

## Gas Meter Hazard - Jeweler Torches

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**Issue:**

The natural gas industry has experienced incidents in prior years where flashback from a jeweler's torch assembly reached the gas meter, causing an ignition and rapid expansion.

Jeweler torches, normally used to perform simple welding, brazing or soldering, are set up to operate with gas/oxygen mixtures where oxygen pressure is set much higher than natural gas pressure (NG - ¼ psig; O<sub>2</sub> - up to 70 psig). Torch flashbacks can occur when the tip of a jeweler's torch is blocked or when oxygen is turned on prior to turning on the gas supply. As a result, oxygen will flow back through gas piping toward the meter. When the torch is ignited under this condition, a flashback can reach the gas meter and ignite an explosive gas-oxygen mixture.

Current installation guidelines (PSE&G Gray Book) and industry codes require jeweler torches to have a "Check Valve" installed on the gas line to ensure that oxygen used in the welding operation does not reach the gas meter. The absence of a check valve in the gas line may have contributed to past meter explosion incidents.

**Figure 1.1:** Check valve



**Note:**

Check valves prevent oxygen from flowing into the natural gas pipeline

These installation guidelines apply to any hot work operation where natural gas is combined with oxygen, such as welding torches used by jewelry stores, muffler shops and auto body repair shops.

**Description:**

In recent years, a technological advancement was created to address flashback conditions occurring in welding torch installations using a gas-air mixture. The "Flashback Arrestor Check Valve" was developed as a safeguard to prevent a flashback from reaching the gas meter.

The manufacturer of the Flashback Arrestor Check Valve, G-TEC Natural Gas Systems, indicates that when a torch flashback occurs, there is a 5,000° flame inside the hose and pipe that will melt right through a regular check valve. This allows the flame to reach all the way to the gas meter, and possibly cause an explosion. A flashback

arrestor will extinguish this flame, as well as prevent oxygen from getting into the gas pipe, and thus will protect the gas meter. A Flashback Arrestor Check Valve would ensure safe operation of all devices, equipment and systems, including the utility gas meter. For more information regarding this new product, check the following link: <http://www.safe-t-gas.com/page4.html>

**Figure 1.2:** Flashback arrestor check valve



**Note:**

Flashback arrestor check valves extinguish the flame from a flashback and stop oxygen from flowing into the natural gas pipe.

Flashback arrestor check valves come in pairs; **one piece** with the red striped is installed on the natural gas pipe and the second piece with the green striped is installed on the oxygen pipe.

Two kinds of flashback arrestor check valves, “torch-mount” and “regulator-mount”, may be outfitted on existing jewelry torch installations. “Torch-mount” flashback arrestor check valves are designed to connect right onto the handle of a melting torch. If the torch has fittings that allow the flashback arrestor check valve to be screwed right on, then “torch-mount” flashback arrestor check valves are the right choice. “Regulator-mount” flashback arrestor check valves connect to the black iron pipe under the work bench. This configuration allows the jeweler to use the torch with a smaller head for maximum flexibility to perform fine, detailed work.

**Figure 1.3:** Combination flashback arrestor check valves with jeweler's torch



Some jewelers will find that after the flashback arrestor check valve is installed, their torches will not light at all, or the flame will be very weak. For cases when natural gas pressure is very low and the flashback arrestor check valve actually blocks gas flow, a

natural gas booster may be installed. G-TEC Natural Gas Torch Boosters will elevate utility natural gas pressure enough so that the flashback arrestor check valve protects the gas meter and the jeweler has a hot, robust flame at the torch.

**Figure 1.4:** Torch Booster



PSE&G Gas Delivery is working with the American Gas Association (**AGA**), Northeast Gas Association (**NGA**), New Jersey utilities and the Division of Community Affairs (**DCA**) to increase awareness regarding the hazards associated with jeweler torch installations. Steps have been taken to influence industry code changes requiring the use of Flame Arrestor Check Valves for all welding torch operations where natural gas is combined with oxygen, such as those used by jewelry stores, muffler shops and auto body repair shops.

Suggested wording has been submitted to address changes to the *International Fuel Gas Code* and National Fire Codes with focus on consumer protection.

**Solution:**

Technicians should inspect whether a welding torch operation using a mixture of natural gas and oxygen has a check valve installed on the supply lines, as required by:

- Section 2.3.2 of PSE&G's "*General Criteria for Installation of Gas Appliances and Gas Piping*" (a.k.a. Gray Book).
- Section 7.3 of "NFPA51 - *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting and Allied Processes*" covering "Piping Protective Equipment".
- Section 414 of the "*International Fuel Gas Code*" covering "Supplemental and Standby Gas Supply" and "Use of Air or Oxygen Under Pressure".
- Section 9.1.5 of the *National Fuel Gas Code* covering "Use of Air or Oxygen Under Pressure".

**If a check valve is missing, technicians should issue a "Class 2 Violation".**

A Class 2 Violation does not constitute an immediate hazard, but if not corrected, may become unsafe. Shutoff is not required on the initial call.

In addition, technicians should make the customer aware that the installation of a Flame Arrestor Check Valve will provide full protection against a potential flashback hazard that could cause damage to the gas meter.