Excess Flow Valves

The GE Style 480 EFV is the safe, economical choice for safety in the event of a catastrophic gas service line rupture

Time-proven design with over one million units in service worldwide!

Excess Flow Valves for Gas Service Connections

Recognizing the need for an automatic flow restricting device, GE developed the Excess Flow Valve over 30 years ago.

The demand for EFV's began to increase throughout the 1980's and 1990's in response to several high profile natural gas incidents. As of February 1999, Title 49 of the Code of Federal Regulations requires gas distribution operators to offer certain residential customers access to EFV's. The customer can elect to have an EFV installed at their expense, or the operator may voluntary install them at their own expense (Reference 49 CFR 192.383).

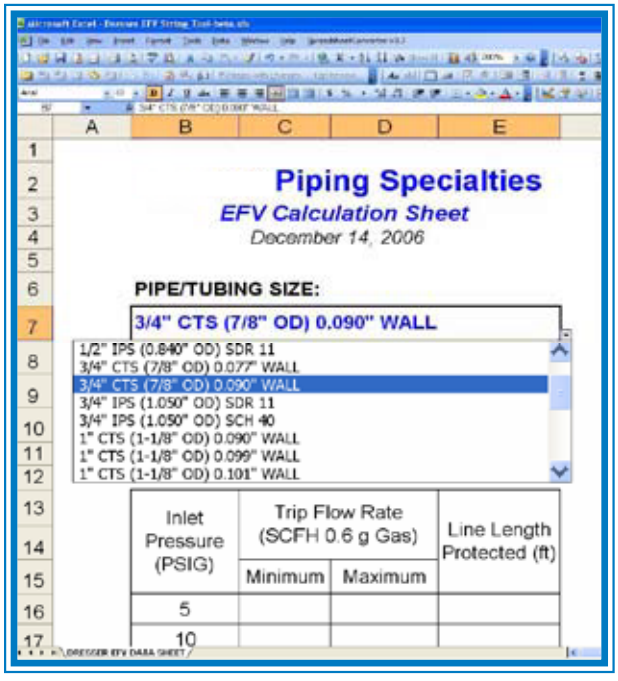
- **EFV's** reduce risks by restricting service line gas flow automatically when conditions exceed the normal operating flow.
- **EFV's** reduce the potential for additional risk to residents, field crews and emergency personnel in case of damaged gas service lines.
- **Each GE EFV** is factory-tested per ASTM F1802 to assure it performs within the designated trip flow and bypass flow ranges per CFR Title 49 D.O.T. 192.381, MSS-SP-115 and ASTM F2138 governing standards.

GE recognizes gas distribution system operators' commitment to safety. Operators know how to best address infrastructure risks, ensuring safety to both life and property. GE continues to offer a comprehensive, high quality line of EFV's for today's operators who believe the EFV is an integral part of their pipeline safety programs.

EFV Electronic Sizing Guide

A Step-by-Step application process to help you determine the appropriate EFV configuration.

Shown below is a desktop screen shot of the GE EFV sizing and calculation program. After selecting service line size and corresponding capacity required, program automatically provides protected line lengths, pressure drop and trip rate performance data.
(See page 5 for complete details).



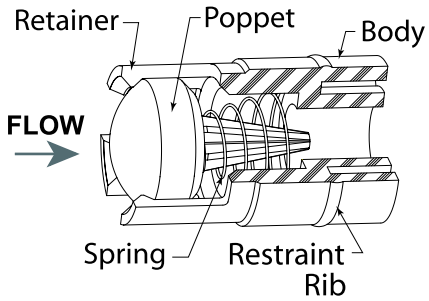
Product Overview

GE EFV's can be supplied in a variety of fusion, weld, and mechanical configurations

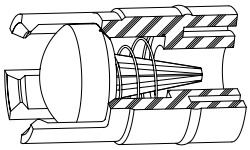
GE® Excess Flow Valve Features:

- **Simplicity of Design…**Only two moving parts - the poppet and spring
- **Maintenance-free…**No lubrication or monitoring required
- **100% Production-tested…**per ASTM F1802 test method assuring trip and bypass flow rates per CFR Title 49 D.O.T. 192.381, MSS-SP-115 and ASTM F2138 governing standards
- **Valve Resets Automatically…**no need to excavate or manually repressurize line
- **Low Pressure Loss…**maximizes gas flow
- **Self-cleaning Design…**resists particulate build-up
- **Integrated Seal & Restraint Rib…**provides gas-tight seal and positive restraint

3/4" CTS Excess Flow Valve Cut-away



EFV poppet and spring components shown in tripped position



EFV Materials of Construction:
Body, Retainer & Poppet:
Molded Chemical-Resistant Thermoplastic
Spring: 18-8 Stainless Steel; Spring Temper

What is an Excess Flow Valve?

An **Excess Flow Valve (EFV)** is a device *that automatically limits the flow of gas when a condition of excess flow occurs.* It is generally used for residential natural gas service lines to minimize escaping gas in the event of third party damage and other types of line ruptures.

What is an Excess Flow condition?

An Excess Flow condition exists when the flow rate in standard cubic feet per hour (SCFH) through the EFV exceeds the trip flow rate of the installed EFV. The EFV is designed to activate or "trip" when this condition occurs. This can be a result of a service line break or due to a flow rate above the design capacity of the EFV.

How do I reset the EFV after it trips?

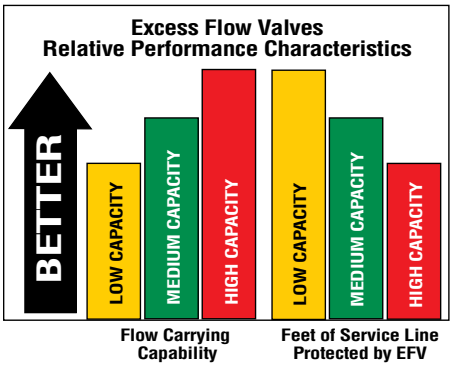
The GE EFV is a bypass type EFV (or EFVB).
At closure, the EFV allows slight bypass flow to move downstream. Once the cause of the Excess Flow condition is corrected, the bypass flow automatically repressurizes the service line. When the pressure on the upstream side and downstream side of the EFV are roughly equal, the EFV automatically resets.

How do I ensure that the EFV does not activate under normal service conditions?

False trips are avoided by selecting an EFV suited to all anticipated service conditions. Initial loads as well as future upgrades to the service should be considered. GE EFV's are available in Low, Medium and High Capacity to meet a variety of service conditions.

How do I know which capacity to use?

The selection of EFV capacity must take into account *the trade off of flow carrying capability* under normal service conditions *and protected line length.* This is illustrated in the chart above. On small diameter services at relatively low inlet pressure, conditions may exist that prevent the EFV from activating in the event of a line rupture. GE has developed an electronic EFV sizing guide to help the customer select the best EFV for the conditions present in the system.



What are the limitations of EFV's?

EFV's view all excess flow conditions in the same way. They are unable to make a distinction between a condition of excess flow caused by a line break and one caused by a peak in demand that has exceeded the design capacity of the EFV. EFV's are designed to trip due to a full line break and can not be expected to activate as the result of a leak that is not large enough to cause an excess flow condition.

How can I incorporate EFV's in my gas distribution system?

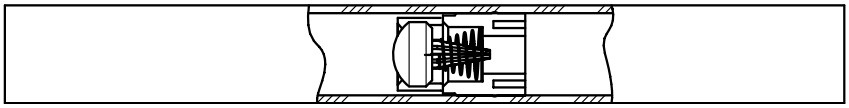
When possible, GE recommends incorporation of the EFV into a fitting that is customarily used in the absence of an EFV. This minimizes the requirements for special installation procedures and training. **GE EFV's are available in a variety of fusion, weld, and mechanical configurations.**

EFV Product Configuration Availability

Polyethylene Sticks (Style 480)

For use with…

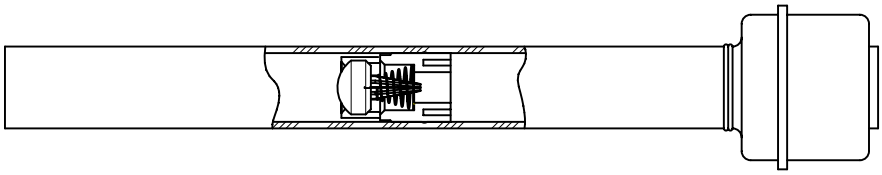
- Mechanical Fittings
- Butt Fusion
- Socket Fusion
- Electrofusion



Factory-fused Assemblies (Style 480)

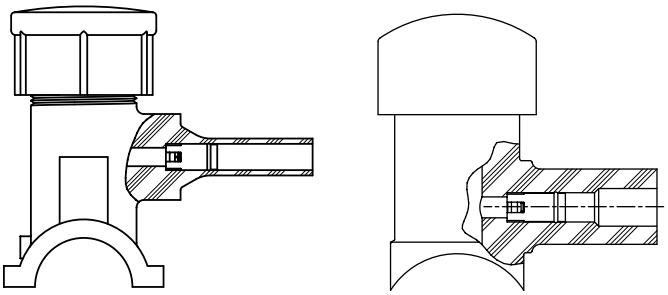
Also available with…

- Straight Couplings
- Reducers
- Mechanical Fittings



Tapping Tees (Style 480)

- Saddle Fusion
- Electrofusion
- Plain Outlet
- Socket Fusion Outlet

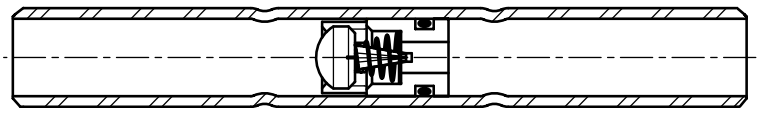


GE EFV's are easily integrated with other supplier's fittings

EFV Product Configurations (cont'd)

Steel Sticks (Style 481)

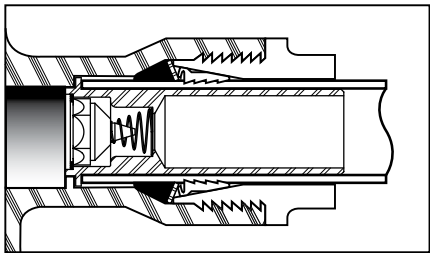
- Ends beveled for field welding
- NPT threads optional



Style 488 Inserts

For use with:

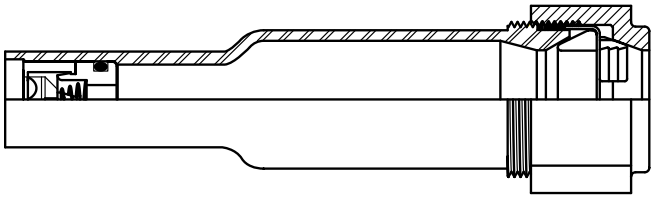
- GE® Seal-Plus Fittings
- Style 401 Plastic Couplings
- Style 408 Service Connector
- Style 475 Plastic Curb Valve
- Style 501 Steel Fittings



Style 408
Service Connector

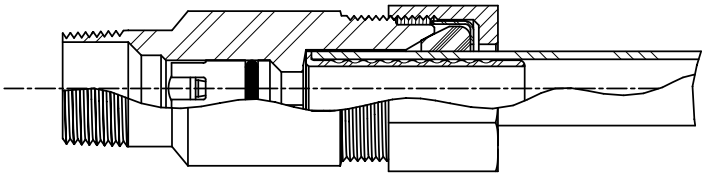
Style 90 Universal Cut-in Adapter

- For installing EFV's in existing steel service lines



Special Applications

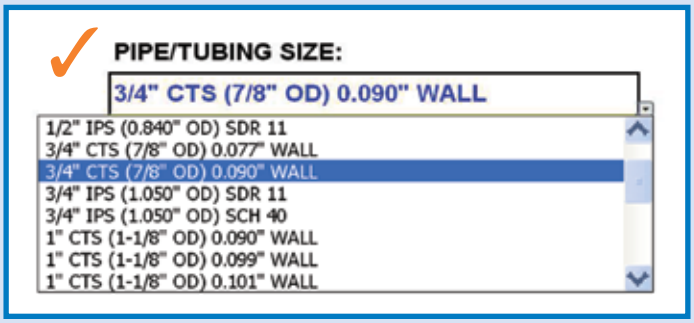
- Shown at right is a GE® 1" MIPS x 3/4" IPS steel transition fitting designed to add an EFV for polyethylene service renewal



Selection Process Using the GE EFV Sizing Tool

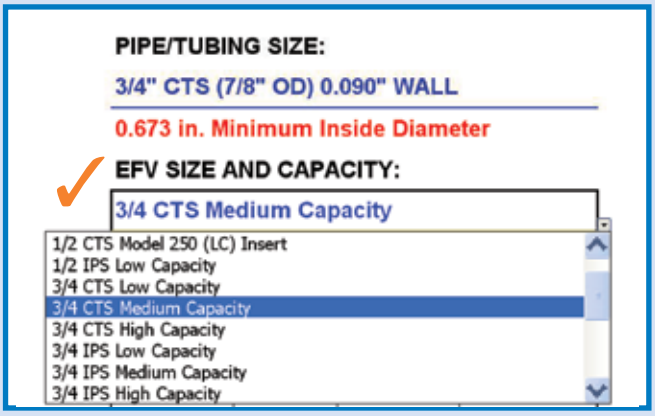
STEP 1:

Select the service line size:



STEP 2:

Select EFV size and capacity:



STEP 3:

Compare Trip Flow Rate and Protected Line Length to your system requirements.

SAMPLE:

- **Service Line Size**
- **EFV Size & Capacity Required**
- **Inlet Pressure, Trip Flow Rate and Protected Line Length are Pre-calculated**
- **In a system with 10 PSI minimum inlet pressure, the GE EFV will be capable of carrying at least 794 SCFH of 0.6 SG natural gas, with a protected line length of 234 feet. Trip rate and protected line length increase with higher system pressure**

Performance Data for 3/4"service line with 3/4" CTS Medium Capacity EFV

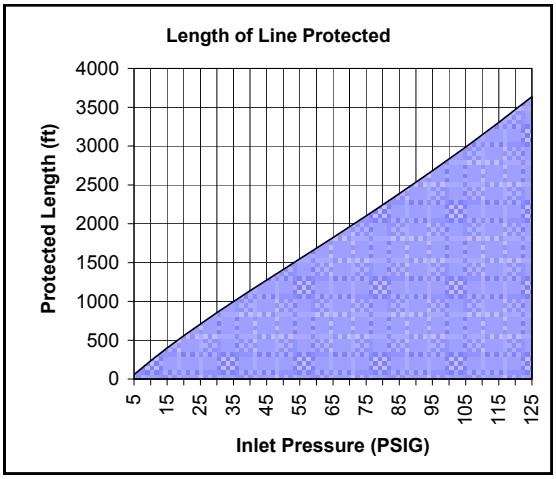
GE Piping Specialties

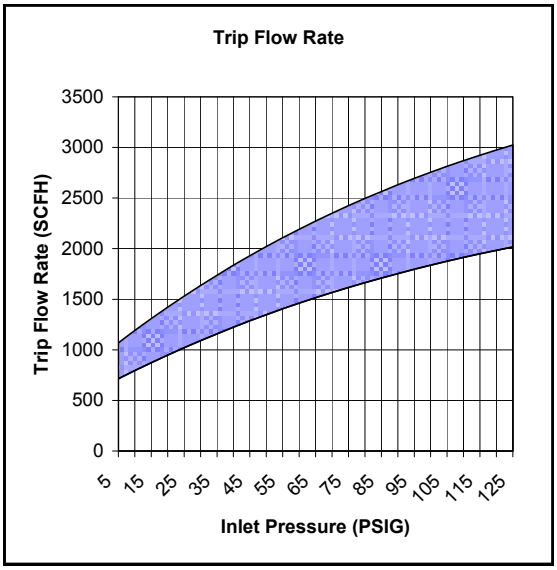
EFV Calculation Sheet

PIPE/TUBING SIZE:
3/4" CTS (7/8" OD) 0.090" WALL
0.673 in. Minimum Inside Diameter

EFV SIZE AND CAPACITY:
3/4 CTS Medium Capacity
97 in. w.c. pressure drop at max. trip rate

Inlet Pressure (PSIG)	Trip Flow Rate (SCFH 0.6 g Gas)		Line Length Protected (ft)
	Minimum	Maximum	
5	713	1070	56
10	794	1191	234
15	872	1309	400
20	948	1422	558
25	1021	1531	709
30	1091	1637	855
35	1159	1738	997
40	1224	1836	1137
45	1287	1930	1275
50	1347	2021	1412
55	1405	2108	1548
60	1461	2192	1685
65	1515	2272	1823
70	1567	2350	1961
75	1616	2425	2102
80	1664	2496	2243
85	1710	2565	2387
90	1754	2631	2534
95	1796	2694	2682
100	1837	2755	2834
105	1876	2813	2988
110	1913	2869	3145
115	1949	2923	3306
120	1983	2975	3469
125	2016	3024	3636





EFV Sizing and Selection Specification Guidelines

Application Considerations for Excess Flow Valve Selection:

- Minimum pressure of the distribution main (PSIG)
- Service line length (Feet)
- Service line flow capacity - Maximum gas consumption rate (SCFH)
- Service line material and diameter
- Type required - Threaded, Weld, Mechancial Fitting, Butt Fusion, Socket Fusion, Electrofusion

NOTE: EFV's use the kinetic energy of flowing gas to operate. On small diameter service lines at relatively low inlet pressures, conditions may exist that prevent the EFV from activating in the event of a line rupture.

Minimum Trip Flow Rate

At the minimum system pressure expected, the **Minimum Trip Flow Rate** of the EFV must be greater than the system demand. NOTE: If the actual flow rate in the line exceeds the Trip Flow Rate of the EFV, a false trip will occur.

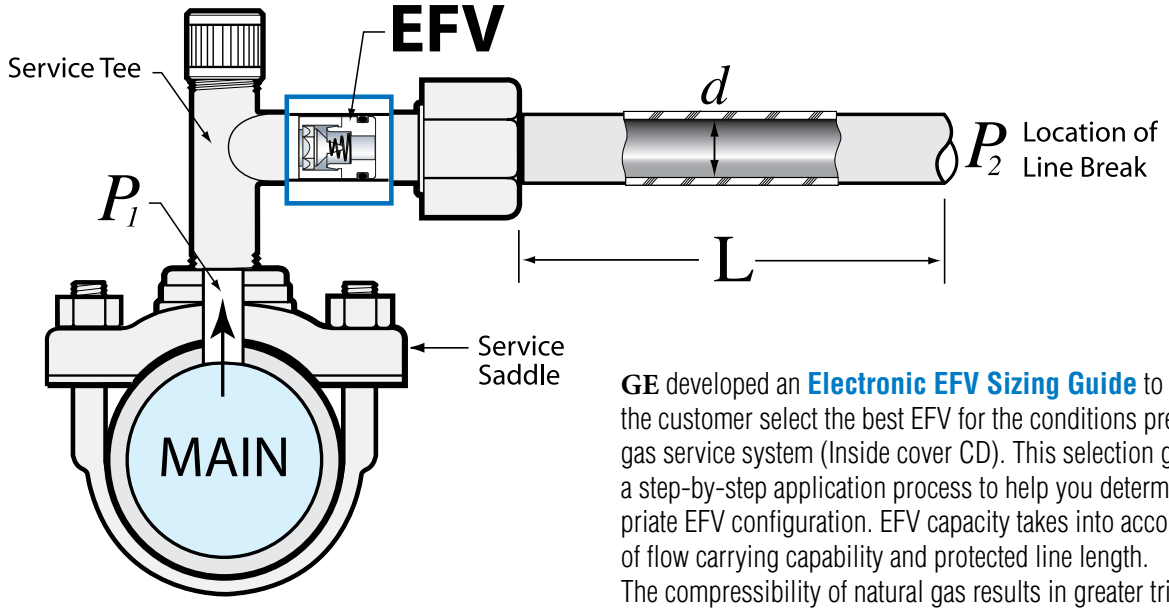
Minimum Protected Line Length

The minimum length of line protected is the distance as measured along the pipeline at which a line break will result in an excess flow condition. This calculation takes into account all variables in the system components and flow conditions. The protected line length formula was adapted from the Mueller formula for high pressure installations of smooth pipe carrying gas at pressures greater than 1 psig.

Definitions of Variables and Constants:

- G - Specific gravity of gas (0.6 for natural gas)
- d - **Minimum** inside diameter of pipe in inches
- Q - **Maximum** EFV trip flow rate at minimum system pressure, SCFH
- P_1 - **Minimum** inlet pressure, PSIA
- P_2 - Outlet pressure, PSIA (Atmospheric pressure assumed 14.7 PSIA)
- L - Protected length of pipe, feet
- ΔP - Pressure loss across EFV corresponding to **maximum** EFV trip flow rate (PSI)

$$L = \left[\frac{2826 \bullet d^{2.725}}{G^{0.425} \bullet Q}\right]^{1.74} \bullet \left((P_1 - \Delta P)^2 - P_2^2 \right)$$



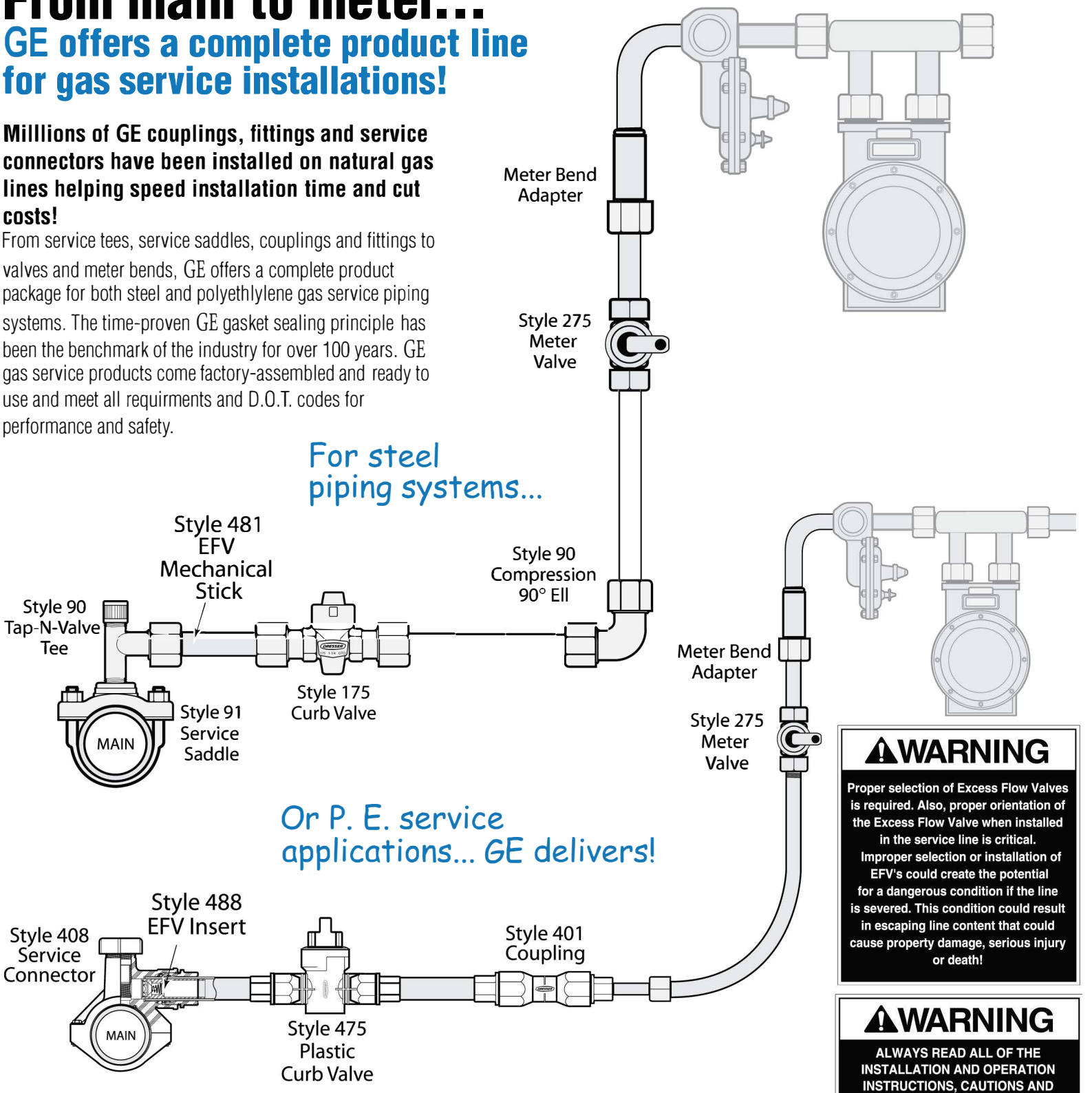
GE developed an **Electronic EFV Sizing Guide** to help the customer select the best EFV for the conditions present in their gas service system (Inside cover CD). This selection guide offers a step-by-step application process to help you determine the appropriate EFV configuration. EFV capacity takes into account the trade off of flow carrying capability and protected line length.
The compressibility of natural gas results in greater trip flow rates for the same EFV at higher system pressures. The lowest system pressure has the greatest risk of "false trip". See Pressure Drop and Trip Flow charts for each size EFV.

From main to meter...

GE offers a complete product line for gas service installations!

Milllions of GE couplings, fittings and service connectors have been installed on natural gas lines helping speed installation time and cut costs!

From service tees, service saddles, couplings and fittings to valves and meter bends, GE offers a complete product package for both steel and polyethlylene gas service piping systems. The time-proven GE gasket sealing principle has been the benchmark of the industry for over 100 years. GE gas service products come factory-assembled and ready to use and meet all requirments and D.O.T. codes for performance and safety.



⚠WARNING

Proper selection of Excess Flow Valves is required. Also, proper orientation of the Excess Flow Valve when installed in the service line is critical. Improper selection or installation of EFV's could create the potential for a dangerous condition if the line is severed. This condition could result in escaping line content that could cause property damage, serious injury or death!

⚠WARNING

ALWAYS READ ALL OF THE INSTALLATION AND OPERATION INSTRUCTIONS, CAUTIONS AND WARNINGS WHEN INSTALLING EXCESS FLOW VALVES! FAILURE TO FOLLOW THE INSTRUCTIONS & WARNINGS COULD RESULT IN IMPROPER OPERATION AND ESCAPING LINE CONTENT THAT COULD CAUSE PROPERTY DAMAGE, SERIOUS INJURY OR DEATH!