GSP

Gas Surge Preventers

What are they? Gas surge preventers are restricted flow orifices designed to work two-fold. The GSP design removes all gas surge associated with GTAW and GMAW welding, while making the gas flow fixed at a predetermined flow according to PSI.

Gas surge is the sudden blast of inert gas after opening the valve of a Tig torch or pulling the trigger of a mig gun. Several factors come into place when trying to evaluate cost savings on gas surge. First and foremost how many times do your welders start and stop a weld. How far are you from your gas supply, the longer and older the gas hose the bigger the surge. Back pressure builds up at valves and solenoids just like the nozzle on your garden hose. When you open that nozzle, you get a blast of water until back pressure is gone, and actual flow rate is established. This might be beneficial when cleaning the driveway, but welding surge adds no benefit to the weld, and at times could be detrimental to the weld deposit.

Finally how many welders do you have welding and how many shifts. (Fig. 2 shows an actual example on cost savings from surge) Minimizing surge could save you hundreds maybe even thousands of dollars a month on your gas bill.

The other benefit of the new GSP is the capability to control maximum CFH (Cubic Feet per Hour) through the torch during a weld. This is achieved by customizing the GSP according to line PSI. (Fig. 1) This chart was compiled to accommodate bulk gas users as well as bottle users. Use figure 3 to determine line pressure of several different manufacturers of regulator flow meters, the chart depicts their working outlet pressures. CFH is determined by PSI, when utilizing a GSP. There are seven different GSP's to choose from. Whether it be the PSI of your regulator/ flow meter, or PSI set at your bulk tank we have the GSP to give you the CFH you are looking for.

Another feature about the new GSP, is the doing away with costly repairs of your regulator flow meters. (On bulk or manifold systems only) CFH is determined by PSI when speaking of GSP's. A properly maintained GSP will deliver exactly what figure 1 states as long as line pressure stays constant. Therefore if you can maintain a constant line PSI throughout your facility, you can do away with your regulator flow meter at each gas drop.

Fig. 1 **GSP Flow Rates** with 75/25 Mix

GSP #	PSI Required to maintain 40 CFH	25 PSI	30 PSI	35 PSI	40 PSI	50 PSI	65 PSI	80 PSI
GSP-1	20 PSI	44 CFH	48 CFH	53 CFH	59 CFH	71 CFH	*	105 CFH
GSP-2	28 PSI	38 CFH	42 CFH	45 CFH	49 CFH	57 CFH	*	85 CFH
GSP-3	34 PSI	32 CFH	37 CFH	41 CFH	45 CFH	50 CFH	*	76 CFH
GSP-4	35 PSI	31 CFH	36 CFH	40 CFH	43 CFH	49 CFH	*	72 CFH
GSP-5	50 PSI	24 CFH	26 CFH	30 CFH	35 CFH	40 CFH	48 CFH	55 CFH
GSP-6	59 PSI	21 CFH	23 CFH	25 CFH	29 CFH	35 CFH	43 CFH	49 CFH
GSP-7	75 PSI	18 CFH	20 CFH	22CFH	23 CFH	28 CFH	35 CFH	42 CFH

Reduce gas usage by as much as 50% with the new GSP

The new **GSP** is made of solid brass components, with a 304 stainless steel screen, to keep trash out of the orifice. The screen is crucial for the success of the **GSP**, maintaining a clear orifice will assure you of the proper CFH.

Another feature of the new **GSP** is the capability to interchange orifices. This feature gives you the ability to change your CFH, if the welding procedure calls for it. Or maybe you just do not need all that line pressure anymore since your usage is down, so you adjust you bulk tank settings which adjust your CFH.

To assure the proper CFH, it is recommended that the orifices be cleaned periodically, flow rates should be checked with a flow monitor and if using a bulk system check to make sure that line pressure has maintained constant since installment.

It is further recommended that the **GSP**'s be changed out every five to ten years to assure proper orifice size and flow.

Fig. 2 **GSP** Actual Example of Cost Savings on Surge

This sample was derived from the average surges from 10 weld stations, randomly selected throughout a facility.

180 cfh surge 6 seconds to settle to actual flow w/o **GSP**
38 cfh surge for 2 seconds to settle to actual flow w/ **GSP**
180 cfh
+ 38 cfh
218 cfh / 2 = 109 cfh average cfh lost in surge
109 cfh / 60 = 1.8166 cf lost per minute 1.8166 / 60 = .030 cf lost per second
.030 cf X 4 (average time of actual surge) = .12 cf lost in every surge
75 (average trigger pulls per person in a shift) X .12 cf =
9 cf lost per person per shift
9 X 90 (weld stations) = 810 cf saved per day per shift
810 cf X 2 (shifts) = 1,620 cf saved per day
1,620 cf X 250 (days of welding a year) = 405,000 cf saved per year
405,000 X .05 (cost per cf of gas) = $20,250.00 cost savings per year

1998 Cost of Gas purchased = $71,075.70 $20,250.00 / $71,075.70 = .284 or 28%
28% cost savings if **GSP's** were in place, **75** was highlighted since it plays such a key role in the calculation, **75** was being very conservative.

This savings was on surge alone, imagine what the savings would be when you have control over maximum CFH out of torch.

Fig. 3 Outlet Pressures from Several Manufacturers

Plus some flow meter calibrations set from factory

MANUFACTURER	25 PSI Outlet Pressure	30 PSI Outlet Pressure	50 PSI Outlet Pressure	80 PSI Outlet Pressure
VICTOR * All Flow meters are calibrated at 25 PSIG	Everything except, some carbon dioxide regulators			All carbon dioxide models that end with 80
HARRIS * All flow meters are calibrated at 20 PSIG			Harris has changed everything to 20 PSI	
ESAB * Flow meters have several different calibration PSIG's to choose from 20, 25, 50, and 80			Everything except one carbon dioxide model	Model R-5008
SMITH * Models H1103D and H1351D are calibrated at 80 PSIG, while all the rest are set at 30 PSIG		Everything except some carbon dioxide regulators		Model #'s H1950C-580 H1955C-320 H1755B-320

The reason the calibration PSIG's was placed on this chart was to bring attention to something that is overlooked quite frequently. Mixing of regulators with other brand flow meters, & bulk systems utilizing only flow meters not paying attention to what PSI the flow meters were calibrated at. This occurs more often than you can imagine. For example; A shop puts a Victor regulator at his bottle and a Harris flow meter at back of his wire feeder, the flow meter will never give him a proper reading since the Victor regulator has an outlet pressure of 25 PSI and the Harris flow meter is calibrated at 20 PSIG. This situation tends to happen more frequently on bulk systems. A shop owner needs 65 PSI on his manifolded bulk system to accommodate the proper flow throughout his shop due to narrow service lines. He then depends on a Victor flow meter which is calibrated at 25 PSI, his readings are never true due to calibration and line pressure differences.

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