WA Technology

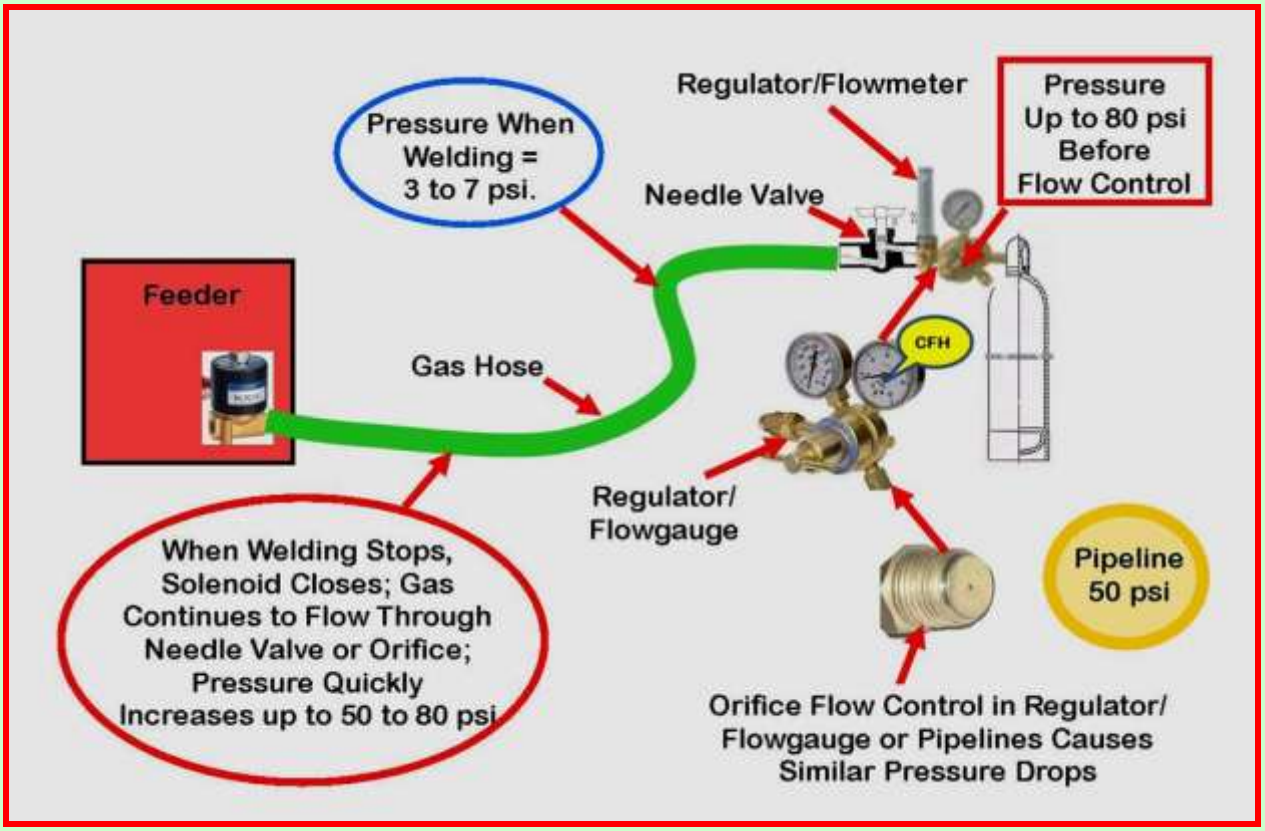
A Graphic Overview of Why Over Half the MIG Shielding Gas Used is Wasted!

THE PROBLEM:

Two published articles state the average fabricator using MIG welding consumes 3 to 5 times the shielding gas needed! One quotes a Praxair representative who states their plant surveys validate this average gas waste value. Another article says the gas surge at the weld start is a major cause.

This Bulletin shows why this happens using mostly graphics.

First: <u>This Figure Shows What Happens With Any Gas Delivery System:</u>

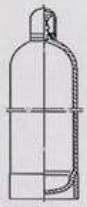


SUMMARY OF FIGURE: While welding, pressure drops across a needle valve or a very small orifice in a regulator/flowgauge or when used at a pipeline drop to that needed to set the gas flow rate. The pressure in the gas delivery hose typically varies from 3 to 8 psi while welding. The exact pressure depends on torch length and bends, spatter build-up in the gun nozzle and gas diffuser etc. When welding stops, the gas solenoid in the feeder closes but gas continues to flow through the needle valve or orifice. The pressure quickly rises to the regulator or pipeline pressure. Typical regulators are set for 25, 50 or 80 psi. Pipelines are typically about 50 psi. Note a minimum of 25 psi is needed to have "Automatic Flow Compensation." What's that? Email: TechSupport@NetWelding.com and ask.

UNDERSTANDING THE EFFECT OF PRESSURE ON VOLUME

WHEN PRESSURE INCREASES SO DOES GAS VOLUME- - A LOT!

CHANGE IN GAS VOLUME WITH PRESSURE

	Physical Volume	Pressure	Increase in Volume	Pressurized Gas Volume
	Large Cylinder 1.8 CF	2500 PSI	2500+14.7 / 14.7 = 171 Times	1.8 CF X 171= 308 CF Gas
	Gas Hose Depends on ID and Length	When Welding Stops= 80 PSI	80+14.7 / 14.7 = 6.44 Times	= 6.44 Times Hose Volume
	+13% Due To Hose Expansion	80 PSI	6.44 + 13%	6.44 X 1.13 = 7.3 Times Hose Volume

SUMMARY OF FIGURE There is a small increase in gas volume due to hose expansion when welding stops – but that is NOT the cause for most of excess stored shielding gas that blasts out at the weld start. Tests show hose expansion causes only about 10 to 13% of the extra stored gas! The increase in volume due to the pressure increase is 87 to 90% or MOST of the problem.

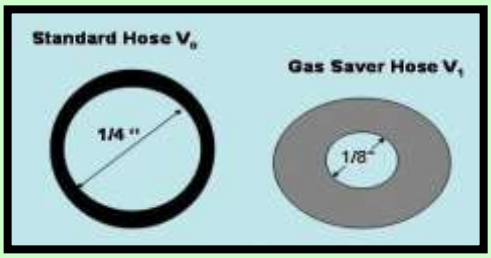
GAS BLAST AT WELD START CAUSES PROBLEMS

Excess gas stored when welding stops, creates the gas "blast" when welding starts; causing waste and inferior weld quality. Gas flow over 50 to 55 CFH pulls air into the gas stream. Two published articles, one recent by Praxair's manager welding R&D, the other The Welding Institute in England, state about 50 CFH is the maximum flow to avoid shielding turbulence and inferior welds.

We've measured peak gas flow at the weld start of over 200 CFH with conventional gas delivery systems! In 1883 Reynolds showed in flow tests that once *Turbulent Flow* is started it takes time for it to stabilize into what we need - smooth *Laminar Flow* - even after flow rate is reduced! This high shielding gas flow pulls in moisture laden air causing excess spatter and possibly internal weld porosity.

PATENTED GAS SAVER SYSTEM

There is a simple, recently patented way to significantly reduce shielding gas waste due to gas flow surge:



First: Use a shielding gas hose with a small internal diameter. At the low flow rates used for welding this creates an acceptably small pressure drop even with 50 + foot long hoses.

Second: Put a peak flow limiting orifice on the wire feeder end of the gas hose. This has the benefit of additionally reducing gas waste and improving weld start quality. The patented ***Gas Saver System (GSS ™)*** incorporates a custom extruded 1/8 inch ID hose with a flow restrictor built into the hose fitting at the wire feeder end. This peak gas flow restrictor is sized to reduce the surge at the start **but allows the operator** to have full control of the steady state flow rate while welding. It provides the needed amount of extra gas flow to purge air and moisture that enter into the MIG gun nozzle and gun body when welding stops as well as to purge the weld start area of moisture laden air. This combination of small ID hose and orifice reduces the amount of stored gas by 80 to 85%.

(*Need to lock flow settings? See another patented device @NetWelding.com.)*

PRODUCTION RESULTS

Thousands of ***Gas Saver Systems*** are being used by fabricators. Collectively they are savings millions of dollars per year. Of the many fabricators who conducted very careful tests to check savings, one relayed the following data. This truck box manufacturer picked an item they make by the thousands-doors. They used two cylinders. With their standard gas hose they welded ***236 doors*** with one cylinder. With the same welding conditions and just replacing the gas delivery hose with a ***GSS*** they welded ***632 doors*** with one cylinder. That is a 63% savings in shielding gas use. They also achieved improved starts.

BOTTOM LINE

The patented *WA Technology GSS* has no moving parts to wear, repair or leak; no pressures to set or knobs to adjust. Its unique design retains the gas pressure in the delivery hose. This allows a controlled amount of extra gas flow at the weld start to quickly purge air that is in the weld start zone, gun nozzle and gas lines when welding is stopped. Maintaining the higher pressure also retains the systems ability to automatically compensate for varying pressure drops as spatter builds in the nozzle, the gun cable is bent, etc. That feature has been used for gas delivery systems since MIG was invented!

The custom extruded hose is made with a heavy wall thickness and fiber reinforced construction providing a robust product. It will continue to flow even when stepped on. For many applications the *GSS* will pay for itself in gas waste reduction alone in a matter of weeks.

 GSS is coved by US Patents 6,610,957; 7,015,412 & 7,019,248

See www.NetWelding.com for further information