


Prepared by: [REDACTED]

		<b>VALVE LUBRICATION AND MAINTENANCE REQUIREMENTS</b>		<b>F-11</b>
		<b>Department:</b> Gas System Maintenance and Technical Support <b>Approved by:</b> [REDACTED]	<b>Section:</b> System Integrity <b>Approved by:</b> [REDACTED]	<b>Date:</b> 10-19-99
<b>Rev. #00:</b> This document replaces PG&E Drawing 086389. For a description of the changes, see Page 10.				

### Purpose and Scope

This gas standard provides information on maintenance requirements, frequencies and procedures for plug, ball and gate valves (referred to as valves) installed in, and determined to be necessary for the safe and reliable operation of, PG&E's gas systems.

### General Information

#### 1. Valve Maintenance Schedule

The responsible operating department shall establish a schedule for valve inspection and maintenance. Mandatory work requirements and frequencies, and guidelines on additional recommended inspection and maintenance, are as follows.

##### A. New Valves

All valves shall be inspected before installation. Valves requiring lubrication for proper operation shall be lubricated before installation. (After lubrication, but before installation, internally inspect the valves to ensure that the lubricant is properly distributed.)

**Note:** Some valves are designed to be operated without lubrication, but are supplied with lubrication systems to provide a good seal if the valve is worn. Do not lubricate these valves unless it is determined in the field that lubrication is necessary for proper operation. Once these valves are lubricated, they may need periodic lubrication to ensure reliable operation.

##### B. Manually Operated Valves

Manually operated valves in gas transmission and distribution systems must be inspected, serviced, lubricated, where required (see Paragraph 1.A.), and operated (see Paragraph 2.A.(1) on Page 2) at intervals not exceeding 15 months, but at least once each calendar year, unless a valve is not necessary for the safe and reliable operation of the system.

The responsible operating department shall identify all valves which are necessary for the safe and reliable operation of the system and ensure that these valves are properly maintained. Sectionalizing or isolation valves, regulator station block valves and blowoff valves are usually required for safe and reliable system operation, as are most other system valves. Valves which might be required in any type of emergency situation are necessary for safe system operation. If a valve requiring lubrication is not lubricated regularly, it may become inoperable, not shutoff adequately when needed, or develop external valve leakage.

##### C. Power-actuated Valves

Power-actuated valves installed in PG&E gas systems must, at a minimum, comply with the maintenance requirements of paragraph 1.B. for manually operated valves. It is recommended, however, that more stringent maintenance schedules be adopted because of the following circumstances.

- The added complexity of valve actuation and control.
- The use of power-actuated valves in throttling applications.
- The fact that power-actuated valves are typically more critical to system operation.

Power-actuated isolation and block valves should be inspected, serviced, lubricated (unless exempted by Paragraph 1.A.), and operated (see Paragraph 2.A.(1) on Page 2) twice each calendar year (at approximate six-month intervals).

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Power-actuated regulating valves on standby (not required to regulate during normal operations) or power-actuated valves used for overpressure protection (monitors) should be partially operated and inspected once a month and serviced and lubricated (unless exempted by Paragraph 1.A.) twice each calendar year (at approximate six-month intervals).

Power-actuated ball and plug valve regulators used frequently during normal operations should be lubricated and inspected at least once a week.

### D. Modifying the Valve Maintenance Schedule

The valve maintenance timetables specified in Paragraphs 1.B. and 1.C. should be modified to provide additional inspecting, servicing and lubricating, when necessary. This is especially important when valves are operated more frequently than usual or when there are special operating conditions. The recommended timetables for power-actuated valves are written as guidelines and may be modified to reduce the frequency of maintenance activities when operating conditions allow.

## 2. Lubrication Procedure

### A. General

- (1) When servicing a valve as required in Section 1., the valve shall be operated (or "stroked") through its complete range when operating conditions permit. When operating conditions do not permit full operation of the valve, it shall be stroked through the maximum range that is practicable. For normally closed valves, never stroke the valve less than the amount required to establish flow through the valve.
- (2) Any problems encountered when operating any of the valves, either during scheduled maintenance or at any other time, shall be reported on a "Material Problem Report" (DCS Standard D-S0333, "Material Problem Reporting").
- (3) Valves equipped with button-head lubricating fittings are to be lubricated, when required, with a high-pressure grease gun that includes the appropriate pressure gauge. Valves equipped with lubricant screws are to be lubricated with stick-type lubricants. All lubricants must be clean and be the specific lubricants specified by the valve manufacturer. Using lubricants that are not recommended by manufacturers voids their warranties and leaves PG&E vulnerable in any potential lawsuit involving third party damages considered caused by valve leakage. Refer to the manufacturer's lubrication instructions for the proper use of lubricants.

**Note:** Resun, Serck AUDCO and Walworth plug valve manufacturers permit the use of Rockwell lubricant 1033 (see Paragraph 2.B.(16)). Each valve requiring lubrication for normal maintenance shall be lubricated as required by Section 1.B. and 1.C. Service conditions may require that some valves be lubricated more frequently (see Paragraph 1.D.).

### (4) Optional

A tag may be attached to the valve to indicate if lubrication is required. If the valve does require lubrication, the tag shall state the type of lubricant, the frequency of application and the date the valve was last lubricated.

- (5) When block and bleed type valves are exposed to water, condensates or other foreign matter, drain the valve body to prevent damage to the valve. Always drain the valve body after hydrotests.
- (6) If a valve is difficult to operate, it may be necessary to flush out the old lubricant. On plug valves, it may also be necessary to make a plug adjustment (see the manufacturer's recommended procedure) to achieve proper operation. See Section 3. for valve flushing procedures and approved valve flushes.
- (7) If the steps in Paragraph 2.A.(6) on Page 2 do not fix a "difficult to operate" valve, then inject the valve with limited amounts of Sealweld 5050. Valves requiring the use of Sealweld 5050 to operate should be scheduled for replacement as soon as economically feasible.
- (8) As part of the maintenance program on valve-operator combinations, maintain a continuing record of the torque or the time required to close and open the valve. Plotting this information over a period of time will show changes which can indicate wear or binding in the operator or problems with the valve.

### B. Plug Valves

- (1) Plug valves should always be lubricated in the fully-open or fully-closed position. In either of these positions, all grease grooves in the body are connected with the circular grooves at the top and bottom of the plug and the surface of the plug is mated to the walls of the body. This ensures a full and even spread of the lubricant over all the surfaces. The lubricant then acts as a bearing interface as well as a sealant.
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Multiport valves have special lubrication systems and should only be lubricated in one of the 90° positions. Where operating conditions permit, turn the valve through its complete range or through the maximum range which is practicable, as described in Paragraph 2.A.(1) on Page 2.

Lubricate plug valves used as regulators, which are backed up by monitor valves, in the the fully open position. This permits the monitor valve to take over the control function. Lubricate plug valve monitors in their normal, fully-open position.

- (2) During the first days of operation or after a significant operating change, closely observe plug valves used as regulators. If a valve is cycling often, lubricate it as frequently as every other day (see Paragraph 1.C. on Page 1 for normal maintenance).
- (3) If a valve plug is stuck, inject it with a lubricant to free it, if possible. After lubrication, operate the valve until it freely turns. If lubricating the valve fails to loosen it, the valve must be flushed as specified in Section 3. on Page 9. It may be necessary to make a plug adjustment (see the manufacturer's recommended procedure) to get the valve to properly operate.
- (4) When lubricating valves, look for the following visual clues that the process is successful. The grease gun's pressure gauge shows steadily increasing pressure with each stroke of the lubricant gun until the pressure gauge reading no longer rises but begins to drop and the pumping effort decreases. At this point, the valve has been sufficiently lubricated. Stop injecting the lubricant.
- (5) The lubricant pressure on the gauge should read a minimum of 2,000 pounds per square inch (psi) for any plug valve, with pressures not to exceed 5,000 psi when lubricating semi-steel valves, and 12,000 psi when lubricating steel valves. Very low pressure or no static pressure on the gauge indicates one of the following troubles.
  - (a) The gun is empty.
  - (b) The valve plug is loose (see paragraph 2.B.(6) below).
  - (c) The gun is malfunctioning and should be checked. No repairs are to be made to the hydraulic system. If the gun is broken, issue an order to have it reconditioned.
- (6) If excessive clearance exists between the plug and the body, either because the adjustment gland or the adjustment screw is backed off too far, the lubricant migrates into the pipeline and the lubricant pressure will not build up properly.
- (7) If a pressure immediately becomes high, it may indicate a defective lubricant fitting, which would prevent lubricant from entering the valve.

### Caution

Couplers should not be attached or detached while guns are under pressure. Relieve gun pressure by opening the by-pass valve.

- (8) The practice of loosening adjustments to obtain a temporarily free turning plug will invariably result in undesirable secondary effects. The secondary effects of improper plug adjustment are as follows.
  - (a) The problems associated with valve leakage.
  - (b) The entrance of foreign or abrasive materials between the plug and seat, resulting in damaged sealing surfaces.
  - (c) Higher torque characteristics as damage occurs.
  - (d) Possible gear and operator damage as the torque becomes excessive.
  - (e) An ultimate need to replace the valve.
- (9) Adjusting the valve gland on fixed-adjustment gland valves is generally not necessary. Do not adjust the valve gland except as specified by the manufacturer.
- (10) When the valve plug is not properly seated or when lubrication is not effective in loosening a tight valve, and an approved valve flush has been used, tighten the gland adjustment nuts. Tightening the nuts will seal off lubricant leaks and will help develop the proper hydraulic pressure during lubrication. Do not attempt to tighten the nuts without consulting the manufacturer unless the operator is experienced with this particular adjustment. (Never loosen the packing gland before lubrication.)

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- (11) The Rockwell Hypreseal-type valves have an adjustment screw in the bottom cover. This screw is adjusted at the factory to strict specifications. To prevent tampering, a cover is welded over this screw. Do not adjust the screw position in the field.
- (12) The lubrication screw must not be left in the plug stem beyond complete engagement of the threads. If the screw is left in this position, a pocket is created where water, dirt or corrosion products could collect and make the lubricant screw difficult to remove. Insert another stick of the sealant into the valve to allow the lubricant screw to be backed out.
- (13) When specified adjustments to adjustable valves are unsuccessful and they can not be properly lubricated, or when an inoperable plug valve requires adjustment, a "Material Problem Report," form number 620113A, shall be submitted.
- (14) Before installing any lubricated plug valve, it must be inspected and lubricated. This ensures the proper flow and distribution of lubricant throughout the valve body (and lubricant extension pipe, if used). Construction personnel should inspect and lubricate the plug valves in cooperation with the operating personnel responsible for the station after construction. If a valve is found to be operating improperly, a "Material Problem Report" shall be submitted.
- (15) The specified types of general-purpose lubricants for plug valves are listed in Table 1, Table 2 and Table 3 on Page 5. Use only the manufacturer's recommended lubricants, as shown in the table, for each valve. Standard sizes and packages of approved lubricants are available by specifying the code number shown.

### Caution

Avoid the routine use of Teflon-bearing lubricants in plug valves. Teflon particles can clog orifices in PG&E's pneumatic-control equipment and customers' appliances, resulting in serious problems.

- (16) Rockwell sealant 1033 has been added to the list of recommended lubricants for Resun, Serck AUDCO and Walworth plug valves. Their use will not void the manufacturer's warranty.
- (17) Comparison of Rockwell Lubricants

Rockwell lubricants 1033 and 386 are quite different in chemical formulation, but for natural gas, both provide similar results. The 1033 is slightly more viscous, providing a better seal in a worn or poorly adjusted valve, and less loss of sealant during operation. However, it is slightly harder to pump. The 1033 is also much more resistant to being dissolved by organic solvents and would, therefore, be preferred if hydrocarbon condensates in the pipeline are a known problem.

On the other hand, 386 is much more resistant to inorganic chemical attack (acids, bases and other chemicals). This is not likely to be an issue for gas pipelines. The 1033 lubricant has a higher temperature rating than the 386, but the 386 is stable up to at least 250° F, so this is not a significant issue for gas pipelines.

Rockwell lubricant 555 is no longer recommended by PG&E since its clay-base composition hardens over time.

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**Table 1 Recommended Lubricants for Rockwell and Serck AUDCO Plug Valves <sup>1</sup>**

Lubricant Fitting Type	Thread Size (Inches)	Lubricant Form Designation (Units per Box)	Codes <sup>2</sup>	
			Rockwell #386	Rockwell #1033
Threaded	1/2	B (24) Stick	503072	Not Available
Threaded	3/8	C (24) Stick	503073	Not Available
	1/2	D (24) Stick	503074	Not Available
	3/4	G (24) Stick	015596	Not Available
Button-head Fitting <sup>3</sup>		K (12) Stick	015597	015585
		GP (6) Gun Pack <sup>4</sup>	015594	015593
		GP (6) Gun Pack	015594	015593
		J (6) Stick	503076	015540
		Cartridge (4) <sup>5</sup>	015579	015564
		Bulk (1) Five-quart Can <sup>6</sup>	503100	034873

<sup>1</sup> Colors of Rockwell lubricants: No. 386 – Cream; No. 1033 – Green.

<sup>2</sup> See Paragraph 2.B.(17) for a comparison of Rockwell lubricants.

<sup>3</sup> Requires lubricant hand gun.

<sup>4</sup> Use with Rockwell No. 400A hand gun or Sealweld SuperGun.

<sup>5</sup> Use with Rockwell No. 400D hand gun.

<sup>6</sup> Use with Rockwell Hypregun or Sealweld Activ-8.

**Table 2 Recommended Lubricants for Walworth Plug Valves <sup>1</sup>**

Lubricant Fitting Type	Thread Size (Inches)	Valve Size (Inches)	Stick or Cartridge Designation (Units per Box)	Code Numbers for Specified Lubricants	
				Walseal #1	Walseal #2
Threaded	1/4	1/2 – 2	B (24) Stick	015555	015561
	3/8	2-1/2 – 3	C (24) Stick	015556	015562
	1/2	4	D (24) Stick	015557	015563
	3/4	6 and Up	G (24) Stick	015558	503109
Button-head Fitting <sup>2</sup>	–	–	Jumbo Stick (6) <sup>3</sup>	015559	015573
			Cartridge (1) <sup>4</sup>	015560	015574

<sup>1</sup> Colors of Walworth lubricants: No. 1 – Light Brown; No. 2 – Black.

<sup>2</sup> Requires lubricant hand gun.

<sup>3</sup> Use with No. 1699 hand gun.

<sup>4</sup> Use with No. 101 hand gun.

**Table 3 Recommended Lubricants for Resun Plug Valves <sup>1</sup>**

Lubricant Fitting Type	Thread Size (Inches)	Valve Size (Inches)	Stick or Cartridge Designation (Units per Box)	Codes	
				Resun #62	Resun #62G
Threaded	1/2	1 - 3	62 or 62G (24)	015575	N / A
	3/4	6 and Up	62 or 62G	015576	
Button-head Fitting	–	–	1-1/4" x 9" (4) Gun Stick	015577	
			1-1/2" x 8" (1) Gun Cartridge	N / A	015578

<sup>1</sup> Colors of Resun lubricants: No. 62 (Stick) – Black; No. 62G (Cartridge) – Black.

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### C. Ball Valves

- (1) All pipeline ball valves 2" and larger shall have a body cavity drain fitting and backup lubricant injection fittings. For buried services, these fittings shall be extended above ground using Grade B, schedule 80 seamless steel pipe. The body cavity drain fitting is used to remove debris from the valve and to test the seat integrity.
- (2) Rockwell Hypresphere Ball Valves (old floating ball model manufacture ended in 1973)
  - (a) Lubricate the Hypresphere valve when the valve is fully open or fully closed. Some sizes have three lubricant fittings, one for each seat and one for the stem. Keep all valves lubricated for satisfactory operation. Thoroughly lubricate the seat on the low-pressure side of the valve, especially if the valve is difficult to operate.

#### Caution

When a valve is closed and the line is blown down on what is normally the upstream side of the valve, seat reversal occurs. Before the line is pressurized and returned to service, lubricate **both** valve seats.

- (b) Rockwell's specified lubricant for Hypresphere valves is Rockwell No. 386 or No. 1033. Do not use any other lubricant in Rockwell valves (Table 4).
- (3) Rockwell TM Hypresphere Ball Valves (new model, Trunnion Mounted Ball, manufactured since 1972)
  - (a) The Rockwell TM Hypresphere ball valve needs no lubrication for a tight shutoff. However, as noted below, perform periodic maintenance according to a schedule that is designed to keep the valve in good working order. Obtain a longer seat life and easier operation by periodically injecting the valve with lubricant.
  - (b) The valve has a lubricant injection system to provide a backup seat seal should the seats become damaged and tight shutoff is not possible. Both valve seats have lubricant injection fittings on the sides of the valve body. In addition, there is a lubricant injection fitting at the base of the valve stem to provide a secondary stem seal. Valves 20" and larger have five lubricant injection fittings.
  - (c) Although lubricant injection is not necessary for shutoff, Rockwell states that, "periodic lubricant injection with approved Rockwell lubricants helps maintain good operating conditions and minimizes wear and abrasion on the seats and ball." Depending on the severity of the service environment, it is recommended that lubricant be injected at least every six months or less.
  - (d) Lubricate Rockwell TM Hypresphere ball valves before installation. Construction personnel, in cooperation with the operating personnel responsible for the station after construction, should lubricate the ball valves. Visually check the valves for lubricant excretion around the ball port and valve body. This inspection will verify the proper flow and distribution of lubricant throughout the valve body (and lubricant extension pipe, if used). Lubricate as often as necessary to ensure smooth operation when the valve is being throttled. Lubricate the valves in the closed position, if possible. Any problems with the operation of these valves, either during scheduled maintenance or at any other time, shall be reported on a "Material Problem Report".
  - (e) Rockwell's specified lubricant for Hypresphere valves is Rockwell No. 386 or No. 1033. Do not use any other lubricant in Rockwell valves (Table 4).
- (4) TK and Grove Ball Valves
  - (a) TK and Grove Model B-4 and B-5 ball valves need no lubrication for bubble-tight shutoff. Lubricate the valves not used as monitors or standby regulators (using the fittings provided) only if a positive shutoff cannot otherwise be obtained. Valves which do not provide positive shutoff should be checked for possible valve seat or ball damage. Once the valve is lubricated, it may need a periodic lubrication to ensure reliable operation.
  - (b) The manufacturer's specified lubricant for shutoff on TK and Grove Model B-4 and B-5 ball valves and for Grove BVR-4 and BVR-5 ball valve regulators is Sealweld No. 911 (Cartridge Code No. 015571). Do not use any other lubricant on Grove ball valve regulators.
  - (c) Lubricate Grove Model BVR-4 and BVR-5 ball valve regulators before installation. Construction personnel, in cooperation with the operating personnel responsible for the station after construction, should lubricate the ball-valve regulators. Visually check the valves for lubricant excretion around the

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ball port and valve body. This inspection will verify the proper flow and distribution of lubricant throughout the valve body (and lubricant extension pipe, if used).

After release to operations, lubricate the valves as often as necessary to ensure smooth operation when the valves are throttling. Lubricate the valves in the closed position, if possible.

- (d) Grove regulating valves with retractable seats (commonly known as the Arcron Model) must not be lubricated. This would destroy the retractable seat feature. The valve has no lubrication fittings to lubricate the valve seats. It does, however, have Zerk fittings under the Arcron cover for lubricating the operator. Use Sealweld No. 911 lubricant to grease these fittings.
  - (e) Before installing any TK or Grove ball valve, remove and plug all body reliefs. Reliefs are only necessary for valves in liquid service. Replace the reliefs with steel plugs with a pressure rating at least equal to that of the valve. Also, remove the shipping tabs and lifting eyes and tighten all body bolts.
- (5) WKM Dynaseal Ball Valves
- (a) WKM Dynaseal ball valves do not require lubrication for bubble-tight shutoff. However, it may be necessary to inject lubricant (Emergency Seat Renewal) if the seats become damaged. The recommended lubricant for shutoff is WKM Lubricant No. 103, or an approved equivalent, such as Rockwell No. 386 or No. 1033. Close the valve and inject lubricant at both seats under block-and-bleed conditions.
  - (b) Should a leak develop around the stem, it can be stopped under pressure by injecting WKM plastic stem packing No. 107.
- (6) Cameron Ball Valves
- (a) Cameron all-welded ball valves do not require lubrication. The valve is sealed for life. Seals and stem bearings are self-lubricating and are designed for the life of the valve. Although lubricant injection is not normally necessary, periodic injection of Sealweld valve cleaner helps maintain the valve in good operating condition by minimizing wear on the seats and ball, and ensuring free movement of the valve seats.
  - (b) The valve has lubricant-injection ports with check valves to provide a backup seat seal should the sealing surfaces become damaged and tight shutoff cannot be obtained.  
**Note:** 2" to 4" valves have a smaller button-head fitting, requiring a 5/8" coupling on the hand gun.
  - (c) The injection system can also be used for flushing the seat ring area, when required.
  - (d) If the primary seats become damaged, it may be necessary to inject lubricant through the lubricant injection fittings. The recommended lubricant for Cameron ball valves is Sealweld 911 (Cartridge Code No. 015571).
  - (e) For Cameron valves 14" and larger, the rotating seat design creates an increased torque for the last 15° when the valve is being closed. Although lubricant injection is not normally necessary, periodic injection of Sealweld valve cleaner helps ensure easy rotation of the valve seats which thereby minimizes operating torque.
- (7) VSI, Kerotest Weldball, and Ballomax Valves
- (a) The VSI Model 111, Kerotest Weldball, and Broen Ballomax valves do not require lubrication or any maintenance. These valves are sealed for life. Seals and stem bearings are self-lubricating and are designed for the life of the valve.
  - (b) The opening torque for a VSI valve may be higher than normal if there is a high differential pressure across the valve.
  - (c) Before removing the bonnet from a VSI valve (no pressure in the line), the valve must be in the fully-open position. In any other position, the internal parts cannot be removed.
- (8) Ball Valve Lubricants
- (a) The recommended types of general purpose lubricants for ball valves are summarized in Table 4 and Table 5. Use only the manufacturer's recommended lubricant, as shown in the tables, for each valve. Standard sizes and packages of approved lubricants are available by specifying the code numbers shown.

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- (b) The specified lubricant for TK, Grove and Cameron ball valves is Sealweld No. 911. Sealweld No. 911 contains micro-fine Teflon particles which can cause serious problems if used in plug valves and other valves requiring more frequent lubrication or large quantities of lubricant. However, the limited amount of Teflon-bearing lubricant used in TK, Grove and Cameron ball valves should not cause a problem.

**Table 4 Recommended Lubricants for WKM Dynaseal and Rockwell Hypresphere Valves <sup>1</sup>**

Lubricant Fitting Type	Thread Size (Inches)	Lubricant Form Designation (Units per Box)	Codes for Specified Lubricants <sup>2</sup>	
			Rockwell #386	Rockwell #1033
Threaded	1/2	B (24) Stick	503072	Not Available
	3/8	C (24) Stick	503073	Not Available
	1/2	D (24) Stick	503074	Not Available
	3/4	G (24) Stick	015596	Not Available
Button-head Fitting <sup>3</sup>		K (12) Stick	015597	015585
		GP (6) Gun Pack <sup>4</sup>	015594	015593
		GP (6) Gun Pack	015594	015593
		J (6) Stick	503076	015540
		Cartridge (4) <sup>5</sup>	015579	015564
		Bulk (1) Five-quart Can <sup>6</sup>	503100	034873

<sup>1</sup> Lubricants for Dynaseal and Rockwell valves: No. 386 – Cream; No. 1033 – Green.

<sup>2</sup> See Paragraph 2.B.(17) for a comparison of Rockwell lubricants.

<sup>3</sup> Requires lubricant hand gun.

<sup>4</sup> Use with Rockwell No. 400A hand gun or Sealweld SuperGun.

<sup>5</sup> Use with Rockwell No. 400D hand gun.

<sup>6</sup> Use with Rockwell Hypregun.

**Table 5 Recommended Lubricant for Grove BVR-4 and BVR-5 Valve Regulators, TK and Grove, Model B-4 and B-5 Valves and Cameron Valves <sup>1, 2</sup>**

Cartridge Designation (Units per Case)	Code
#1 Gun Cartridge (16) 12 Ounce <sup>3</sup>	015571

<sup>1</sup> Lubricant: Sealweld Total Lube No. 911 (see Footnote 2) – White.

<sup>2</sup> Sealweld #911 contains micro-fine Teflon particles (40 microns or smaller) and must only be used on approved ball valves.

<sup>3</sup> Can be used with Rockwell 4000 hand gun.

D. Gate Valves

(1) Kerotest M-1 Gate Valves

- (a) The Kerotest M-1 gate valve does not require lubrication or gland tightening. A stem leak requires replacing the packing seals and gland gasket. Repack the valve and lubricate it as described in Kerotest’s procedure for “Primary or Secondary” repacking. The primary repacking procedures may be performed with the line pressurized. See the Kerotest M-1 *Gate Valve Operations Manual* for more information.
- (b) If the bonnet gasket leaks, retighten the bonnet screws per torque specifications found in the Kerotest operations manual. If leaking persists, remove the valve from service, disassemble it, and inspect it for damage to the gasket or sealing area. Replace the gasket and/or polish the sealing area with a very fine emery cloth. Coat the bonnet gasket with a light film of multipurpose grease, and reassemble.
- (c) Be careful if the valves are in the open position in a pipeline for a period of time. Sediment or dirt can collect inside the valves and block the wedges from fully closing. When these valves are to be closed, do it slowly. The valves should not be closed completely, but “throttled” for a short period of time, so



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the turbulence created will flush away any sediment or dirt that might have settled in the valves. In the event of an emergency, close the valves as quickly as possible.

- (d) If a valve does not completely shut off, the valve may be resealed using the following procedure.
- (i) Throttle the valve to flush out loose sediment.
  - (ii) Close the valve using moderate effort. This will force the wedge partially into the seat and loosen accumulated sediment.
  - (iii) Open the valve one or two turns to retract the wedge from the seat.
  - (iv) Repeat this procedure, if necessary.

(2) Kerotest Model EV-11 "Stirrup" Gate Valve

- (a) The EV-11 gate valve does not require lubrication for a bubble-tight seal. Lubrication is required only during cleaning and inspecting, as specified in Kerotest's maintenance procedures.
- (b) If a leak develops in the bonnet, retighten the bonnet screws to Kerotest's torque specifications. If leaking persists, replace the bonnet O-ring.
- (c) A stem leak requires replacing the stem seal and gland bushing O-rings. Replacing the stem seal and gland bushings O-rings can be performed under pressure if Kerotest's repair procedure is followed.
- (d) If the valve does not completely shut off, it may be necessary to disassemble the valve and clean or replace the wedge seals.
- (e) For repair procedures and torque requirements, refer to EV-11 gate valve maintenance instructions.

(3) RMI Weld Patent Gate Valve (WPV)

- (a) The WPV does not require lubrication for a bubble-tight seal.
- (b) A stem leak requires replacing the stem O-rings. Replacing the stem O-rings can be performed under pressure if WPV's repair procedure is followed.
- (c) The WPV is an all-welded design; therefore, the valve cannot be disassembled to replace the stem or wedge.

### 3. Flushing Procedures

- A. Inject plug valves that are seized or difficult to turn and leaking ball valves and gate valves with an approved cleaning solvent to soften old lubricants and to purge grease grooves. The valves should then be lubricated with the manufacturer's recommended lubricant to provide proper lubrication on the mating surfaces when the valves are operated.
- B. The valve flushing agent manufacturers' procedures shall be followed when performing any valve cleaning operation.
- C. The following valve flushing agents are approved for use on any brand of valve and with existing valve lubrication equipment.

Agent Name	Quantity	Code
Rockwell Valve Purge VPX	Gun Pak (6 per Box)	015565
	Cartridges (4 per Box)	015566
	Five-quart Can	015567
Sealweld Valve Cleaner <sup>1</sup>	16 Ounces Cartridge	015568
	Five-quart Can	015569
Sealweld Equa-Lube Gold Flush	One 32 Ounces Bottle (4 per Box)	490177
Val-Tex Valve Flush	One-quart Bottle (4 per Box)	015570
	Five-quart Can	015602

<sup>1</sup> Use Sealweld valve cleaner on valves that are extremely difficult to turn.

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It is recommended that the valve flushing agent be left in the valve for a minimum of 12 hours to a maximum of three days.

**Caution**

Valve flushing agents can have a damaging effect on elastomers if they are left in contact for extended periods of time. Minimize contact time with rubber sealant gun components by cleaning valve flushing agents out of the gun. Do this by pumping sealant through the hand gun. When the softening process is complete, always inject fresh lubricant (as recommended by the valve manufacturer) into the valve.

**Note:** A Material Safety Data Sheet (MSDS) must be on file in each operating department for each valve flushing agent and lubricant being used.

4. Valve Maintenance Records

Valve maintenance shall be recorded on the appropriate "Valve Maintenance Record" form FF11. See Attachment A for "Valve Maintenance Record" form and instructions on completing the form. The maintenance history of each valve shall be recorded on a separate form.

5. Miscellaneous Lubricant-Sealant Injection Fittings

A. Rockwell Fitting

The following table lists Rockwell-manufactured combination button-head fittings and lubricant screws for use with Rockwell plug valves. These fittings have parallel (straight) pipe threads. Do not use them with the tapered pipe threads of the ball valves and the screwed pipe fittings.

**Table 6 Miscellaneous Rockwell Fittings**

Parallel Pipe Threads Size (Inches)	Size of Stick for Valves Using Rockwell Lubricant	Rockwell Part Number	Code
1/4	B	37415	208416
3/8	C	37416	208417
1/2	D	37417	208418
3/4	G	37418	201048

B. Sealweld Flow Wolf Fitting (Ball Valves)

The following table lists Sealweld Flow Wolf button-head fittings used as the seat lubricant-sealant injection fitting on the ball valves. These fittings have low internal flow restriction to minimize plugging the fitting's internal ball check valve when injecting the sealant. These fittings have tapered pipe threads. Never use them on the straight pipe threads found on plug valves.

**Table 7 Miscellaneous Sealweld Flow Wolf Fittings**

Tapered Pipe Threads Size (Inches)	Sealweld Flow Wolf Part Number	Code
3/8	F-FW-3/8	441174
1/2	F-FW-1/2	441175

**Revision Notes**

Revision 00 has the following changes.

1. Converted PG&E Drawing 086389 to Gas Standard F-11.
2. Rearranged the contents, edited the text and the tables.
3. Added the Sealweld Equa-Lube Gold Flush as an approved flushing agent.
4. Added ordering information for miscellaneous valve lubricant-sealant injection fittings.
5. Added Attachment A including the "Valve Maintenance Record" form and instructions.
6. This document is part of Change 46.





## Valve Lubrication and Maintenance Requirements

### Attachment A, continued

### “Valve Maintenance Record” Form Instructions

#### General Information

Ensure that all natural gas block valves (2" and greater) requiring maintenance per this gas standard and ball or plug valve regulators have a completed “Valve Maintenance Record” form. For valves smaller than 2" use the “Technical Maintenance Equipment Card.”

**Note:** The “Valve Maintenance Record” form should be copied on to white, 67-pound weight card stock. Copy the front and back sides of the form on to the card stock unless a location sketch is needed. If a sketch is required, copy only the front of the form and leave the back of the card blank for the sketch.

#### Explaining Form Entries

##### 1. General Information (upper portion of the form)

###### A. Emergency or Other: An “Emergency” valve is

- a transmission line valve that might be required during any emergency, or
- a valve which may be necessary for the safe operation of a distribution system.

Other valves are considered non-emergency. Insert an “X” in the box  to signify whether the valve is an “Emergency” valve or an “Other” (non-emergency) valve.

###### B. Division / District: List the name of the division or district which is maintaining the valve.

###### C. Valve No.: This is the unique number assigned to the valve. This number is consistent with the operating map or operating diagram, or division plat sheets.

###### D. Gas FM (or PLM) No.: This is the unique number used by the work scheduling program to identify the maintenance required on the specified valve.

###### E. Location: This refers to the physical location of the valve. If a location sketch is necessary, provide a sketch on the back of the form. Generally, if the valve is located in a gas facility with an associated operating diagram, the location description is not required.

###### F. Transmission or Distribution: Insert an “X” in the box to signify whether the valve is located on a CGT (Transmission) or a DCS (Distribution) line. CGT pipelines are any lines operating in excess of 60 pounds per square inch gauge (psig).

##### 2. Valve Data

Fill out the information in the “Valve Data” section. The Serial Number field is optional.

Complete the information on the recommended valve lubricant/sealant and the frequency of lubrication and/or inspection. Although a manually-operated ball valve does not require lubrication, the valve is generally required to be operated annually. Table 8 summarizes the recommended seat and stem sealant for the various makes of valves.

If the valve has a manually enclosed gearbox operator, document whether the gearbox

- has a Bettis breather installed on top of the actuator, and
- is filled with oil.

Subsequently, if the oil is ever drained, indicate this action on the form.

If the valve is buried and has a high-head extension, document whether the extension has a vent installed. The vent can indicate whether or not the entire valve stem seal on a buried valve has failed.

Use the comment section to provide any additional maintenance information or notes.

##### 3. Service History

Use this portion of the form to document the maintenance performed on the valve, as well as to document any required repairs and action taken.

## Valve Lubrication and Maintenance Requirements

*Attachment A, continued***Table 8 Recommended Seat And Stem Sealant Summary**

Manufacturer	Type	Seat Sealant	Stem Sealant
Rockwell Nordstrom	Plug	Rockwell 1033/386	Rockwell 909
Walworth	Plug	Rockwell 1033	Walworth 630 (909)
Resun	Plug	Rockwell 1033	Contact GSM&TS
Serck Audco	Plug	Rockwell 1033	Rockwell 909
Grove	Ball	Sealweld 911	See Note 1
Orbit	Ball	Sealweld 911	Orbit GP-6
Cameron	Ball	Sealweld 911	Sealweld 911
Rockwell	Ball	Rockwell 1033/386	Rockwell 950 (5050)
TK	Ball	Sealweld 911	See Note 1
WKM	Ball	Rockwell 1033/386	WKM 107
Grove	G-4 Gate	Sealweld 911	See Note 1
Grove	G-3, G-9 Gate	N/A	See Note 1
Grove	G-5 Gate	N/A	N/A

Note 1. Use 80/90 weight gear oil for a minor leak. If the leak does not stop and a large button-head fitting is furnished for the stem sealant injection, use Sealweld 911. If the leak still does not stop, use Rockwell 950 (Sealweld 5050) as a last option.