

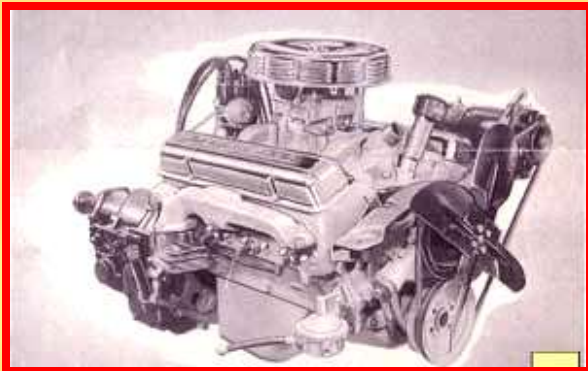
# WA Technology

## MIG Shielding Gas Supply Systems Have Evolved Like The Small Block Chevy!

(Both had advances and set backs until the optimum air/gas control was achieved.)

### Small Block Chevy

The small block Chevy V8 was introduced in 1955. It was very innovative, just like MIG welding that was introduced about that same time! It was light weight, high revving with a big bore and short stroke. The valves were actuated with a very unique light weight rocker arm assembly. The highest performance engine was in the 1955 Corvette, rated at 195 HP.



### Duntov Cam

Using high compression, very high octane gasoline and employing a Duntov designed camshaft produced considerable power from this "mouse" motor. Peak power was obtained at high rpm and idle was very rough with little torque until about 3000 rpm. In the late 1960's small block power reached 350 HP! (Prior to 1972 Gross HP was quoted, measured without air cleaner, accessories, water pump, mufflers, and at times with long tube headers and was 20+% higher than today's Net Ratings!- 350 Gross = ~280 Net)

### The Government Interferes!



In the mid 1970's government regulated emissions laws and the mandate to use nonleaded gas caused a drastic reduction in HP!

The highest power offered in the 350 cubic inch 1976 Vette was 210 HP! Engineers eventually learned to deal with the new requirements and were able to increase power while meeting the growing and more stringent government regulations.

### 2014 LT1

With the same 4.4 inch bore spacing as its early ancestor, the 376 cubic inch 2014 LT1 produces 460 HP. That's 1.22 HP/cubic inch, in stock



trim! Arkus Duntov was always striving to surpass 1:1! It does that with 91 octane gasoline and an idle that purrs like a kitten. My 2014, Z51 Vette cruises at 60 mph at 1500 rpm getting over 35 mpg in 4 cylinder mode! Like all its predecessors, it's high revving, still pulling strong when the 6600 rpm rev limiter cuts fuel flow!

What is the secret on how the Chevy engineers achieved this outstanding performance from the pushrod activated small block Chevy?

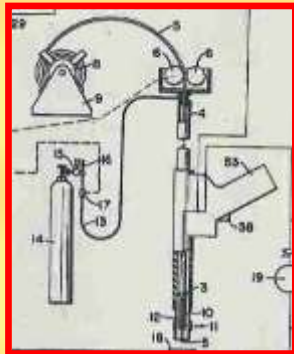
In two words, “Optimized Airflow!”



Picture of LT1 Heads Showing Intake & Exhausts Ports

### Evolution of MIG Shielding Gas Systems

MIG welding was introduced about the same time as the small block Chevy. The main objective, clearly defined in the original patent, was to produce a “Non Turbulent” shielding



gas stream to protect the weld metal.

These pioneering engineers also understood the need to provide “Automatic Flow Compensation.”

This was needed to maintain the preset shielding gas flow rate with inevitable weld spatter buildup in the gun nozzle and gas diffuser. Also the small gas passage in the flexible MIG gun cable caused restrictions when bent and twisted during welding. To maintain preset flow they used what is referred to as “choked flow” or “critical flow” though an orifice or needle valve. Within practical limits, regardless of downstream flow restrictions, the preset flow remains constant. To achieve this feature the pressure upstream of orifice or needle valve flow control must be 25 psi or

greater. That is the pressure that will be in the gas delivery hose when welding stops.

A very popular welding and cutting process at the time was oxyfuel so for economic reasons the ¼ inch ID hose it used was employed for MIG shielding gas delivery. Unfortunately this large size stores considerable gas in the hose when welding stops. Up to 7 times the physical hose volume! Much of this stored gas is wasted when welding starts with a high gas surge that causes very turbulent flow. A ¼ inch ID gas hose is not needed for pressure drop since flow rates of 35 CFH create less than a 1 psi drop in even a 100 foot!

### Device Designed to Reduce Gas Waste and Improve Weld Starts

Stauffer in 1982 invented a device that eliminated the excess gas surge at the weld start. He also recognized that some extra gas was needed at the weld start, as stated in his patent, “to purge the weld gun nozzle and weld start area of air.” However to control flow he used a moderately low pressure approach and lost the benefits of automatic flow control. His device included an “accumulator” to delivery extra start gas. Since pressures were low the “accumulator” size and therefore the device was rather large.

### Low Pressure Devices and Orifices Installed at the Welder/Feeder Introduced to Reduce Gas Surge

Some devices were introduced that used even lower pressures than Stauffer to reduce the weld start gas surge. These devices lost the “Automatic Flow Compensation” feature. When restrictions occur in the nozzle and gun gas lines we have measured changes in flow of 65%! Similar to when the government

intervened into the auto industry, one result was achieved and other problems created!

Some of these low pressure devices, advertised as “Gas Guards,” mount at the wire feeder or welder and create both lack of “Automatic Flow Compensation” and also do not provide sufficient extra gas at the weld start. Other flow control devices installed at the feeder/welder such as flowmeters or orifices designed to reduce surge also lack sufficient starting gas to purge air from the weld start zone.

**Simple Gas Saving Device  
Developed and Patented**

After considerable laboratory and field testing a device was invented and patented, which:

1. Reduces shielding gas waste.
2. Is rugged, simple, inexpensive with no moving parts
3. Maintains pressures to retain Automatic Flow Compensation
4. Quickly supplies a small amount of extra shielding gas at the weld start at a flow rate that minimizes turbulence and improves weld start quality

Called the Gas Saver System (**GSS™**) it employs a significantly reduced volume, heavy wall hose and a peak flow, surge limiting orifice incorporated in the feeder/welder hose end to avoid excess turbulence.

It installs by simply replacing the existing gas delivery hose from gas supply to welder/feeder.



The system works with



cylinder or pipeline gas supply; flowmeter or flowgauge flow control.

**What is the secret of the patented **GSS??** As with the latest small block Chevy - Optimized Gas Flow Control!**

**ORDERING**

The *Gas Saver System* is available in lengths to fit from the smallest MIG welder to industrial applications.

The systems available are:

Product	Part Number
3 Foot Prefitted Hose	FB3
6 Foot Prefitted Hose	FB6
12 Foot Prefitted Hose	FB12
25 Foot Prefitted Hose	FB25
Above With Splice Connectors if Needed	Email

Detailed descriptions and photos are on our WA Technology web site.

The **GSS** is inexpensive and Payback is measured in weeks or months depending on use. Many thousands are in use. It can be purchased at our web site: [www.NetWelding.com](http://www.NetWelding.com)

*To Focus on Reducing Not Selling Gas –  
Our Gas Saver Systems are –  
**NOT AVAILABLE IN “STORES.”***



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7,019,248; 7,462,799  
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## **Running Out of Shielding Gas on a Saturday Night?**

### **How Much Gas Can Be Saved??**

The best way to show the savings using a **GSS**, is with an example from one of our industrial customers who tested the system then bought them for all 35 of his MIG welders.



A Texas Truck Box manufacturer evaluated the system on a repetitive job, welding doors. With their standard gas delivery hose they welded **236 doors** with a full cylinder of shielding gas. Just substituting their gas hose with our patented **GSS**, maintaining the same flow settings, they welded **632 doors!** That's a 63% reduction in shielding gas use.

### **Weld Performance**

A small shop owner provided this feedback after he purchased a 3 foot **GSS** for his small MIG welder.

Al Hackethal reported these findings:



*"Well, I can't believe it. I never thought a hose could make that much of a difference. I had a small job that's been waiting for a while. The weld quality, and even penetration is considerable better. Almost no spatter! The weld seemed to be hotter and I turned my MIG down a notch.*

*Initially thought that my imagination had kicked in, but then realized that the gas I'm buying is actually working the way it's supposed to. Glad I found your website. This is one of the few things that really works better than any info could suggest. I understood the theory,*

*though in practice I understood much better after the first couple of welds. Now I have better looking welds and almost no spatter, which means less grinding and finish work! In addition, the tip was cleaner after the job I just did.*

*This will provide savings in time, labor and maybe even consumables too. As a one man shop there's never enough time for anything.*

Al also has a TIG welder with 300 amp water cooled gun and bought one of our Leather Cable Covers. He email said this about it!

*Oh, the leather wrap for my TIG hoses worked very well and fits perfectly. I'd just replaced them (the hoses), but was looking for something to protect them that was better than the nylon wrap that's available around here. Now I'm TIGing again too, and much safer. It's good to know the coolant hoses are well protected. Much better than using a 300 amp TIG and then realizing that I was standing in a puddle of coolant, which is what recently happened. Can't pay the bills if I electrocute myself!*

*Thanks for making products affordable".*

### **Another Home Shop Writes About GSS System**

Perry Thomasson has a very well equipped home shop. He uses a 175 amp MIG welder. However the small welder cart only held a medium size shielding gas cylinder and he wanted to reduce the number of times he had to have it filled.



He purchased the largest cylinder his distributor offered for sale and chained it to a wall in his shop. He needed a much longer gas delivery hose so he added a 50 foot conventional 1/4 inch ID hose. He found he was using a lot of gas.

He purchased a 50 foot long **GSS** and saved a significant amount of shielding gas while improving his weld starts by reducing the starting gas surge. Since his regulator/flowgauge had a hose barb on the output he used a splice connector we supplied him with the **GSS**. He simply cut the existing gas delivery hose close to the regulator and spliced in the **GSS** hose. The welder end uses a standard CGA fitting that is supplied with the system.

Perry emailed a picture and said;

*" The system works great. Thanks for the professional service and a great product."*

### **A Professional Street Rod Builder Had This to Say:**

They use a 250 amp MIG welder with built in feeder and a 6 foot gas delivery hose. With their standard gas delivery hose the peak shielding flow at weld start was measured at 150

CFH, far more than needed and enough to pull air into the shielding stream. Air is then sucked into the gas stream causing poor weld starts and possibly weld porosity.

With the **GSS** replacing their existing hose, the peak flow surge at the weld start was about 50 CFH. **With the many short welds made and frequent inching of the wire, they used less**

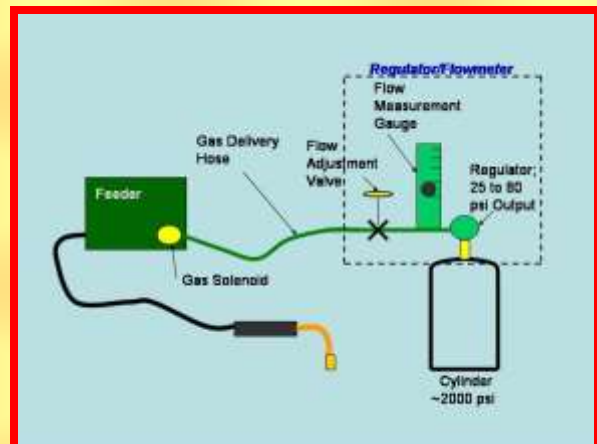


than half the gas and had better starts.

Kyle Bond, President, indicated a big benefit is the reduced time and effort changing cylinders since it's required less frequently. He quickly saw the improvement achieved in weld start quality as a significant advantage! Kyle, an excellent automotive painter, was well aware of the effects of gas surge caused by pressure buildup in the delivery hose when stopped. He has to deal with the visible effects in the air hose lines on the spray gun in his paint booth! It's too bad we can't see the shielding gas waste as Kyle can the effects of excess pressure when he triggers his spray gun! The paint surge is visible and creates defects unless the gun is triggered off the part being painted! Kyle can manage the surge by triggering the paint gun off the part; unfortunately we can't start our weld with the MIG gun off the part ! The **GSS** has a built in surge flow limiting orifice that keeps the peak flow from becoming excessive. So you not only save gas you improve your weld starts!

### **How Does The GSS Work?**

Gas waste occurs every time you pull the MIG gun trigger even if it's only to inch the wire to cut off the end.



To keep flow at the preset level the gas pressure in the cylinder regulator will be between 25 and 80 psi.



Flowgauge regulators (those with a flow calibrated pressure gauge) operate in this pressure

range as well.) However to flow shielding gas through the welder and gun requires only from 3 to 7 psi depending on restrictions. Therefore every time welding stops the pressure in the gas hose raises to the regulator pressure of 25 to 80 psi. That stores up to 7 times the hose volume of gas in the hose. This is similar to your shielding gas cylinder which holds about 150 times the volume of gas as the physical volume of the cylinder due to the high pressure!

The patented **GSS** stores over 80% less gas than typical shielding gas hoses. In addition to the wasted gas (which you can hear when you pull the gun trigger) the high flow also causes air to be pulled into the turbulent shielding gas stream! This is like starting with the gas cylinder shut off! You have probably experienced that before when you forgot to open the valve!

It takes a short time for the shielding gas flow to return to a smooth less turbulent (laminar) flow even when the start gas surge flow reduces. That can take several seconds so when making short welds or tack welds you're not getting all the benefits of the shielding gas you're purchasing!

The **GSS** also has a surge restriction orifice built into the fitting at the welder- wire feeder end. That limits peak flow (*but not your set flow, you're still in control, unless trying to set excessively high flow rates*) to a level that avoids excess turbulence but still allows a controlled amount of shielding gas to quickly purge the weld start area. **All you need to do is replace the exiting gas hose from cylinder regulator to welder with our patented GSS.**

**Have a Friend with a MIG Welder?**

**Know Someone with a Fabrication Shop That Welds?**

**Do Them a Big Favor and Have Them Review the Shielding Gas Saving Information on Our Web Site:**

**[www.NetWelding.com](http://www.NetWelding.com)**

There are more testimonials at:

[http://www.netwelding.com/product/on\\_test\\_results.htm](http://www.netwelding.com/product/on_test_results.htm)

Have more questions? See:

[http://www.netwelding.com/Overview\\_GSS.htm](http://www.netwelding.com/Overview_GSS.htm)

Or email us at:

[TechSupport@NetWelding.com](mailto:TechSupport@NetWelding.com)