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EXCESS FLOW VALVES

A-93.3

Asset Type: Gas Distribution

Function: Design

Issued by: M. G. Rossi Original Signed By

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Rev. #06: This document replaces Revision #05. For a description of the changes, see Page 8.

Purpose and Scope

This numbered document provides use and design information for selecting, installing, maintaining, and documenting EFVs. Supplements to this document may be found in the manufacturer's product manuals and catalogs, and in the numbered documents listed in the "References" section.

Acronyms

APD:	abnormal peak day
ASTM:	American Society for Testing and Materials
CFR:	*Code of Federal Regulations*
CTS:	copper tubing size
DOT:	Department of Transportation
EFV:	excess flow valve
GPRP:	Gas Pipeline Replacement Program
HVTT:	high-volume tapping tee
IPS:	iron pipe size
MAOP:	maximum allowable operating pressure
PE:	polyethylene
psig:	pounds per square inch gauge
QC/S:	qualified contractor/subcontractor
scfh:	standard cubic feet per hour
WRO:	work at the request of others

References

	Document
Piping Design and Test Requirements	A-34
Plastic Main and Service Installation	A-90
Polyethylene Pipe Specifications and Design Considerations	A-93
Plastic Gas Distribution System Construction and Maintenance	A-93.1
Plastic System Mechanical Fittings	B-91.1
Qualifications for Joining Plastic Pipe	D-34
Diaphragm Meter Capacities	J-10.1
Polyethylene Mechanical Fitting Connections	Utility Work Procedure WP4170-08
Material Problem Reporting (MPR)	Utility Standard S2333
Specifications for Furnishing and Delivery of Non-Corrodible Mechanical Fittings for Polyethylene (PE) Plastic Gas Piping and Tubing	EMS 4761
Standard Test Method for Performance Testing of Excess Flow Valves	ASTM F-1802
Standard Specification for Excess Flow Valves for Natural Gas Service	ASTM F-2138

General Information

The United States DOT required gas distribution utilities to have an EFV program effective February 3, 1999. Since then, Congress has specified in the 2006 Pipeline Safety (PIPES) Act that all operators of gas distribution systems install EFVs in lieu of customer notification. This change went into effect in June 2008. The applicable DOT requirement is 49 CFR 192.383. The Company has installed EFVs in lieu of providing notification to affected customers since the original request was implemented. EFVs are spring operated and control the flow of gas through a service line when the flow rate exceeds a predetermined quantity. EFVs must perform to the requirements of

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49 CFR 192.381. As such, careful sizing of the EFV is critical. EFVs are typically installed in a coupling and activate when a gas service line is severed due to a dig-in. All EFVs supplied with mechanical ends must meet the requirements listed in Engineering Material Specification 4761. All EFVs supplied must meet the requirements of ASTM F-1802 and ASTM F-2138. The EFV has a bleed-by mechanism that will reopen the EFV when the pressure on both sides equalizes.

Application

1. New Business: Single services on systems with an MAOP greater than or equal to 15 psig and an APD main pressure greater than or equal to 10 psig (see Table 1 for details) to serve new, single family residential customers with one gas meter. Install EFVs on new service stubs as close as practical to the main. Refer to Numbered Document A-90 for installation details. Do not install EFVs on stub completions.
2. Reconstruction: Single services that feed single family residential customers with one gas meter and are replaced during a job that has been planned and engineered. GPRP jobs and other main replacement jobs with associated service replacements are included in this category. Complete service replacements that are engineered are also included in this category.
3. Contact the Plastic Hotline (8-223-9161 or 415-973-9161) for installation information about EFVs on services larger than 2” IPS, loads greater than 4,400 scfh, or for assistance with the application of this document.

Limitations

1. EFVs are not required on branch services and should not be installed in those locations.
2. Do not install EFVs on steel services. Replace these services with PE services.
3. EFVs are not required on systems that can have a minimum pressure below 10 psig. Low-pressure systems and some semi-high and high-pressure systems are included in this category. Contact the local gas planning engineer for assistance in determining which systems are excluded from the EFV program.
4. EFVs are not required on services that are replaced in an emergency or on a short lead-time basis. Service replacements to repair Grade 1 leaks are included in this category. Service replacements to repair Grade 2+ and Grade 2 leaks that are not part of an engineered main replacement job are included in this category. Usually, this occurs when a crew, gas operations engineer, or repair supervisor determines that the condition of the service line is such that a full replacement of the service is the best repair method. At this point, the excavation is usually already open and the work must be completed quickly.
5. EFVs are not required on services that have more than one meter.
6. EFVs are not required on services that are serving other than a residential customer (e.g., serving a commercial/industrial customer).
7. EFVs are not required on services that are partially replaced, such as service alterations.
8. EFVs are not required on services where there is a reasonable expectation that an additional meter(s) will be added in the future. This includes installations where a multi-family dwelling may be constructed. Contact the local estimating group if a service is engineered with an EFV and there is a possibility of additional meters being installed in the future.
9. EFVs shall not be installed on service lines with contaminants in the gas stream, where these contaminants could be expected to cause the EFV to malfunction or where the EFV would interfere with the necessary operation and maintenance activities on the service, such as blowing liquids from the line.
10. Refer to the installation and replacement matrix shown in Table 4 on Page 6 when field conditions change.
11. Only employees, contractors, and QC/S with a current D-34 mechanical qualification may install an EFV.
12. EFVs shall not be installed on 1/4” CTS services or on any service where a portion of the service has 1/4” CTS tubing.

Guidelines for Selecting an EFV Based on the MAOP

Table 1 on Page 3 illustrates the system capability requirements for EFVs. Any variances from the requirements listed shall be approved by gas engineering personnel. Any variances shall be determined on a case-by-case basis.

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EFV Selection Guide

The tubing or pipe size on the ends of EFV fittings and the service tubing or pipe size shall be the same. The EFV flow model shall be selected according to the criteria found in the cases below and in Table 2 on Page 4. Pressures listed refer to the minimum APD main pressure that could occur.

Table 1 EFV Requirements — System MAOP Rating and APD Performance

System MAOP	APD Main Pressure	EFV Required
< 15 psig	NA	No
≥ 15 psig	< 10 psig	No
≥ 15 psig	≥ 10 psig	Yes

Customer loads are total connected loads that are determined at the time of the service request or during service design for reconstruction. EFVs should be designed for proposed/existing total connected loads and not based upon anticipated future loads.

Case 1 For all 1/2” CTS plastic gas services with service line lengths up to 122 feet and customer loads less than 320 scfh, install a Perfection 400 Series EFV. This represents most single family residential installations. Go to Case 3 if the line length is longer, or Case 2 or Case 4 if the load is greater.

Case 2 For all 1/2” CTS plastic gas services with service line lengths up to 28 feet and customer loads more than 320 scfh, but less than 640 scfh, install a Perfection 800 Series EFV. If the service length goes beyond 28 feet, install a 1” CTS service with a 1” EFV as required in Case 4.

Case 3 If the 1/2” CTS service line is in excess of 122 feet and customer loads less than 320 scfh, install a 1” CTS service with a 1” Perfection 800 EFV. The maximum service length is 1,000 feet. If the service length goes beyond 1,000 feet, go to Case 8.

Case 4 For all 1” CTS plastic gas services with service line lengths up to 1,000 feet and customer loads less than 640 scfh, install a 1” CTS service with a 1” Perfection 800 EFV. If the load is greater than 640 scfh, go to Case 5.

Case 5 For all 1” CTS plastic gas services with service line lengths up to 261 feet and customer loads greater than 640 scfh, but less than 880 scfh, install a 1” CTS service with a 1” Perfection 1100 EFV. If the customer load is greater than 880 scfh, go to Case 6. If the line length is in excess of 261 feet, go to Case 7.

Case 6 For all 1” CTS plastic gas services with service line lengths up to 122 feet (note that 122 feet is limiting) and customer loads greater than 880 scfh and less than 1,440 scfh, install a 1” CTS service with a 1” Perfection 1800 EFV. If the customer loads are between 880 and 1,440 scfh and the line length is in excess of 122 feet, go to Case 7.

Case 7 For 1-1/4” IPS service lines, 1” CTS service lengths in excess of the maximum protected lengths as noted in Case 5 or Case 6, or customer loads between 1,440 scfh and 2,043 scfh and service line lengths less than 960 feet, install a 1-1/4” IPS service with a 1-1/4” Perfection 2600 EFV. If the customer load is in excess of 2,043 scfh or service line length is in excess of 960 feet, go to Case 8.

Case 8 For all 2” IPS plastic gas services, services that do not meet the criteria of Case 3 or Case 7, customer loads between 2,043 scfh and 4,400 scfh with service line lengths less than 2,560 feet, install a 2” IPS plastic gas service with a 2” Perfection EFV. If the line length is in excess of 2,560 feet or customer load is in excess of 4,400 scfh, do not install an EFV.

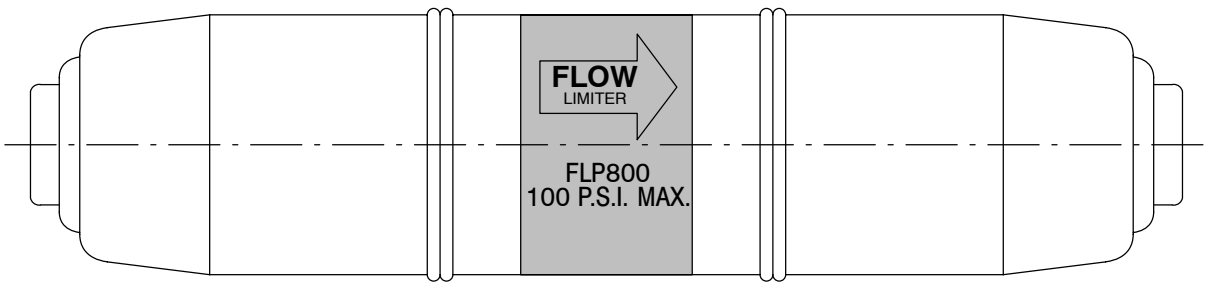

Figure 1
1” CTS Excess Flow Valve With Permasert Ends

Excess Flow Valves

Table 2 Service Size and EFV Series as a Function of Load and Line Length [1, 2]

Length (Feet)	Total Connected Load [3] (scfh)					
	0 – 320	321 – 640	641 – 880	881 – 1,440	1,441 – 2,043	2,044 – 4,400 [4]
0 – 28	1/2" - 400	1/2" - 800	1" - 1100	1" - 1800	1-1/4" - 2600	2" - 5500
29 – 122	1/2" - 400	1" - 800	1" - 1100	1" - 1800	1-1/4" - 2600	2" - 5500
123 – 261	1" - 800	1" - 800	1" - 1100	1-1/4" - 2600	1-1/4" - 2600	2" - 5500
262 – 960	1" - 800	1" - 800	1-1/4" - 2600	1-1/4" - 2600	1-1/4" - 2600	2" - 5500
961 – 1,000	1" - 800	1" - 800	2" - 5500	2" - 5500	2" - 5500	2" - 5500
1,001 – 2,560 [5]	2" - 5500	2" - 5500	2" - 5500	2" - 5500	2" - 5500	2" - 5500

[1] Length of service is determined from the EFV location to meter.
[2] Sizing criterion: 10 psig main pressure, maximum pressure drop across device, average ID of service pipe or tubing, and trip at 50% above minimum trip flow at 10 psig.
[3] Total connected load not to exceed 80% of minimum trip flow at 10 psig.
[4] No EFV required on loads greater than 4,400 scfh.
[5] No EFV required on services longer than 2,560 feet.

Table 3 Model Descriptions and Code Numbers

Flow Series	Size (Inches)	Type of Valve Ends	Approximate Pressure Drop (psig)	Code
Perfection Low Flow Series 400	1/2 CTS	Permasert Ends	0.75	020948
Perfection Medium Flow Series 800	1/2 CTS	Permasert Ends	1.40	020950
Perfection Medium Flow Series 800	1 CTS	Permasert Ends	1.40	020953
Perfection Medium Flow Series 1100	1 CTS	Permasert Ends	3.00	021706
Perfection High Flow Series 1800	1 CTS	Permasert Ends	3.20	020956
Perfection Ultra High Flow Series 2600	1-1/4 IPS	Permasert Ends	4.90	021709
Perfection Ultra High Flow Series 5500	2 IPS	Permasert Ends	0.50	021710
Extra Metal Tags for EFVs				020957

Estimating Instructions

1. Determine, using the criteria in Table 1 on Page 3, Table 2 above, Table 4 on Page 6, and the Cases on Page 3 and above, if the proposed new service or replacement service requires the installation of an EFV.
2. Select the proper size and flow model EFV from the cases and Table 3. Series 400 models are designed for most single-family residential loads. Install a larger service if the proposed service length exceeds the maximum protected service length for a specified EFV. Do not install an EFV if loads exceed the EFV's capacities.
3. Use the EFV stamp shown in Figure 2 on Page 5 for all service orders with EFVs. Indicate the EFV brand, type, size, and flow model on the gas service order stamp.

Field Installation Instructions

1. Install the EFV as close to the gas main and tee as possible. Refer to Numbered Document A-90 for an illustration of a typical installation. On 1/2" and 1" CTS services install a short section of service tubing (approximately 8" – 12" long) between the service tee and the EFV. If the installation of substructures requires that the EFV be installed farther than 12" from the service tee, install the EFV as close to the tee as practical. For 1-1/4" and 2" IPS services, install a short section of pipe (approximately 15" – 18" long) between the service tee and EFV. The short section of service tubing and piping located between the service tee and the EFV is required for future squeezing needs. This additional length allows the EFV to be removed in the future, if necessary, without removing the service tee. Note that, if the EFV will be directly connected to a steel-to-PE transition fitting (HVTT or

an electrofusion tee), no additional piping is required. If the EFV malfunctions or requires replacement, the service tee will have to be stopped off. Do not squeeze the PE upstream of the EFV.

2. Do not install an EFV on 1/4" CTS plastic service.
3. Use only Perfection chamfering tools to install Perfection EFVs. Approved chamfering tools are listed in Numbered Document B-91.1. Refer to Utility Work Procedure WP4170-08 for installation instructions.
4. Install the EFV with the directional arrow in line with the flow of the gas and pointing toward the gas meter. The adhesive stickers on EFVs are color-coded, indicating the flow model and flow direction of the EFV. Perfection has enhanced the design by molding the arrow into the body of all EFVs. This will allow the installer to identify the proper flow direction if the label is damaged or missing. All new EFVs with 1" CTS Permasert ends are tapered in the center. All EFVs perform similarly. The most commonly used medium-flow Series 800 EFV is color-coded orange. The low-flow Series 400 is blue. The medium-flow 1100 Series is grey. The high-flow Series 1800 is green. The ultra-high-flow Series 2600 is pink and the 5500 Series is white. If an EFV is inadvertently installed with the flow direction going the wrong way, the EFV will flow normally, but will not activate. It must be removed and installed properly.
5. Direct bury the EFV. No valve frame or cover is required.
6. All EFVs are composed of either PE 2406/2708 or PE 3408/4710 on the outside and do not need to be cathodically protected.
7. The EFV is supplied with a small metal identification tag and an adhesive tag. Install the metal tag on the gas service riser at the gas service valve location. Use the nylon tie supplied to install the metal tag. Install the adhesive sticker on the gas riser sun shield.
8. On stub services, leave the metal tag and adhesive sticker in the EFV plastic bag and wrap the bag around the buried stub. When the service is completed, attach the tag and sticker at the riser.
9. If necessary, remove large amounts of debris from the service line before installing an EFV.
10. EFVs are similar to other mechanical and fusion fittings and shall be air tested per Numbered Document A-34. EFVs have the same pressure rating as other plastic gas distribution pipes and fittings. The manufacturer's installation instruction recommends pressurizing a service slowly during the air test. For a typical 50'–100', 1/2" or 1" service, the manufacturer recommends a time of at least 15 seconds to fully pressurize the service. High flow, above 1,800 scfh, may cause the EFV to trip. When testing from the riser, a high flow rate can cause the spring and ball of the EFV to lock together, causing the EFV to malfunction and require replacement. Depressurize the service at a slow flow rate because of possible activation.
11. Do not squeeze an EFV.
12. Purge the service in accordance with this document.
13. Indicate the location of the EFV on the "as-built" gas service order. Include the distance from the property line. Verify the flow series used and indicate the mechanical type of the installed EFV on the gas service order.
14. EFVs may be reused if they are in good working order, have not been subjected to damage, and are sized in accordance with this document. Evaluate the cost savings of this option on a case-by-case basis. (For example, the cost of two new Permasert couplings, required when re-using an old EFV, exceeds the cost of a new EFV; therefore, install a new EFV.)

EFV Brand	
Type	
Flow Series	
Size	
☐ – 1/2" ☐ – 1" ☐ – 1-1/4" ☐ – 2"	

Figure 2
Template to Stamp Gas Service Records

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Mapping Instructions

1. Map EFVs on the plat sheets.
2. Use the established symbol for “Gas Service with EFV.”
3. Indicate whether or not an EFV is installed in the Customer Care and Billing system.
4. Verify that the stamp is properly completed. Contact the appropriate construction group to obtain missing information.

Purging Gas Services

1. Look for the EFV identification tag on the gas service valve, riser, or the riser sun shield. If the tag is present, an EFV is installed on the service.
2. When purging a gas service, open the gas service valve very slowly. If the valve is opened too quickly, the resulting rapid flow of gas may cause a pressure spike that can activate the EFV. Depending on the main pressure, size, and length of tubing, the EFV may activate when purging to atmosphere even if the gas valve is opened slowly. Purge the service line with compressor air, install the EFV, and then slowly purge the entire service. If the EFV activates during purging, close the gas service valve and wait until the pressure equalizes. Attempt to re-purge. The preferred method of purging is to gradually open the service valve to prevent tripping the EFV.
3. When performing service work after the regulator at the meter set, removing a plug or associated piping too quickly can create a pressure spike and activate the EFV.
4. If the EFV activates, shut off the service valve and wait a few minutes for the line to repressurize via the bleed-by mechanism. If an EFV activates, the time that it takes for the pressure to equalize varies depending on the main pressure, the service size, and the length of service. For example, if the main pressure is 60 psig, a 6’ long, 1/2” CTS service equalizes in approximately 10 seconds, and a 100’ long, 1” CTS service equalizes in about 5 minutes.
5. Do not intentionally activate the EFV during installation or purging to test the device.
6. Do not use the EFV as a means of pressure control on the service in lieu of stopcock changer equipment, squeezers, or pinning off the service tee.

Accounting Instructions

1. Charge the installation of the EFV to the same accounting number as the service it is being installed on.
2. Charge any repairs or replacements of EFVs due to failure or leakage to orders established under Major Work Category FH – Maintenance of Services (excluding leak repairs). Save all failed EFVs and submit a “Material Problem Report” as required by Utility Standard S2333.

Replacement/Removal Instructions

Follow the instructions in Table 4 for load additions or changes to the service line.

Table 4 EFV Installation and Replacement Matrix

Situation	EFV Presently Installed	EFV Not Presently Installed	Action	Charge To
Customer requests new gas service, and a new single service is installed.		X	Engineered job. Install a new EFV with the appropriate capacity.	New Business
Customer adds load to a single service, and the service is completely replaced.	X			
		X		
Customer adds load to a single service, and the service is altered to accommodate load.	X		Check the EFV’s capacity and replace it if the capacity is inadequate.	New Business

[1] If the service size is increased to meet the EFV maximum protected service line limitation, bill the applicant under New Business or WRO, as appropriate.
[2] Reimbursable WRO.

Table 4 EFV Installation and Replacement Matrix, continued

Situation	EFV Presently Installed	EFV Not Presently Installed	Action	Charge To
Customer adds load to a single service, and the service is altered to accommodate load.		X	No EFV installation is required.	NA
Customer adds load, and no service reinforcement work is performed.	X		Check the EFV's capacity and replace it if the capacity is inadequate. [1]	New Business
		X	No EFV installation is required.	NA
Existing branch service where PG&E deactivates the branch, and a single service remains from the old service and branch.		X		
Customer requests service to serve new or existing load and PG&E branches off an existing service.	X		Remove the EFV.	New Business
		X	No EFV installation is required.	NA
Customer requests service to serve the new or existing load, and PG&E installs a multimeter manifold with one or more additional meters.	X		Remove the EFV.	New Business
		X	No EFV installation is required.	NA
Developer does a lot flop, and PG&E deactivates the old stub and installs new service at the new service point.	X		Engineered job. Install a new EFV.	WRO [2]
		X	Engineered job. Install a new EFV if it is not a branch service.	WRO [2]
Customer requests an EFV on an existing plastic service.		X	Engineered job (service alteration). Install a new EFV. [1]	WRO [2]
Customer requests an EFV on an existing steel service.		X		WRO [2]
The EFV is leaking or has failed.	X		Replace the EFV.	Maintenance
GPRP, reliability, or capacity job where service is replaced as part of the job.	X		Engineered job. Install a new EFV if it is not a branch service.	Capital Job
		X		Capital Job
GPRP, reliability, or capacity job where service is transferred as part of the job.	X		Install a new EFV if the EFV is within the bell hole.	Capital Job
		X	No EFV installation is required.	NA
Existing service cut off at property line by PG&E to facilitate work by customer, and reconnected later.	X		Same load: leave current EFV.	NA
			Added load: check the EFV's capacity and replace it if the capacity is inadequate.	WRO [2]
		X	No EFV installation is required.	NA

[1] If the service size is increased to meet the EFV maximum protected service line limitation, bill the applicant under New Business or WRO, as appropriate.

[2] Reimbursable WRO.

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Revision Notes

Revision 06 has the following changes:

1. Updated the “Acronyms” and “References” section.
2. Specified in the “General Information” section that EFVs with mechanical ends must meet the requirements of EMS 4761.
3. Clarified that services greater than 2” IPS or loads greater than 4,400 scfh should be referred to the Plastic Hotline.
4. Clarified that EFVs are not required on branch services and should not be installed in those locations.
5. Clarified that EFVs are not installed on steel services.
6. Clarified that EFVs are not required on altered services or branches.
7. Clarified that EFVs are not required on services that have more than one meter each.
8. Clarified that EFVs are not required on services or branches where there is a reasonable expectation of adding an additional meter on either the service or branch at a later date.
9. Clarified that only the persons with a current D-34 mechanical qualification can install an EFV.
10. Clarified that EFVs shall not be installed on 1/4” CTS services or on any service where a portion of the service has 1/4” CTS tubing.
11. Added a new Case 5 for the Series 1100 EFV.
12. Renumbered remaining existing cases.
13. Added new Case 7 and Case 8 for the Series 2600 and 5500 EFVs, respectively.
14. Added Table 2 on Page 4.
15. Deleted all socket fusion end EFVs from Table 3 on Page 4.
16. Added the Series 1100, 2600, and 5500 EFVs to Table 3 on Page 4.
17. Added the “Approximate Pressure Drop” column to Table 3 on Page 4.
18. Specified in the “Estimating Instructions” section to use Table 1, Table 2, Table 4, and the cases to select a proper EFV.
19. Specified that only the Perfection chamfering tools may be used when making mechanical stub-type connections.
20. Specified that for 1-1/4” and 2” IPS services a short section (15” – 18” long) of PE piping be installed between the tee and the EFV, unless an electrofusion tee, HVTT, or a steel-to-PE transition fitting is used.
21. Added the Series 1100, 2600, and 5500 EFV color coding information to Item 4 in the “Field Installation Instructions” section on Page 5.
22. Clarified that supplied EFVs are composed of either PE 2406/2708 or PE 3408/4710.
23. Deleted the socket fusion EFV figure (former Figure 1).
24. Updated the stamp template in Figure 2 on Page 5 to reflect the revisions to this document.
25. Added Item 5 and Item 6 to the “Purging Gas Services” section to prevent field testing of EFVs and using EFVs in lieu of the pressure control equipment.
26. Added new situations to the matrix in Table 4 on Page 6.

EXCESS FLOW VALVE Q&A

1. Do I size the EFV then the service or size the service first?

Always size the service first according to the requirements found in the Estimator's Manual. Take into account customer load, diversity factors, Abnormal Peak Day (APD) main pressures, line length and permissible pressure drop to size the service. Then determine if an EFV is required and size it per the cases listed in Gas Standard A-93.3. If a larger service is required, install the larger service. In many instances, the pressure drop across the EFV will be less than 1 psig. This should be taken into account in sizing the service, noting that larger services have lower pressure drops for a given line length and load. Note that the service and EFV sizes in the cases represent specific equipment limitations.

2. If a customer adds load with an EFV installed, is it OK to just dig up the EFV, cut it out and install a larger EFV and not replace the service?

It depends. For example if a customer adds load and a ½" CTS 400 series EFV is installed, a ½" CTS 800 Series EFV can be installed if the line length is less than 28 feet. The existing ½" CTS service line would be adequate. However for the given service line size, if the criteria in the cases cannot be met a larger service is required. For example, customer adds load and a ½" CTS 400 series EFV is installed, the total connected load increases to 400 SCFH thus requiring an AL425 meter. The next available size EFV would be the 800 series. If the service line length is greater than 28 feet, a 1" CTS service and 1" CTS EFV is required.

3. Can I install a 1" EFV on a ½" CTS service line?

The short answer is "No". The performance of the EFV is predicated on downstream service line diameter and length. Likewise as a matter of practice, we don't want folks installing a ½" EFV on a 1" CTS service line.

4. If I want to branch off an existing service to serve a new customer and the service line has an EFV, do I bill the applicant for the removal?

Yes. Refer to Table 3 in Gas Standard A-93.3. Note that is the DOT requires us to install EFV's on branch services, this guidance will change.

5. Do I have to install EFV's on commercial services?

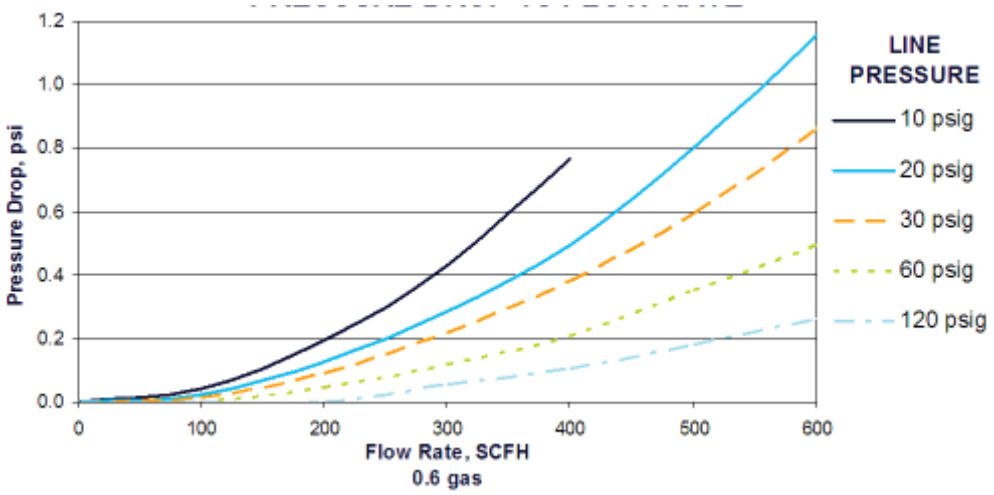
No. EFV's are only required on single-family residential services.

6. I noticed in Bulletin 261 that the pressure drops are large when the main pressure is 10 psig. Should I use these ΔP's when sizing the service?

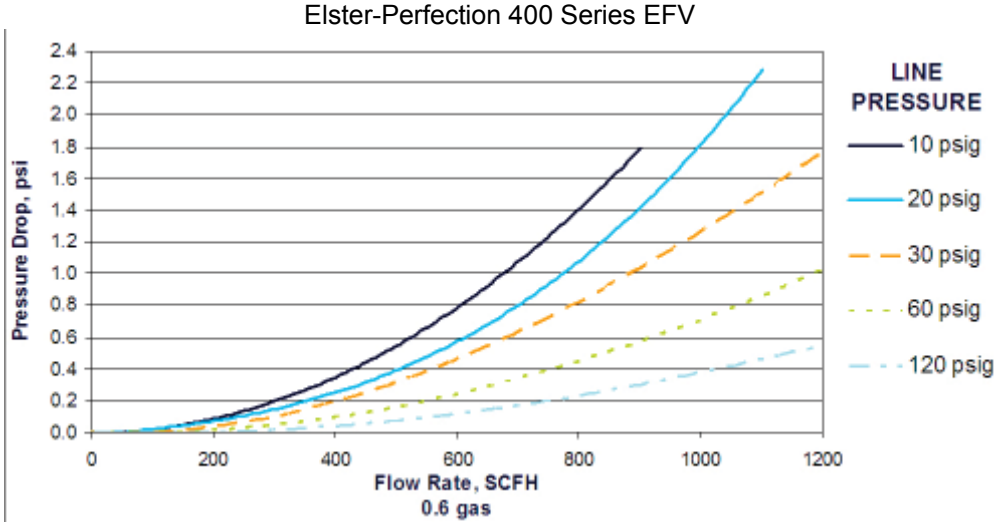
Not necessarily. They are presented for reference only and represent the estimated maximum pressure drop across the device at the onset of actuation. **Please use the manufacturer's pressure drop charts for a given APD main pressure and Series EFV to size the service**. If the APD main pressure is 10 psig, then you may use the published values for the large diameter EFV's in Bulletin 261. Note that Gas Standard A-93.3 will be revised to show these maximum pressure drops in Table 2 (Change 61).

7. What is the manufacturer's published pressure drops for each EFV?

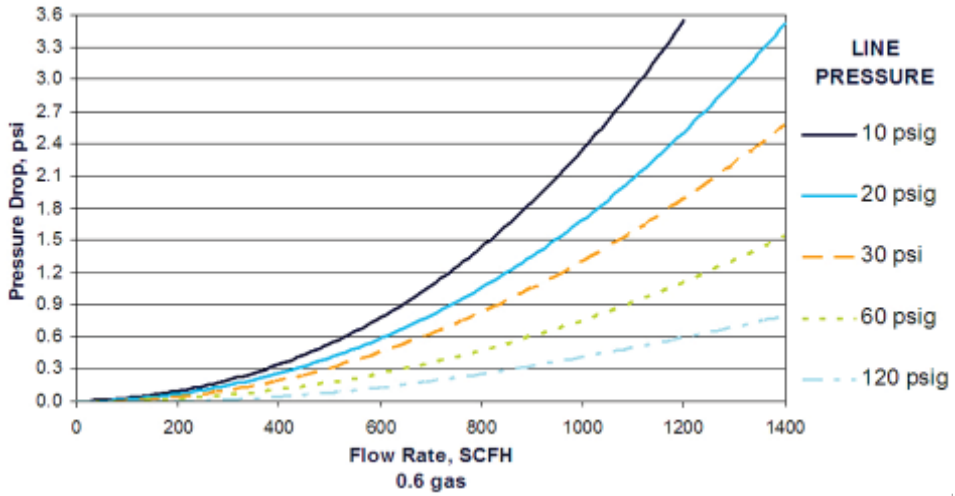
Attached are extracts from the manufacturer's EFV book for the 400, 800, 1000 and 1800 series EFV's. The flow rate should be the customer's total connected load, not the EFV trip rate. Note that most customer loads coming off of the 400-1800 series EFV's will result in pressure drops ranging from negligible to about 1.2 psig (max). The average pressure drop for the 2600 series EFV is 0.9 psig. For the 5500 series EFV, use 0.5psig (note that the manufacturer's literature has a higher, yet unsubstantiated value). Use these values for the large diameter EFV's.



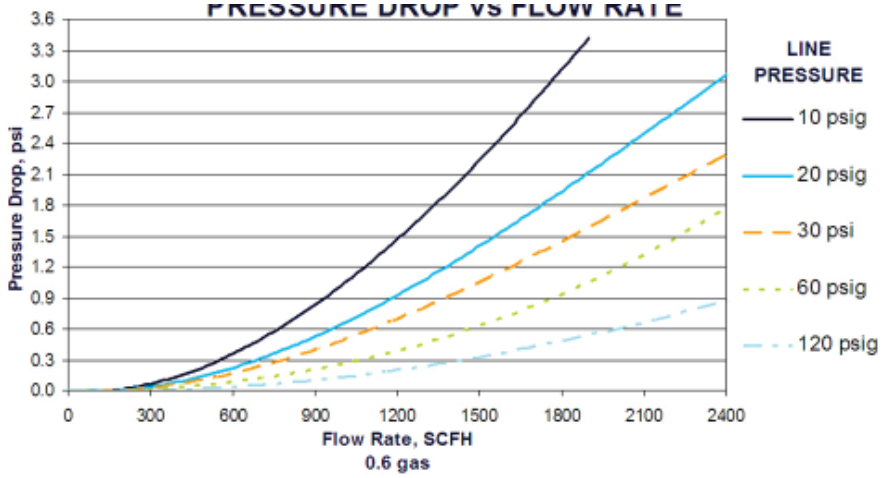
Elster-Perfection 400 Series EFV



Elster-Perfection 800 Series EFV



Elster-Perfection 1100 Series EFV



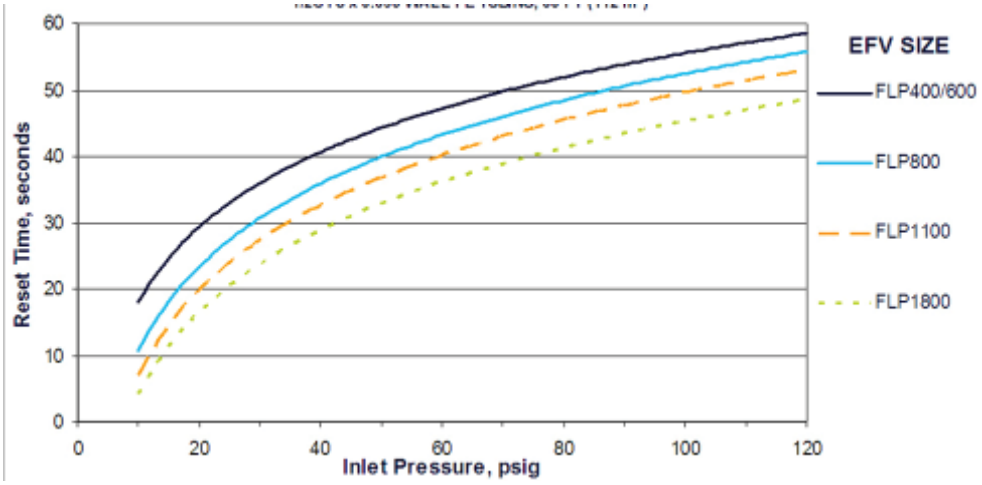
Elster-Perfection 1800 Series EFV

8. I don't know of anyone using socket fusion end EFV's. Why are we keeping them?

Good question. From July 2007 to July 2008, PG&E crews requisitioned 13,068 Permasert end EFV's. During the same period, only 58 socket fusion end EFV's were ordered. The UO Plastic Committee is looking into whether or not it makes sense to continue with socket fusion end EFV's.

9. How long do I have to wait if an EFV trips before it resets after repair?

Attached is an extract from the manufacturer's EFV book for the 400-1800 series EFV's. This chart is for a ½" CTS EFV with a 60' service length.



Line Pressure versus Reset Time (seconds)

For a 1" CTS service, multiply the above times by 3.9. The published values in GIB 261 are used as current guidance for the 2600 and 5500 series EFV's. We've asked the manufacturer to publish trip reset times similar to the graph shown here.