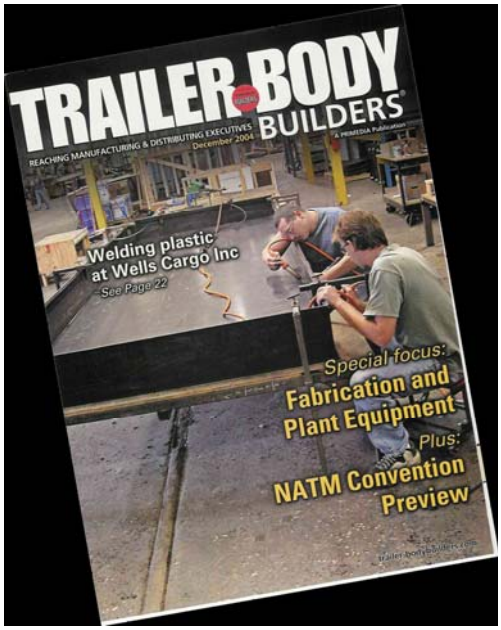

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A solution for weld shielding gas waste

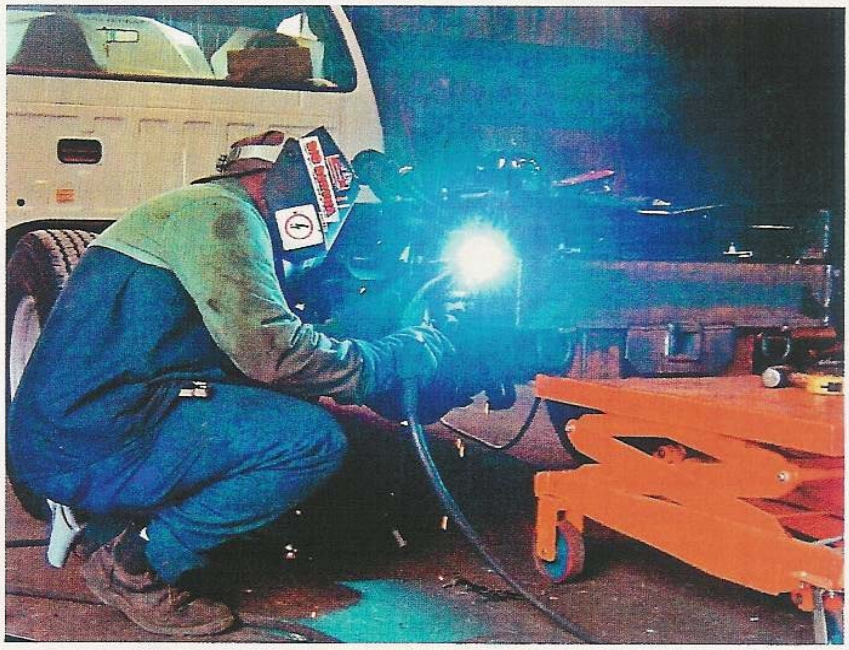
By Jerry Uttrachi

THE average user of MIG welding consumes between 18 and 30 cubic feet of shielding gas per pound of wire—between three and fives times the amount that could be used.

At least that's what Double A Body Builders has discovered.

Double A Body Builders started producing custom truck bodies 40 years ago in Pamplico, South Carolina. The company has grown to the point where it uses about 40,000 lb of steel per week, most of which arrives flat and is bent and welded into 120 custom truck bodies each month.

MIG welding is employed almost exclusively, with solid wire (0.035" diameter) used to make welds in all positions. All 23 MIG welders use Argon/CO^2 shielding gas mixture to keep spatter to a minimum and to pro-



Double A Body Builders has been successfully using the Gas Saver System to reduce shielding gas usage on MIG welding.

duce high-quality, visually attractive welds. The MIG wire feeders are located about 30' from the shielding gas piping system used throughout most of the shop.

Ken Ard, son of founder Jimmy Ard, knew his company was using more shielding gas than it should have because of excess gas surge at the weld start. So he was intrigued when he heard of the Gas Saver System (GSS), a product from WA Technology that recently received a patent.

Ard set up a comparative test using two welders having shielding gas supplied with cylinders. Starting with full cylinders, one welder incorporated GSS to transport gas 30' to the wire feeder and the other used the standard 1/4"-diameter gas delivery hose. Ard found that he achieved about twice the amount of welds with the cylinder of gas on the system with the GSS installed. Both MIG welders used virtually the same amount of wire during the test, validating that they were working for the same amount of time.

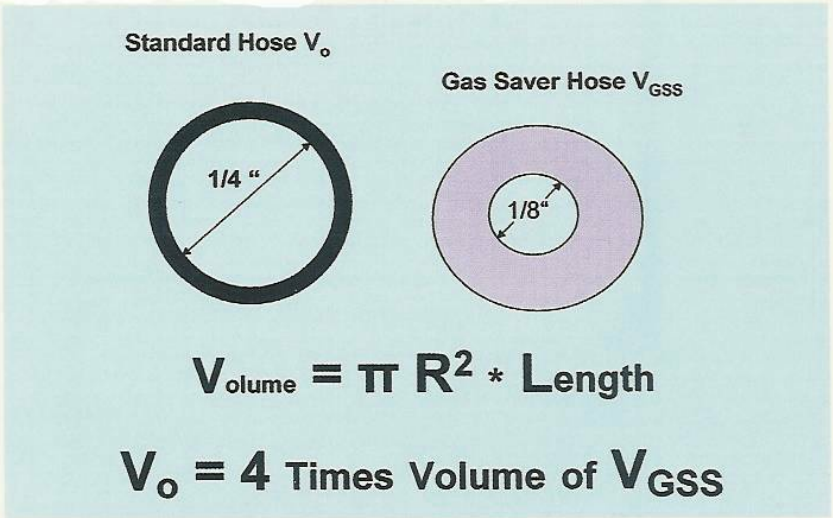
High surge flow at the weld start not only wastes gas but also pulls air into the shielding gas steam, causing excess spatter and possibly porosity.

The GSS system is simple and does not interfere with the welding operators' ability to control gas flow. On most days, Double A Body Builders has all the overhead doors open, and depending on the draft conditions, a slightly higher weld shielding gas flow rate may be needed. Each welder can adjust gas flow as done in the past. The system does, however, eliminate the very high gas-flow rate and waste at the weld start caused by pressure build-up in the delivery hose when welding is stopped.

As in most shops, the gas pressure in the pipeline distribution system is about 50 psi. When welding, the pressure in the delivery hose will reduce to that needed to produce the desired flow rate, typically from 4 to 6 psi. When welding is stopped, the pressure in the shielding gas delivery hose quickly raised to the 50 psi line pressure. Each time a weld is made, the excess gas in the hose flows for a short time at a surge rate in excess of 150 cubic feet per hour. This high surge flow at the weld start not only wastes gas but also pulls air into the shielding gas steam, causing excess spatter and possibly porosity. Depending on the pipeline pressure, the volume of gas wasted every time a weld is started or even when the welder just inches the wire forward is equal to three to five times the hose volume (when measured at standard temperature and pressure).

GSS uses a custom manufactured small ID hose, which is made with composite fiber reinforced construction with a large OD to handle the shop environment of being pulled across the floor over metal parts, stepped on, etc. It also incorporates a surge flow-limiting orifice at the wire feeder end to reduce peak gas-flow rate. This improves weld-start quality by avoiding turbulence that pulls air into the shielding gas stream. The reduced hose ID area and the added peak flow-limiting orifice result in an 80-85% reduction in the shielding gas waste caused by the pressure buildup.

GSS does not alter the pressure in the delivery hose. Maintaining the higher hose pressure is important in order to automatically compensate for restrictions that occur in operation. Restrictions will occur during production as the gas line is twisted or pinched as the welder moves around the fabrication. In addition, spatter will build up in the torch front end, causing gas-flow restrictions. The higher system pressure automatically maintains the preset gas flow and compensates for restrictions as long as they are less than half of the 50 psi line pressure. This self-compensating fea-



This diagram shows how the reduced ID hose area and the added peak flow-limiting orifice result in an 80-85% reduction in shielding gas waste caused by pressure buildup.

ture is a key reason why gas-delivery systems are designed to operate at higher pressures.

Maintaining higher hose pressure also provides a small amount of extra gas flow at the weld start to displace the air that enters into the torch cup, body, and gas line when welding is stopped. It also quickly provides extra gas in the weld start zone. The built-in surge restriction orifice limits the maximum flow rate to an acceptable level, providing quality weld starts.

Some devices—such as a simple peak flow-limiting orifice or a low-pressure regulator at the feeder end of the hose—have been employed to reduce gas-surge flow. But they actually reduce the gas surge at the start, giving the perception of reduced gas waste. But when WA Technology ran comparative tests, it found some of these devices still allowed the pressure build-up in the gas delivery hose, as if the flow-limiting orifice or low-pressure device was not there. WA Technology found that the excess waste gas at the weld start was expelled, but instead of happening in one second where the surge could be easily heard, it takes several seconds at the reduced flow rate. So in essence, shielding gas waste still occurred—it just took longer and was not as obvious.

WA Technology says GSS can easily be added to an existing welder by replacing the gas delivery hose with the GSS hose and its special fittings.

The system can be purchased as a pre-fitted hose with fittings installed, or the special hose and fittings can be purchased separately. There are no moving parts to wear or maintain and no extra knobs for the welder to set or adjust.

More information is available at www.NetWelding.com. ❑

Double A Body Builders has 23 MIG welders, all of which use argon/CO2 shielding gas mixture to minimize spatter spatter. The MIG wire feeders are located about 30' from the shielding gas piping system.