	164267	169176	174084	178993	183902	188811	193719	198628
	1250	164791	169700	174608	179517	184426	189335	194243	199152	204061	208970
	1500	175132	180041	184950	189859	194767	199676	204585	209494	214402	219311
	1750	185474	190383	195291	200200	205109	210018	214926	219835	224744	229653
	2000	195815	200724	205633	210542	215450	220359	225268	230177	235085	239994
	2250	206157	211066	215974	220883	225792	230701	235609	240518	245427	250336
	2500	216498	221407	226316	231225	236133	241042	245951	250860	255768	260677
	2750	226840	231749	236657	241566	246475	251384	256292	261201	266110	271018
	3000	237181	242090	246999	251908	256816	261725	266634	271542	276451	281360
	3250	247523	252432	257340	262249	267158	272067	276975	281884	286793	291701
	3500	257864	262773	267682	272591	277499	282408	287317	292225	297134	302043
	3750	268206	273115	278023	282932	287841	292749	297658	302567	307476	312384
	4000	278547	283456	288365	293273	298182	303091	308000	312908	317817	322726
	4250	288889	293797	298706	303615	308524	313432	318341	323250	328159	333067
	4500	299230	304139	309048	313956	318865	323774	328683	333591	338500	343409
	4750	309572	314480	319389	324298	329207	334115	339024	343933	348842	353750
	5000	319913	324822	329731	334639	339548	344457	349366	354274	359183	364092
5250	330255	335163	340072	344981	349890	354798	359707	364616	369525	374433	
5500		345505	350414	355322	360231	365140	370049	374957	379866	384775	
5750			360755	365664	370573	375481	380390	385299	390208	395116	
6000				376005	380914	385823	390732	395640	400549	405458	

**Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
13 1/4" Seat I.D.**

		Line Pressure									
		7750	8000	8250	8500	8750	9000	9250	9500	9750	10000
P R E S S U R E D I F F E R E N T I A L	250	172512	177421	182330	187239	192147	197056	201965	206874	211782	216691
	500	182854	187763	192671	197580	202489	207398	212306	217215	222124	227033
	750	193195	198104	203013	207922	212830	217739	222648	227557	232465	237374
	1000	203537	208446	213354	218263	223172	228081	232989	237898	424807	247715
	1250	213878	218787	223696	228605	233513	238422	243331	248239	253148	258057
	1500	224220	229129	234037	238946	243855	248763	253672	258581	263490	268398
	1750	234561	239470	244379	249288	254196	259105	264014	268922	273831	278740
	2000	244903	249812	254720	259629	264538	269446	274355	279264	284173	289081
	2250	255244	260153	265062	269970	274879	279788	284697	289605	294514	299423
	2500	265586	270494	275403	280312	285221	290129	295038	299947	304856	309764
	2750	275927	280836	285745	290653	295562	300471	305380	310288	315197	320106
	3000	286269	291177	296086	300995	305904	310812	315721	320630	325539	330448
	3250	296610	301519	306428	311336	316245	321154	326063	330971	335880	340789
	3500	306952	311860	316769	321678	326587	331495	336404	341313	346222	351130
	3750	317293	322202	327111	332019	336928	341837	346746	351654	356563	361472
	4000	327635	332543	337452	342361	347270	352178	357087	361996	366905	371813
	4250	337976	342885	347794	352702	357611	362520	367429	372337	377246	382155
	4500	348318	353226	358135	363044	367953	372861	377770	382679	387588	392496
	4750	358659	363568	368477	373385	378294	383203	388112	393020	397929	402838
	5000	369001	373909	378818	383727	388636	393544	398453	403362	408270	413179
5250	379342	384251	389160	394068	398977	403886	408795	413703	418612	423521	
5500	389684	394592	399501	404410	409319	414227	419136	424045	428953	433862	
5750	400025	404934	409843	414751	419660	424569	429477	434386	439295	444204	
6000	410367	415275	420184	425093	430001	434910	439819	444728	449636	454545	

Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
15" Seat I.D.

		Line Pressure									
		250	500	750	1000	1250	1500	1750	2000	2250	2500
P R E S S U R E D I F F E R E N T I A L	250	28162	33071	37980	42889	47797	52706	57615	62524	67432	72341
	500		46325	51233	56142	61051	65960	70868	75777	80686	85595
	750			64487	69396	74304	79213	84122	89031	93939	98848
	1000				82649	87558	92467	97376	102284	107193	112102
	1250					100812	105720	110629	115538	120447	125355
	1500						118974	123883	128791	133700	138609
	1750							137136	142045	146954	151863
	2000								155299	160207	165116
	2250									173461	178370
	2500										191623
	2750										
	3000										
	3250										
	3500										
	3750										
	4000										
	4250										
	4500										
	4750										
	5000										
5250											
5500											
5750											
6000											

Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
15" Seat I.D.

		Line Pressure									
		2750	3000	3250	3500	3750	4000	4250	4500	4750	5000
P R E S S U R E D I F F E R E N T I A L	250	77250	82158	87067	91976	96885	101793	106702	111611	116520	121428
	500	90503	95412	100321	105230	110138	115047	119957	124864	129773	134682
	750	103757	108666	113574	118483	123392	128301	133209	138118	143027	147936
	1000	117010	121919	126828	131737	136645	141554	146463	151372	156280	161189
	1250	130264	135173	140082	144990	149899	154808	159717	164625	169534	174443
	1500	143518	148426	153335	158244	163153	168061	172970	177879	182788	187696
	1750	156771	161680	166589	171497	176406	181315	186224	191132	196041	200950
	2000	170025	174934	179842	184751	189660	194569	199477	204386	209295	214204
	2250	183278	188187	193096	198005	202913	207822	212731	217640	222548	227457
	2500	196532	201441	206350	211258	216167	221076	225984	230893	235802	240711
	2750	209786	214694	219603	224512	229421	234329	239238	244147	249025	253964
	3000		227948	232857	237765	242674	247583	252492	257400	262309	267218
	3250			246110	251019	255928	260837	265745	270654	275563	280471
	3500				264273	269181	274090	278999	283908	288816	293725
	3750					282435	287344	292252	297161	302070	306979
	4000						300597	305506	310415	315324	320232
	4250							318760	323668	328577	333486
	4500								336922	341831	346739
	4750									355084	359993
	5000										373247
5250											
5500											
5750											
6000											

**Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
15" Seat I.D.**

		Line Pressure									
		5250	5500	5750	6000	6250	6500	6750	7000	7250	7500
P R E S S U R E D I F F E R E N T I A L	250	126337	131246	136155	141063	145972	150881	155790	160698	165607	170516
	500	139591	144499	149408	154317	159226	164134	169043	173952	178861	183769
	750	152844	157753	162662	167571	172479	177388	182297	187205	192114	197023
	1000	166098	171007	175915	180824	185733	190642	195550	200459	205368	210277
	1250	179351	184260	189169	194078	198986	203895	208804	213713	218621	223530
	1500	192605	197514	202423	207331	212240	217149	222058	226966	231875	236784
	1750	205859	210767	215676	220585	225494	230402	235311	240220	245129	250037
	2000	219112	224021	228930	233838	238747	243656	248565	253473	258382	263291
	2250	232366	237275	242183	247092	252001	256910	261818	266727	271636	276545
	2500	245619	250528	255437	260346	265254	270163	275072	279981	284889	289798
	2750	258873	263782	268691	273599	278508	283417	288325	293234	298143	303052
	3000	272127	277025	281944	286853	291762	296670	301579	306488	311397	316305
	3250	285380	290289	295198	300106	305015	309924	314833	319741	324650	329559
	3500	298634	303543	308451	313360	318269	323178	328086	332995	337904	342812
	3750	311887	316796	321705	326614	331522	336431	341340	346249	351157	356066
	4000	325141	330050	334958	339867	344776	349685	354593	359502	364411	369320
	4250	338395	343303	348212	353121	358030	362938	367847	372756	377665	382573
	4500	351648	356557	361466	366374	371283	376192	381101	386009	390918	395827
	4750	364902	369811	374719	379628	384537	389445	394354	399263	404172	409080
5000	378155	383064	387973	392882	397790	402699	407608	412517	417425	422334	
5250	391409	396318	401226	406135	411044	415953	420861	425770	430679	435588	
5500		409571	414480	419389	424298	429206	434115	439024	443932	448841	
5750			427734	432642	437551	442460	447369	452277	457186	462095	
6000				445896	450805	455713	460622	465531	470440	475348	

Stem Thrust (Lbs.) for
Parallel Slide Gate Valves
15" Seat I.D.

		Line Pressure									
		7750	8000	8250	8500	8750	9000	9250	9500	9750	10000
P R E S S U R E D I F F E R E N T I A L	250	175424	180333	185242	190151	195059	199968	204877	209786	214694	219603
	500	188678	193587	198496	203404	208313	213222	218131	223039	227948	232857
	750	201932	206840	211749	216658	221567	226475	231384	236293	241202	246110
	1000	215185	220094	225003	229911	234820	239729	244638	249546	254455	259364
	1250	228439	233348	238256	243165	248074	252983	257891	262800	267709	272618
	1500	241692	246601	251510	256419	261327	266236	271145	276054	280962	285871
	1750	254946	259855	264764	269672	274581	279490	284398	289307	294216	299125
	2000	268200	273108	278017	282926	287835	292743	297652	302561	307470	312378
	2250	281453	286362	291271	296179	301088	305997	310906	315814	320723	325632
	2500	294707	299616	304524	309433	314342	319251	324159	329068	333977	338885
	2750	307960	312869	317778	322687	327595	332504	337413	342322	347230	352139
	3000	321214	326123	331031	335940	340849	345758	350666	355575	360484	365393
	3250	334468	339376	344285	349194	354103	359011	363920	368829	373738	378646
	3500	347721	352630	357539	362447	367356	372265	377174	382082	386991	391900
	3750	360975	365884	370792	375701	380610	385518	390427	395336	400245	405153
	4000	374228	379137	384046	388955	393863	398772	403681	408590	413498	418407
	4250	387482	392391	397299	402208	407117	412026	416934	421843	426752	431661
	4500	400736	405644	410553	415462	420371	425279	430188	435097	440005	444914
	4750	413989	418898	423807	428715	433624	438533	443442	448350	453259	458168
	5000	427243	432152	437060	441969	446878	451786	456695	461604	466513	471421
5250	440496	445405	450314	455223	460131	465040	469949	474858	479766	484675	
5500	453750	458659	463567	468476	473385	478294	483202	488111	493020	497929	
5750	467004	471912	476821	481730	486639	491547	496456	501365	506273	511182	
6000	480257	485166	490075	494983	499892	504801	509710	514618	519527	524436	

		<i>Torque for</i> 8" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		250	500	750	1000	1250	1500	1750	2000	2250	2500
P R E S S U R E D I F F E R E N T I A L	250	370	401	431	461	492	522	552	583	613	643
	500		494	524	554	585	615	645	676	706	736
	750			617	648	678	708	739	769	799	829
	1000				741	771	801	832	862	892	923
	1250					864	894	925	955	985	1016
	1500						988	1018	1048	1079	1109
	1750							1111	1141	1172	1202
	2000								1234	1265	1295
	2250									1358	1388
	2500										1481
	2750										
	3000										
	3250										
	3500										
	3750										
	4000										
	4250										
	4500										
	4750										
	5000										
5250											
5500											
5750											
6000											

I. Stem Factor 0.0247		<i>Torque for</i> 8" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		2750	3000	3250	3500	3750	4000	4250	4500	4750	5000
P R E S S U R E D I F F E R E N T I A L	250	674	704	734	764	795	825	855	886	916	946
	500	767	797	827	858	888	918	949	979	1009	1039
	750	860	890	920	951	981	1011	1042	1072	1102	1133
	1000	953	983	1014	1044	1074	1104	1135	1165	1195	1226
	1250	1046	1076	1107	1137	1167	1198	1228	1258	1289	1319
	1500	1139	1169	1200	1230	1260	1291	1321	1351	1382	1412
	1750	1232	1263	1293	1323	1353	1384	1414	1444	1475	1505
	2000	1325	1356	1386	1416	1447	1477	1507	1538	1568	1598
	2250	1418	1449	1479	1509	1540	1570	1600	1631	1661	1691
	2500	1512	1542	1572	1603	1633	1663	1693	1724	1754	1784
	2750	1605	1635	1665	1696	1726	1756	1787	1817	1847	1878
	3000		1728	1758	1789	1819	1849	1880	1910	1940	1971
	3250			1852	1882	1912	1943	1973	2003	2033	2064
	3500				1975	2005	2036	2066	2096	2127	2157
	3750					2098	2129	2159	2189	2220	2250
	4000						2222	2252	2282	2313	2343
	4250							2345	2376	2406	2436
	4500								2469	2499	2529
	4750									2592	2622
	5000										2716
5250											
5500											
5750											
6000											

II. Stem Factor 0.0247		Torque for 8" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		5250	5500	5750	6000	6250	6500	6750	7000	7250	7500
P R E S S U R E D I F F E R E N T I A L	250	977	1007	1037	1068	1098	1128	1159	1189	1219	1249
	500	1070	1100	1130	1161	1191	1221	1252	1282	1312	1343
	750	1163	1193	1224	1254	1284	1314	1345	1375	1405	1436
	1000	1256	1286	1317	1347	1377	1408	1438	1468	1498	1529
	1250	1349	1379	1410	1440	1470	1501	1531	1561	1592	1622
	1500	1442	1473	1503	1533	1563	1594	1624	1654	1685	1715
	1750	1535	1566	1596	1626	1657	1687	1717	1748	1778	1808
	2000	1628	1659	1689	1719	1750	1780	1810	1841	1871	1901
	2250	1722	1752	1782	1813	1843	1873	1903	1934	1964	1994
	2500	1815	1845	1875	1906	1936	1966	1997	2027	2057	2088
	2750	1908	1938	1968	1999	2029	2059	2090	2120	2150	2181
	3000	2001	2031	2062	2092	2122	2152	2183	2213	2243	2274
	3250	2094	2124	2155	2185	2215	2246	2276	2306	2337	2367
	3500	2187	2217	2248	2278	2308	2339	2369	2399	2430	2460
	3750	2280	2311	2341	2371	2402	2432	2462	2492	2523	2553
	4000	2373	2404	2434	2464	2495	2525	2555	2586	2616	2646
	4250	2467	2497	2527	2557	2588	2618	2648	2679	2709	2739
	4500	2560	2590	2620	2651	2681	2711	2742	2772	2802	2832
	4750	2653	2683	2713	2744	2774	2804	2835	2865	2895	2926
	5000	2746	2776	2806	2837	2867	2897	2928	2958	2988	3019
5250	2839	2869	2900	2930	2960	2991	3021	3051	3081	3112	
5500		2962	2993	3023	3053	3084	3114	3144	3175	3205	
5750			3086	3116	3146	3177	3207	3237	3268	3298	
6000				3206	3240	3270	3300	3331	3361	3391	

III. Stem Factor 0.0247		<i>Torque for</i> 8" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		7750	8000	8250	8500	8750	9000	9250	9500	9750	10000
P R E S S U R E D I F F E R E N T I A L	250	1280	1310	1340	1371	1401	1431	1462	1492	1522	1553
	500	1373	1403	1434	1464	1494	1524	1555	1585	1615	1646
	750	1466	1496	1527	1557	1587	1618	1648	1678	1708	1739
	1000	1559	1589	1620	1650	1680	1711	1741	1771	1802	1832
	1250	1652	1683	1713	1743	1773	1804	1834	1864	1895	1925
	1500	1745	1776	1806	1836	1867	1897	1927	1958	1988	2018
	1750	1838	1869	1899	1929	1960	1990	2020	2051	2081	2111
	2000	1932	1962	1992	2023	2053	2083	2113	2144	2174	2204
	2250	2025	2055	2085	2116	2146	2176	2207	2237	2267	2298
	2500	2118	2148	2178	2209	2239	2269	2300	2330	2360	2391
	2750	2211	2241	2272	2302	2332	2362	2393	2423	2453	2484
	3000	2304	2334	2365	2395	2425	2456	2486	2516	2547	2577
	3250	2397	2427	2458	2488	2518	2549	2579	2609	2640	2670
	3500	2490	2521	2551	2581	2612	2642	2672	2702	2733	2763
	3750	2583	2614	2644	2674	2705	2735	2765	2796	2826	2856
	4000	2677	2707	2737	2767	2798	2828	2858	2889	2919	2949
	4250	2770	2800	2830	2861	2891	2921	2952	2982	3012	3042
	4500	2863	2893	2923	2954	2984	3014	3045	3075	3105	3136
	4750	2956	2986	3016	3047	3077	3107	3138	3168	3198	3229
	5000	3049	3079	3110	3140	3170	3201	3231	3261	3291	3322
5250	3142	3172	3203	3233	3263	3294	3324	3354	3385	3415	
5500	3235	3266	3296	3326	3356	3387	3417	3447	3478	3508	
5750	3328	3359	3389	3419	3450	3480	3510	3541	3571	3601	
6000	3421	3452	3482	3512	3543	3573	3603	3634	3664	3694	

		<i>Torque for</i> 11 3/4" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		250	500	750	1000	1250	1500	1750	2000	2250	2500
P R E S S U R E D I F F E R E N T I A L	250	865	966	1067	1168	1270	1371	1472	1573	1675	1776
	500		1308	1410	1511	1612	1713	1815	1916	2017	2118
	750			1752	1853	1954	2056	2157	2258	2360	2461
	1000				2196	2297	2398	2499	2601	2702	2803
	1250					2639	2740	2842	2943	3044	3146
	1500						3083	3184	3285	3387	3488
	1750							3526	3628	3729	3830
	2000								3970	4071	4173
	2250									4414	4515
	2500										4857
	2750										
	3000										
	3250										
	3500										
	3750										
	4000										
	4250										
	4500										
	4750										
	5000										
5250											
5500											
5750											
6000											

IV. Stem Factor 0.0421		<i>Torque for</i> 11 3/4" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		2750	3000	3250	3500	3750	4000	4250	4500	4750	5000
P R E S S U R E D I F F E R E N T I A L	250	1877	1979	2080	2181	2282	2384	2485	2586	2687	2789
	500	2220	2321	2422	2523	2625	2726	2827	2928	3030	3131
	750	2562	2663	2765	2866	2967	3068	3170	3271	3372	3473
	1000	2904	3006	3107	3208	3309	3411	3512	3613	3715	3816
	1250	3247	3348	3449	3551	3652	3753	3854	3956	4057	4158
	1500	3589	3690	3792	3893	3994	4095	4197	4298	4399	4501
	1750	3932	4033	4134	4235	4337	4438	4539	4640	4742	4843
	2000	4274	4375	4476	4578	4679	4780	4882	4983	5084	5185
	2250	4616	4718	4819	4920	5021	5123	5224	5325	5426	5528
	2500	4959	5060	5161	5262	5364	5465	5566	5668	5769	5870
	2750	5301	5402	5504	5605	5706	5807	5909	6010	6111	6212
	3000		5745	5846	5947	6049	6150	6251	6352	6454	6555
	3250			6188	6290	6391	6492	6593	6695	6796	6897
	3500				6632	6733	6835	6936	7037	7138	7240
	3750					7076	7177	7278	7379	7481	7582
	4000						7519	7621	7722	7823	7924
	4250							7963	8064	8165	8267
	4500								8407	8508	8609
	4750									8850	8951
	5000										9294
5250											
5500											
5750											
6000											

V. Stem Factor 0.0421		Torque for 11 3/4" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		5250	5500	5750	6000	6250	6500	6750	7000	7250	7500
P R E S S U R E D I F F E R E N T I A L	250	2890	2991	3092	3194	3295	3396	3497	3599	3700	3801
	500	3232	3334	3435	3536	3637	3739	3840	3941	4042	4144
	750	3575	3676	3777	3878	3980	4081	4182	4283	4385	4486
	1000	3917	4018	4120	4221	4322	4423	4525	4626	4727	4828
	1250	4259	4361	4462	4563	4664	4766	4867	4968	5070	5171
	1500	4602	4703	4804	4906	5007	5108	5209	5311	5412	5513
	1750	4944	5045	5147	5248	5349	5450	5552	5653	5754	5856
	2000	5287	5388	5489	5590	5692	5793	5894	5995	6097	6198
	2250	5629	5730	5831	5933	6034	6135	6237	6338	6439	6540
	2500	5971	6073	6174	6275	6376	6478	6579	6680	6781	6883
	2750	6314	6415	6516	6617	6719	6820	6921	7023	7124	7225
	3000	6656	6757	6859	6960	7061	7162	7264	7365	7466	7567
	3250	6998	7100	7201	7302	7404	7505	7606	7707	7809	7910
	3500	7341	7442	7543	7645	7746	7847	7948	8050	8151	8252
	3750	7683	7784	7886	7987	8088	8190	8291	8392	8493	8595
	4000	8026	8127	8228	8329	8431	8532	8633	8734	8836	8937
	4250	8368	8469	8571	8672	8773	8874	8976	9077	9178	9279
	4500	8710	8812	8913	9014	9115	9217	9318	9419	9520	9622
	4750	9053	9154	9255	9357	9458	9559	9660	9762	9863	9964
	5000	9395	9496	9598	9699	9800	9901	10003	10104	10205	10306
5250	9737	9839	9940	10041	10143	10244	10345	10446	10548	10649	
5500		10181	10282	10384	10485	10586	10687	10789	10890	10991	
5750			10625	10726	10827	10929	11030	11131	11232	11334	
6000				11068	11170	11271	11372	11473	11575	11676	

VI. Stem Factor 0.0421		Torque for 11 3/4" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		7750	8000	8250	8500	8750	9000	9250	9500	9750	10000
P R E S S U R E D I F F E R E N T I A L	250	3903	4004	4105	4206	4308	4409	4510	4611	4713	4814
	500	4245	4346	4447	4549	4650	4751	4852	4954	5055	5156
	750	4587	4689	4790	4891	4992	5094	5195	5296	5397	5499
	1000	4930	5031	5132	5233	5335	5436	5537	5638	5740	5841
	1250	5272	5373	5475	5576	5677	5778	5880	5981	6082	6183
	1500	5614	5716	5817	5918	6019	6121	6222	6323	6425	6526
	1750	5957	6058	6159	6261	6362	6463	6564	6666	6767	6868
	2000	6299	6400	6502	6603	6704	6805	6907	7008	7109	7211
	2250	6642	6743	6844	6945	7047	7148	7249	7350	7452	7553
	2500	6984	7085	7186	7288	7389	7490	7592	7693	7794	7895
	2750	7326	7428	7529	4630	7731	7833	7934	8035	8136	8238
	3000	7669	7770	7871	7972	8074	8175	8276	8378	8479	8580
	3250	8011	8112	8214	8315	8416	8517	8619	8720	8821	8922
	3500	8353	8455	8556	8657	8759	8860	8961	9062	9164	9265
	3750	8696	8797	8898	9000	9101	9202	9303	9405	9506	9607
	4000	9038	9139	9241	9342	9443	9545	9646	9747	9849	9950
	4250	9381	9482	9583	9684	9786	9887	9988	10089	10191	10292
	4500	9723	9824	9926	10027	10128	10229	10331	10432	10533	10634
	4750	10065	10167	10268	10369	10470	10572	10673	10774	10875	10977
	5000	10408	10509	10610	10712	10813	10914	11015	11117	11218	11319
5250	10750	10851	10953	11054	11155	11256	11358	11459	11560	11661	
5500	11093	11194	11295	11396	11498	11599	11700	11801	11903	12004	
5750	11435	11536	11637	11739	11840	11941	12042	12144	12245	12346	
6000	11777	11879	11980	12081	12182	12284	12385	12486	12587	12689	

		<i>Torque for</i> 13 1/4" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		250	500	750	1000	1250	1500	1750	2000	2250	2500
P R E S S U R E D I F F E R E N T I A L	250	1386	1656	1925	2195	2464	2734	3003	3273	3542	3812
	500		2223	2493	2762	3032	3301	3571	3840	4110	4379
	750			3061	3330	3600	3869	4139	4408	4678	4947
	1000				3898	4167	4437	4706	4976	5245	5515
	1250					4735	5005	5274	5544	5813	6083
	1500						5572	5842	6111	6381	6650
	1750							6410	6679	6949	7218
	2000								7247	7516	7786
	2250									8084	8354
	2500										8921
	2750										
	3000										
	3250										
	3500										
	3750										
	4000										
	4250										
	4500										
	4750										
	5000										
5250											
5500											
5750											
6000											

VII. Stem Factor 0.0549		<i>Torque for</i> 13 1/4" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		2750	3000	3250	3500	3750	4000	4250	4500	4750	5000
P R E S S U R E D I F F E R E N T I A L	250	4081	4351	4620	4890	5159	5429	5698	5968	6237	6507
	500	4649	4918	5188	5457	5727	5996	6266	6535	6805	7074
	750	5217	5486	5756	6025	6295	6564	6834	7103	7373	7642
	1000	5784	6054	6323	6593	6862	7132	7401	7671	7940	8210
	1250	6352	6622	6891	7161	7430	7700	7969	8239	8508	8778
	1500	6920	7189	7459	7728	7998	8267	8537	8806	9076	9345
	1750	7488	7757	8027	8296	8566	8835	9105	9374	9644	9913
	2000	8055	8325	8594	8864	9133	9403	9672	9942	10211	10481
	2250	8623	8893	9162	9432	9701	9971	10240	10510	10779	11049
	2500	9191	9460	9730	9999	10269	10538	10808	11077	11347	11616
	2750	9759	10028	10298	10567	10837	11106	11376	11645	11915	12184
	3000		10596	10865	11135	11404	11674	11943	12213	12482	12752
	3250			11433	11703	11972	12242	12511	12781	13050	13320
	3500				12270	12540	12809	13079	13348	13618	13887
	3750					13108	13377	13647	13916	14186	14455
	4000						13945	14214	14484	14753	15023
	4250							14782	15052	15321	15591
	4500								15619	15889	16158
	4750									16457	16726
	5000										17294
5250											
5500											
5750											
6000											

VIII. Stem Factor 0.0549		Torque for 13 1/4" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		5250	5500	5750	6000	6250	6500	6750	7000	7250	7500
P R E S S U R E D I F F E R E N T I A L	250	6776	7046	7315	7585	7854	8123	8393	8662	8932	9201
	500	7344	7613	7883	8152	8422	8691	8961	9230	9500	9769
	750	7912	8181	8451	8720	8989	9259	9528	9798	10067	10337
	1000	8479	8749	9018	9288	9557	9827	10096	10366	10635	10905
	1250	9047	9317	9586	9855	10125	10394	10664	10933	11203	11472
	1500	9615	9884	10154	10423	10693	10962	11232	11501	11771	12040
	1750	10183	10452	10721	10991	11260	11530	11799	12069	12338	12608
	2000	10750	11020	11289	11559	11828	12098	12367	12637	12906	13176
	2250	11318	11588	11857	12126	12396	12665	12935	13204	13474	13743
	2500	11886	12155	12425	12694	12964	13233	13503	13772	14042	14311
	2750	12454	12723	12992	13262	13531	13801	14070	14340	14609	14879
	3000	13021	13291	13560	13830	14099	14369	14638	14908	15177	15447
	3250	13589	13858	14128	14397	14667	14936	15206	15475	15745	16014
	3500	14157	14426	14696	14965	15235	15504	15774	16043	16313	16582
	3750	14724	14994	15263	15533	15802	16072	16341	16611	16880	17150
	4000	15292	15562	15831	16101	16370	16640	16909	17179	17448	17718
	4250	15860	16129	16399	16668	16938	17207	17477	17746	18016	18285
	4500	16428	16697	16967	17236	17506	17775	18045	18314	18584	18853
	4750	16995	17265	17534	17804	18073	18343	18612	18882	19151	19421
	5000	17563	17833	18102	18372	18641	18911	19180	19450	19719	19989
5250	18131	18400	18670	18939	19209	19478	19748	20017	20287	20556	
5500		18968	19238	19507	19777	20046	20316	20585	20855	21124	
5750			19805	20075	20344	20614	20883	21153	21422	21692	
6000				20643	20912	21182	21451	21721	21990	22260	

IX. Stem Factor 0.0549		<i>Torque for</i> 13 1/4" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		7750	8000	8250	8500	8750	9000	9250	9500	9750	10000
P R E S S U R E D I F F E R E N T I A L	250	9471	9740	10010	10279	10549	10818	11088	11357	11627	11896
	500	10039	10308	10578	10847	11117	11386	11656	11925	12195	12464
	750	10606	10876	11145	11415	11684	11954	12223	12493	12762	13032
	1000	11174	11444	11713	11983	12252	12522	12791	13061	13330	13600
	1250	11742	12011	12281	12550	12820	13089	13359	13628	13898	14167
	1500	12310	12579	12849	13118	13388	13657	13927	14196	14466	14735
	1750	12877	13147	13416	13686	13955	14225	14494	14764	15033	15303
	2000	13445	13715	13984	14254	14523	14793	15062	15332	15601	15871
	2250	14013	14282	14552	14821	15091	15360	15630	15899	16169	16438
	2500	14581	14850	15120	15389	15659	15928	16198	16467	16737	17006
	2750	15148	15418	15687	15957	16226	16496	16765	17035	17304	17574
	3000	15716	15986	16255	16525	16794	17064	17333	17603	17872	18142
	3250	16284	16553	16823	17092	17362	17631	17901	18170	18440	18709
	3500	16852	17121	17391	17660	17930	18199	18469	18738	19008	19277
	3750	17419	17689	17958	18228	18497	18767	19036	19306	19575	19845
	4000	17987	18257	18526	18796	19065	19335	19604	19874	20143	20413
	4250	18555	18824	19094	19363	19633	19902	20172	20441	20711	20980
	4500	19123	19392	19662	19931	20201	20470	20740	21009	21279	21548
	4750	19690	19960	20229	20499	20768	21038	21307	21577	21846	22116
	5000	20258	20528	20797	21067	21336	21606	21875	22145	22414	22684
5250	20826	21095	21365	21634	21904	22173	22443	22712	22982	23251	
5500	21394	21663	21933	22202	22472	22741	23011	23280	23550	23819	
5750	21961	22231	22500	22770	23039	23309	23578	23848	24117	24387	
6000	22529	22799	23068	23338	23607	23877	24146	24416	24685	24955	

		<i>Torque for</i> 15" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		250	500	750	1000	1250	1500	1750	2000	2250	2500
P R E S S U R E D I F F E R E N T I A L	250	1546	1816	2085	2355	2624	2894	3163	3433	3702	3972
	500		2543	2813	3082	3352	3621	3891	4160	4430	4699
	750			3540	3810	4079	4349	4618	4888	5157	5427
	1000				4537	4807	5076	5346	5615	5885	6154
	1250					5535	5804	6074	6343	6613	6882
	1500						6532	6801	7071	7340	7610
	1750							7529	7798	8068	8337
	2000								8526	9795	9065
	2250									9523	9792
	2500										10520
	2750										
	3000										
	3250										
	3500										
	3750										
	4000										
	4250										
	4500										
	4750										
	5000										
5250											
5500											
5750											
6000											

X. Stem Factor 0.0549		<i>Torque for</i> 15" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		2750	3000	3250	3500	3750	4000	4250	4500	4750	5000
P R E S S U R E D I F F E R E N T I A L	250	4241	4510	4780	5049	5319	5588	5858	6127	6397	6666
	500	4969	5238	5508	5777	6047	6316	6586	6855	7125	7394
	750	5696	5966	6235	6505	6774	7044	7313	7583	7852	8122
	1000	6424	6693	6963	7232	7502	7771	8041	8310	8580	8849
	1250	7151	7421	7690	7960	8229	8499	8768	9038	9307	9577
	1500	7879	8149	8418	8688	8957	9227	9496	9766	10035	10305
	1750	8607	8876	9146	9415	9685	9954	10224	10493	10763	11032
	2000	9334	9604	9873	10143	10412	10682	10951	11221	11490	11760
	2250	10062	10331	10601	10870	11140	11409	11679	11948	12218	12487
	2500	10790	11059	11329	11598	11868	12137	12407	12676	12946	13215
	2750	11517	11787	12056	12326	12595	12865	13134	13404	13673	13943
	3000		12514	12784	13053	13323	13592	13862	14131	14401	14670
	3250			13511	13781	14050	14320	14589	14859	15128	15398
	3500				14509	14778	15048	15317	15587	15856	16126
	3750					15506	15775	16045	16314	16584	16853
	4000						16503	16772	17042	17311	17581
	4250							17500	17769	18039	18308
	4500								18497	18767	19036
	4750									19494	19764
	5000										20491
5250											
5500											
5750											
6000											

XI. Stem Factor 0.0549		Torque for 15" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		5250	5500	5750	6000	6250	6500	6750	7000	7250	7500
P R E S S U R E D I F F E R E N T I A L	250	6936	7205	7475	7744	8014	8283	8553	8822	9092	9361
	500	7664	7933	8203	8472	8741	9011	9280	9550	9819	10089
	750	8391	8661	8930	9200	9469	9739	10008	10278	10547	10817
	1000	9119	9388	9658	9927	10197	10466	10736	11005	11275	11544
	1250	9846	10116	10385	10655	10924	11194	11463	11733	12002	12272
	1500	10574	10844	11113	11382	11652	11921	12191	12460	12730	12999
	1750	11302	11571	11841	12110	12380	12649	12919	13188	13458	13727
	2000	12029	12299	12568	12838	13107	13377	13646	13916	14185	14455
	2250	12757	13026	13296	13565	13835	14104	14374	14643	14913	15182
	2500	13485	13754	14023	14293	14562	14832	15101	15371	15640	15910
	2750	14212	14482	14751	15021	15290	15560	15829	16099	16368	16638
	3000	14940	15209	15479	15748	16018	16287	16557	16826	17096	17365
	3250	15667	15937	16206	16476	16745	17015	17284	17554	17823	18093
	3500	16395	16664	16934	17203	17473	17742	18012	18281	18551	18820
	3750	17123	17392	17662	17931	18201	18470	18740	19009	19279	19548
	4000	17850	18120	18389	18659	18928	19198	19467	19737	20006	20276
	4250	18578	18847	19117	19386	19656	19925	20195	20464	20734	21003
	4500	19305	19575	19844	20114	20383	20653	20922	21192	21461	21731
	4750	20033	20303	20572	20842	21111	21381	21650	21920	22189	22459
	5000	20761	21030	21300	21569	21839	22108	22378	22647	22917	23186
5250	21488	21758	22027	22297	22566	22836	23105	23375	23644	23914	
5500		22485	22755	23024	23294	23563	23833	24102	24372	24641	
5750			23483	23752	24022	24291	24561	24830	25100	25369	
6000				24480	24749	25019	25288	25558	25827	26097	

XII. Stem Factor 0.0549		<i>Torque for</i> 15" Parallel Slide Gate Valves Ft/Lbs									
		Line Pressure									
		7750	8000	8250	8500	8750	9000	9250	9500	9750	10000
P R E S S U R E D I F F E R E N T I A L	250	9631	9900	10170	10439	10709	10978	11248	11517	11787	12056
	500	10358	10628	10897	11167	11436	11706	11975	12245	12514	12784
	750	11086	11356	11625	11895	12164	12433	12703	12972	13242	13511
	1000	11814	12083	12353	12622	12892	13161	13431	13700	13970	14239
	1250	12541	12811	13080	13350	13619	13889	14158	14428	14697	14967
	1500	13269	13538	13808	14077	14347	14616	14886	15155	15425	15694
	1750	13997	14266	14536	14805	15074	15344	15613	15883	16152	16422
	2000	14724	14994	15263	15533	15802	16072	16341	16611	16880	17150
	2250	15452	15721	15991	16260	16530	16799	17069	17338	17608	17877
	2500	16179	16449	16718	16988	17257	17527	17796	18066	18335	18605
	2750	16907	17177	17446	17715	17985	18254	18524	18793	19063	19332
	3000	17635	17904	18174	18443	18713	18982	19252	19521	19791	20060
	3250	18362	18632	18901	19171	19440	19710	19979	20249	20518	20788
	3500	19090	19359	19629	19898	20168	20437	20707	20976	21246	21515
	3750	19818	20087	20356	20626	20895	21165	21434	21704	21973	22243
	4000	20545	20815	21084	21354	21623	21893	22162	22432	22701	22971
	4250	21273	21542	21812	22081	22351	22620	22890	23159	23429	23698
	4500	22000	22270	22539	22809	23078	23348	23617	23887	24156	24426
	4750	22728	22997	23267	23536	23806	24075	24345	24614	24884	25153
	5000	23456	23725	23995	24264	24534	24803	25073	25342	25612	25881
5250	24183	24453	24722	24992	25261	25531	25800	26070	26339	26609	
5500	24911	25180	25450	25719	25989	26258	26528	26797	27067	27336	
5750	25638	25908	26177	26447	26716	26986	27255	27525	27794	28064	
6000	26366	26636	26905	27175	27444	27714	27983	28253	28522	28792	

CHART 1091 BODY BOLT TORQUE VALUES

BOLT SIZE IN INCHES	TORQUE (ft/lbs)	
	B7 OR EQUAL	B8M OR EQUAL
5/16	12	4
3/8	18	6
7/16"	29	9
1/2	45	13
9/16	50	19
5/8	85	26
3/4	150	45
7/8	240	70
1	355	110
1-1/8	510	155
1-1/4	700	210
1-3/8	950	290
1-1/2	1250	370
1-5/8	1600	480
1-3/4	2060	500
1-7/8	2500	750
2	3000	900
3	10300	3100
3-1/2	16500	5000

Note: Torque values are based on Sweeney 505 (or Valvtechnologies, Inc. Engineering approved equivalent) lubricant on all threads and V nut faces. Without lube there is a risk of stripping the threads before reaching adequate bolt tension.

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Signature: <i>Michael Stacy</i>	Date: 8/25/03
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Signature: <i>Nat Mule</i>	Date: 8/25/03