

safety

OXYFUEL SAFETY: It's Not an Option



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For oxyfuel cutting and welding, nothing can replace operating procedures for protecting operators and equipment from harm. Two special safety devices – check valves and flashback arrestors – offer additional protection. Every oxyfuel operator should understand the function of the two devices and the distinction between them.

What Check Valves Do

The reverse-flow check valve is a device that permits forward flow of gas and closes when gas begins to flow in a reverse direction. Forward flow moves a disc by overcoming slight spring pressure. Reverse-flow pressure moves the disc against a seat into a sealed, closed position.

Reverse flow can occur as a result of a blocked torch tip, excess gas or oxygen pressure, lack of pressure, or unsafe start-up or shut-down procedures. When it occurs, mixed gases can ignite and travel as far as and even into the oxygen or fuel-gas-supply system. Installed in the torch or in the gas regulators, check valves help to prevent reverse flow. Externally threaded, check valves attach to the torch or to the regulator. Some models fit internally into the torch.



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Should the mixed gases ignite and travel into the torch or other parts of the oxyfuel equipment, flashback – a dangerous situation – can occur. The first sign of a flashback is a booming or whistling noise caused by the flame burning in the gas mixer. The operator must shut down the torch oxygen immediately on hearing the noise.

Not Fail-Safe

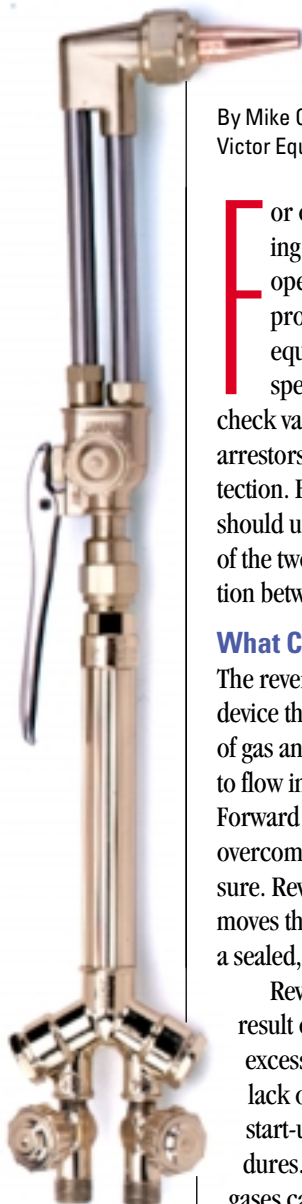
Check valves are mechanical devices, subject to failure from accumulation of dirt, spring fatigue and other causes. They should be tested per manufacturers' recommendations. One test procedure puts the valves under back pressure while submerged in water; emission of bubbles indicates a leak.

These devices must be constructed to provide the best possible seal against reverse flow and at the same time allow adequate forward flow of gases to satisfy equipment operating needs.

Designs that are too restrictive can contribute to volume starvation, another dangerous situation. When oxygen is added to fuel gas at the torch tip, fuel gas must be flowing in sufficient volume to promote accelerated burning at the end of the tip. Restriction of fuel-gas flow causes the flame to burn back into the tip, resulting in ignition of the mixed gases and flashback. If the flashback is not detected and the torch is not turned off, the flashback can travel to the point where the gases mix, damaging the equipment and possibly harming the operator.

The Flashback Arrestor

The dry (sintered metal alloy) flash arrestor was first developed to fit onto the regulator outlet. The design incorporated a check valve and a sintered-stainless-steel filter or tube that would permit forward passage (and also reverse flow) of gas but would extinguish a flame, preventing it from moving upstream of the arrestor. These



units offer almost total protection against a flame entering the gas source, and they allow excellent downstream flow. Diameter and length of flashback arrestors are proportional to the volume of gas passing through them. A large flashback arrestor uses a large sintered filter to allow high gas flow through it. Small, light units, though they provide better balance with the torch, are likely to restrict flow.

Even with these two devices for protection, the hose between the torch and regulator contains a significant volume of gas, poten-

tially combustible if reverse flow and ignition occur. To counter this danger, a small torch-mounted flash arrestor was developed to prevent a flashback from entering the hose. Unfortunately, many torch-mounted flashback arrestors restrict flow and may, therefore, contribute to torch flashback.

Regulator and torch arrestors both may be used in the same oxyfuel system. Regulator flashback arrestors protect regulators and gas-supply systems; and torch flashback arrestors protect regulators and gas supply systems;

torch flashback arrestors protect regulators, gas-supply systems and hoses.

Torch-mounted flash arrestors come with standard B threads to mate with the torch inlet or with a quick-connect coupling device for rapid connect-disconnect. Threads and couplings are configured to avoid mismatching of fuel and oxygen lines.

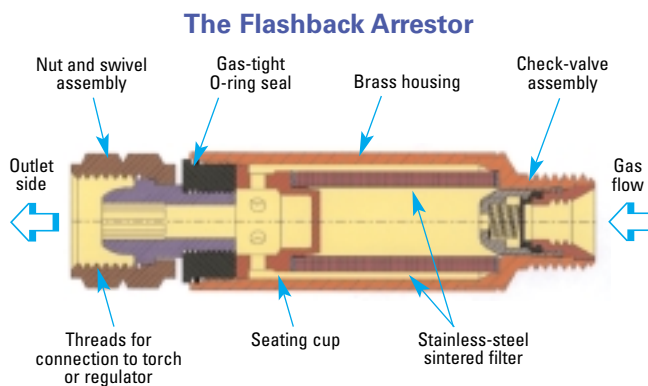
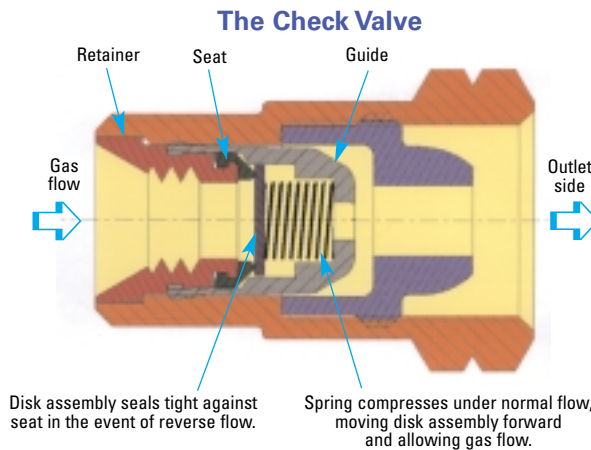
A dry torch flashback arrestor is available today that flows sufficient volume to supply all tips and high-volume heating nozzles, even when attached to hand units that incorporate check valves. Hand-cutting tips up to size # 8, welding tips, and heating tips will operate without mishap caused by restriction of gas flow.

A Final Caveat

Neither check valves nor flashback arrestors protect torch or tips. The best way to prevent accidents is to assure that operators adhere to safety operating procedures. For more information about check valves, ask for document E-2 and TB-3 on flashback arrestors from the Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202-3269.

Victor Equipment is now offering a new safety video entitled, Oxyfuel Safety: It's Not an Option.™ For more information about the video or Victor's line of VanGuard apparatus, call (800) 426-1888. n

> Every oxyfuel operator should understand the function of check valves and flashback arrestors and the difference between them.



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