7000 SERIES

FLASHBACK ARRESTORS

What everyone should know about flashback arrestors and associated safety devices.

CONCOA

A Guide To The Selection Of Flashback Arrestors

This booklet is designed to help you decide whether you need flashback arrestors and help you choose the best models for your needs.

Properly installed and maintained flashback arrestors help provide an extra measure of protection to both the operator and his equipment. In addition, operators should always wear proper protective equipment and follow safe operating procedures. Ask your distributor for the most up to date information on equipment and service.

A Guide To The Selection Of Flashback Arrestors

Flashback and backfire are both generally undesirable conditions associated with improperly operated or maintained oxy-fuel torch systems. They differ mainly in the speed at which they occur, and the potential for personal injury and damage to equipment.

Flashback:

The term “flashback” refers to the sustained retrogression of the flame back into the mixing chamber, accompanied by the well-known hissing or squealing sound and characteristic smokey, sharp pointed flame.

The damage to equipment and personnel is usually caused by the extremely high temperatures (5-6000°F) associated with oxy-fuel systems. Stopping a flashback requires the immediate cutting off of the mixed gas supply; one gas first, then the other. Hopefully, this can be accomplished in time to prevent severe overheating and possible damage to equipment and personnel injury.

Backfire:

Backfire is the momentary retrogression of the flame into and possibly back beyond the tip into the oxy-fuel system.

Backfires can vary in severity. Modern, well-designed equipment can generally survive a number of minor backfires without damage to the equipment.

The worst form of a backfire is caused when the gases, which have been improperly mixed within the oxy-fuel system, are confined and suddenly ignited. A mixture of oxygen and fuel gas, when ignited, can burn extremely fast; as high as 1400 mph and release a tremendous amount of energy, enough to cause a violent explosion!

Pressure increases of up to ten times the initial system pressures are commonplace and even considerably higher pressures are possible. The damage to equipment and injury to personnel can be much more severe in a backfire because, not only does the high temperature associated with the oxy-fuel process exist, but also the potential of injury from exploding equipment. This includes torches, hoses and metal cylinders or pipelines.

A backfire cannot be stopped by the operator once it starts and only the correction of the conditions that cause them will prevent them from happening.

Causes:

The cause of flashbacks and backfires can be traced to one or a combination of three conditions:

1. Faulty Equipment

Equipment incorrectly maintained, abused or modified may result in improper mixing or restricting conditions that make the equipment more susceptible to flashback.

2. Incorrect Operation Procedures

Lack of purging to remove air or mixed gases, incorrect pressures, backfeeding, all produce a risk of flashback. Also, a sudden change in the gas flow caused by hose kinking or otherwise being restricted in some way.

3. Operating Conditions

Some common operating conditions make equipment susceptible to backfire. For example, when a tip becomes overheated because of slag buildup or working in confined spaces, such as in a piercing, there is greater susceptibility to backfire on objects that can radiate back heat.

The above causes of backfire are usually avoidable. In order to prevent any risk occurring, you must be certain that the equipment is in good working condition, the operator and those around him are aware of procedures and are competent. They must also be able to judge the risks within any environment. A flashback arrestor is not an alternative to these precautions, but provides the best safeguards against the consequences of not being able to control some aspects of the operation adequately.

As with any safety device, there are certain questions individuals responsible for the selection of and the subsequent performance of flashback arrestors should ask before considering their purchase.

Question 1.

Flow Rates - Will It Severely Restrict Flow and Performance?

The greater the density of the sintered metal flame trap in a flashback arrestor, the greater its ability to survive a series of violent flashbacks. The drawback is that dense filters also restrict the flow of gases and these restrictions generally increase the danger of backfires. The cone shaped design of the flashback arrestor gives it a greater surface area, allowing the use of a dense filter for longer service life and greater safety without sacrificing performance. Check the “true” flow rating of any flashback arrestor you are considering. Many manufacturer’s quote maximum flowrates based upon ideal conditions which seldom occur during conventional applications.

Question 2

Gas Mixtures - Is It Effective At All Gas Mixture Ratios?

Any flashback arrestor, to be effective, should be designed to handle the most severe conditions. A mixture of 35% Acetylene and 65% Oxygen has the greatest amount of explosive force and any flashback arrestor you choose should be tested to provide protection under the most severe conditions.

Question 3

Pressure Sensitive Cut Off Valves - Does It Incorporate One? Is It Effective Against Minor Shocks?

Burnbacks and flashbacks, if not promptly interrupted by the shutting off of either of the gases, may graduate into a more serious condition. Since they can occur at speeds of up to 1400 mph, an operator cannot react quickly enough to stop the re-ignition of the gases that continue to flow even after the flame is extinguished by the initial shockwave. To do this quickly enough to stop further damage, the flashback arrestor should incorporate an automatic shut-off valve. The valve should also be capable of reacting to both minor and severe forms of flashbacks. Often initial flashbacks and even burnbacks produce a minor shockwave and if the flow of either oxygen or fuel is not cut-off by the valve, the gases will continue to mix, creating a potential for even much greater damage or injury.

Question 4

What Method of Resetting Does the System Use?

Pressure sensitive cut-off valves can usually be reset. The question is in the method used in resetting. Does the method require that the oxy-fuel system be shutdown and require removal of the flashback arrestor? An externally resettable device eliminating downtime to reset is an advantage. The mechanism should be simple to use and a permanent part of the arrestor so it cannot be lost. In all cases, when a flashback occurs, the system should be examined and problems corrected before resetting and being put back into service.

Question 5

Does the Arrestor Incorporate An External Warning Device To Show If The Cut-Off Device Has Operated?

Because pressure cut-off devices are operated by pressure differentials between inlet and outlet, they may trip if incorrect operating procedures are used. As an example, if the hoses are left pressurized and the cylinder valve is closed, any leakage of gas upstream of the arrestor will cause the valve to close. With an external signaling device, incorrect procedures and/or leaks can be identified much more easily and quickly. Without it, the operator may incorrectly identify the problem as empty cylinders, and waste valuable production time changing them.

Question 6

Does The Arrestor Incorporate A Non-Return Valve?

Non-return valves are a sensible precaution. Without this device, a dangerous reverse flow of mixed gases can occur. It should be located so that there is no danger of damage to it from flame associated with flashback and burnback. It should also have a low operating pressure, reducing restrictions of gas flow.

Question 7

How Do You Know If An Arrestor Is In Proper Working Condition?

As will all passive safety devices, generally it is not known if it will work when needed until something happens requiring it to work. Any mechanical device needs periodic checking; if not, it may fail when needed and damage to the equipment and/or personal injury may be the result. The manufacturer of

an arrestor should provide instructions and/or equipment to allow periodic checking to assure it is in proper working condition.

Question 8

Does The Arrestor Incorporate A Temperature Activated Cut-Off Valve?

A temperature activated cut-off valve protects personnel and equipment when oxy-fuel systems are exposed to high temperatures either from fires in the system or from sources outside the system. The dangerous release of gases into the atmosphere surrounding the oxy-fuel system is prevented when the thermal cut-off valve is activated. Quite often the release of gases into the work area becomes an even greater danger than the backfire or burnback that may have initiated it.

Series
801-7001/801-7002

Series
801-7003/801-7004

Series
801-7007/801-7008

Series
801-7015/801-7016

Series
801-7005/801-7006
801-7011/801-7012

Flashback Arrestor Ordering Information

Stock No.	Service	Regulator End	Hose End	Max PSIG	Max SCFH	Weight
801-7004	Oxygen	9/16"-18 RH Female	9/16"-18 RH Male	143	2307 SCFH (at 143 PSIG)	5.25 oz. (.15 kg)
801-7003	Acetylene Hydrogen LPG	9/16"-18 LH Female	9/16"-18 LH Male	15 50 50	349 SCFH (at 15 PSIG) 3308 SCFH (at 50 PSIG) 698 SCFH (at 50 PSIG)	5.25 oz. (.15 kg)
801-7002	Oxygen	9/16"-18 RH Female	9/16"-18 RH Male	143	3745 SCFH (at 143 PSIG)	1.1 lbs. (.5 kg)
801-7001	Acetylene Hydrogen LPG	9/16"-18 LH Female	9/16"-18 LH Male	15 50 50	508 SCFH (at 15 PSIG) 5213 SCFH (at 50 PSIG) 1100 SCFH (at 50 PSIG)	1.1 lbs. (.5 kg)
801-7006	Oxygen	9/16"-18 RH Female	9/16"-18 RH Male	143	3745 SCFH (at 143 PSIG)	12 oz. (.34 kg)
801-7005	Acetylene Hydrogen LPG	9/16"-18 LH Female	9/16"-18 LH Male	15 50 50	508 SCFH (at 15 PSIG) 5213 SCFH (at 50 PSIG) 1100 SCFH (at 50 PSIG)	12 oz. (.34 kg)
801-7012	Oxygen	3/8" NPT Female	3/8" NPT Female	143	3745 SCFH (at 143 PSIG)	1.2 lbs. (.54 kg)
801-7011	Acetylene Hydrogen LPG	3/8" NPT Female	3/8" NPT Female	15 50 50	508 SCFH (at 15 PSIG) 5213 SCFH (at 50 PSIG) 1100 SCFH (at 50 PSIG)	1.2 lbs. (.54 kg)
801-7016	Oxygen	1" NPT Female	1" NPT Female	143	10,063 SCFH (at 143 PSIG)	7.8 lbs. (3.5 kg)
801-7015	Acetylene Hydrogen LPG	1" NPT Female	1" NPT Female	15 50 50	1226 SCFH (at 15 PSIG) 13,646 SCFH (at 50 PSIG) 2880 SCFH (at 50 PSIG)	7.8 lbs. (3.5 kg)

CONCOA

AUTOSTOP

- **Resettable**
- **Regulator Mount**

The AutoStop Models 801-7001 and 801-7002 are CONCOA's standard flashback arrestor designed for applications where maximum safety is essential. The AutoStop size and features make it ideal for use at the regulator outlet.

Stock No.	Service	Regulator End	Hose End	Max PSIG	Max SCFH	Weight
801-7002	Oxygen	9/16"-18 RH Female	9/16"-18 RH Male	143	3745 SCFH (at 143 PSIG)	1.1 lbs. (.5 kg)
801-7001	Acetylene Hydrogen LPG	9/16"-18 LH Female	9/16"-18 LH Male	15 50 50	508 SCFH (at 15 PSIG) 5213 SCFH (at 50 PSIG) 1100 SCFH (at 50 PSIG)	1.1 lbs. (.5 kg)

AutoStop Model 801-7001 & 801-7002

Features and Benefits

Flame Trap
Designed to quench flames resulting from flashback. All CONCOA arrestors incorporate a dense stainless steel filter designed to stop the most violent flashbacks that result from oxy-fuel gas mixtures.

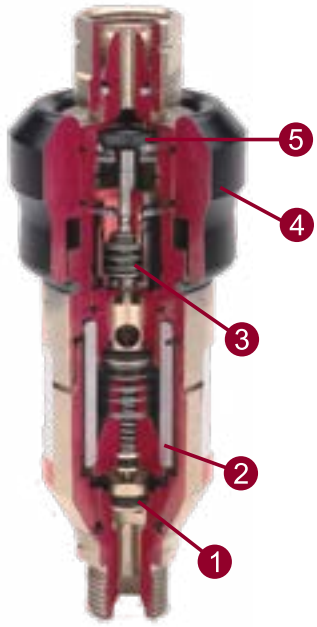
Non-return Valve
This valve prevents reverse flow of gases, a major cause of flashbacks.

Flow Cut-Off Valve
The cut-off valve automatically stops the flow of gas in the event of flashback, preventing further gases from being fed to the equipment

Warning Re-Set Knob
Arrestors with pressure sensitive cut-off valves are fitted with indicating ring to signal the operator that a flashback has occurred and that the reason for the occurrence should be corrected. The knob can be reset without having to remove the arrestor.

Inlet Filter
This feature is available on certain models to limit the flow particles into the arrestor which may cause damage to internal components and subsequent malfunction of the arrestor.

Temperature Actuated Cut-Off Valve
This thermal sensitive valve is designed to shut off gas supply before critical ignition temperature of the fuel gas is reached. This valve actuates at a temperature of approximately 212° F (100°C).



Features

1. Thermal Shut Off
2. Flame Barrier
3. Check Valve
4. Re-settable Pressure Control
5. Inlet Filter

Series 801-7003 & 801-7004

- **Medium Duty**
- **Regulator Mount**

The series 801-7003 and 801-7004 are a budget-priced, general purpose flashback arrestor suitable for cylinder systems. These series should be used whenever there is a possibility of flammable gas mixing with oxygen or air. There are two versions available: the 801-7004 for oxygen and the 801-7003 for fuel gas service. For total protection, 801-7003 and 801-7004 Series Flashback Arrestors should be installed on both oxygen and fuel gas.

CONCOA flashback arrestors should not be used with acetylene generators, hydraulic flashback arrestors or liquid fluxing systems upstream of installation.

Stock No.	Service	Regulator End	Hose End	Max PSIG	Max SCFH	Weight
801-7004	Oxygen	9/16"-18 RH Female	9/16"-18 RH Male	143	2307 SCFH (at 143 PSIG)	5.25 oz. (.15 kg)
801-7003	Acetylene Hydrogen LPG	9/16"-18 LH Female	9/16"-18 LH Male	15 50 50	349 SCFH (at 15 PSIG) 3308 SCFH (at 50 PSIG) 698 SCFH (at 50 PSIG)	5.25 oz. (.15 kg)

Series 801-7007 & 801-7008

- **Compact**
- **Torch Mount**

The Series 801-7007 and 801-7008 Flashback Arrestor is an economically priced safety device suitable for installation at the inlets of hand or machine oxy-fuel gas torches. These models should be used whenever there is a possibility of flammable gas mixing with oxygen or air. There are two versions available: the 801-7008 for oxygen and the 801-7007 for fuel gas service. For total protection, these arrestors should be installed on both oxygen and fuel gas.

CONCOA flashback arrestors should not be used with acetylene generators, hydraulic flashback arrestors or liquid fluxing systems upstream of installation.

Stock No.	Service	Regulator End	Hose End	Max PSIG	Max SCFH	Weight
801-7008	Oxygen	9/16"-18 RH Female	9/16"-18 RH Male	143	1835 SCFH (at 143 PSIG)	2.30 oz. (.07 kg)
801-7007	Acetylene Hydrogen LPG	9/16"-18 LH Female	9/16"-18 LH Male	15 50 50	224 SCFH (at 15 PSIG) 2490 SCFH (at 50 PSIG) 526 SCFH (at 50 PSIG)	2.30 oz. (.07 kg)

CONCOA

MAXFLOW

Series 801-7015 and 801-7016

• Ultra High Flow
• Pipeline mount

- Meets OSHA and NFPA Std. 51 requirements Complies with ISO5175 (Heavy Class) DIN 8521 and BS 6158
- Flame Trap extinguishes flames in the system
- Non-return check valve - prevents reverse flow of gases.
- Automatic temperature-sensitive cut-off valve - prevents overheating of the arrestor.
- Vertical or horizontal mounting

Stock No.	Service	Regulator End	Hose End	Max PSIG	Max SCFH	Weight
801-7016	Oxygen	1" NPT Female	1" NPT Female	143	10,063 SCFH (at 143 PSIG)	7.8 lbs. (3.5 kg)
801-7015	Acetylene Hydrogen LPG	1" NPT Female	1" NPT Female	15 50 50	1226 SCFH (at 15 PSIG) 13,646 SCFH (at 50 PSIG) 2880 SCFH (at 50 PSIG)	7.8 lbs. (3.5 kg)

Stock No.	Service	Regulator End	Hose End	Max PSIG	Max SCFH	Weight
801-7006	Oxygen	9/16"-18 RH Female	9/16"-18 RH Male	143	3745 SCFH (at 143 PSIG)	12 oz. (.34 kg)
801-7005	Acetylene Hydrogen LPG	9/16"-18 LH Female	9/16"-18 LH Male	15 50 50	508 SCFH (at 15 PSIG) 5213 SCFH (at 50 PSIG) 1100 SCFH (at 50 PSIG)	12 oz. (.34 kg)
801-7012	Oxygen	3/8" NPT Female	3/8" NPT Female	143	3745 SCFH (at 143 PSIG)	1.2 lbs. (.54 kg)
801-7011	Acetylene Hydrogen LPG	3/8" NPT Female	3/8" NPT Female	15 50 50	508 SCFH (at 15 PSIG) 5213 SCFH (at 50 PSIG) 1100 SCFH (at 50 PSIG)	1.2 lbs. (.54 kg)

Flashback Arrestor Testing Kit – Part Number 801-7099

CONCOA Flashback Arrestors offer the highest level of safety protection available. To ensure that the equipment will operate properly in the event of a flashback, it is essential that they are checked at regular intervals. For details outlining recommended testing procedures, please contact your nearest CONCOA distributor. In cases where large quantities of arrestors are to be checked, the CONCOA Flashback Arrestor Test Panel is available. This enables systematic testing under controlled conditions and is recommended in these situations.

Installation Instructions

When using on pipeline outlets, a shut-off valve should be installed upstream of the arrestor. If there is danger of water vapor being carried off the gas, then a separator should be connected to one flashback arrestor. If it is necessary that the hydraulic and dry flashback arrestors are installed in the same pipeline system, the hydraulic arrestor should be restricted to separate branch lines. For increased flow requirements, two or more flashback arrestors may be connected in parallel.

When using the resettable arrestors,,it is recommended that the gas supply be closed and the connecting nut between arrestor and regulator loosened to release the built-up gas before resetting. This will avoid excessive force being applied to the lever.

Properly installed and maintained protection arrestors help provide an extra measure of protection to both the operator and the equipment. Operators should always wear proper protective equipment and follow safe operating procedures. Contact your CONCOA distributor for the most up-to-date information on equipment and service.

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