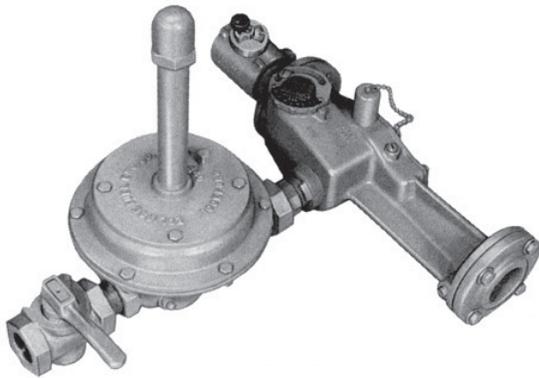


# Eclipse Vari-Set Proportional Mixers



**Figure 1.1. Assembly "VSBG"**

Eclipse Vari-Set Proportional Mixers are used to mix low pressure air (2 osig to 4 psig) and any commercially available fuel gas at low pressure (4" w.c. to 16 osig) and deliver the mixture under pressure to open or sealed premix type gas burners.

The gas is automatically entrained and mixed with the air in the correct air/gas ratio over the entire range of operation. The amount of air pressure that should be provided from the combustion air blower (Bulletin 610) will depend on the turndown range required, and this will vary according to the application. Vari-Set Mixers can also be used with compressed air by using an Eclipse Airjector (Bulletin 618).

Single valve control, as provided by the "VS" Mixer, eliminates the need for the operator to regulate both the gas and air valves as the heat requirements change. Efficiency losses invariably result when manual adjustment of both air and gas valves is depended upon for air/gas ratio control. A slight excess air or excess gas condition can cause serious losses in efficiency of operation and extend length of heat-up time. When these losses are eliminated by a Series "VS" Mixer, the investment in equipment is soon repaid in fuel savings.

By providing single valve control, the Vari-Set Mixer makes temperature control adaptation very simple. It is necessary to control the air flow only, using a single

control valve, and the gas flow automatically changes in direct proportion.

## Operation

The complete mixer (Series "VSBG") consists of a manually controlled air butterfly valve, a venturi casting with integral, adjustable throat blades for air/gas ratio adjustment, a zero gas governor and a lever handle gas shut-off cock.

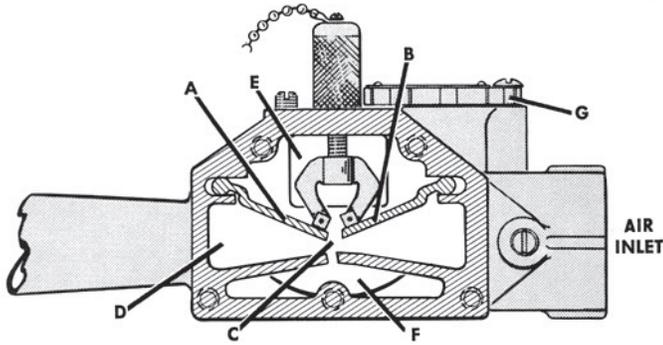
Referring to the sketch, as air flows past the adjustable throat blades "A" and "B", through the adjustable jet "C" into the venturi tube "D", a suction is created in chambers "E" and "F", entraining gas that has been reduced to zero pressure by the zero gas governor, and mixing it with the air in the venturi. If the gas varies in Btu content or specific gravity, a simple change in the gas selector, "G", will again provide the correct mixture.

To secure highly accurate air/gas ratio control, the gas pressure must be reduced either to atmospheric or to the same pressure or suction condition as exists in the combustion chamber.

If the burners being used are firing in the open or into a furnace at zero pressure, the governor is used with the top diaphragm chamber vented to the atmosphere. If a suction or pressure condition exists, the top diaphragm chamber should be connected to the combustion chamber. The governor will then deliver gas only when air flows through the mixer.

If only very low air pressure is available (4 osig or under), the suction in the entrainment tee may not be sufficient to draw enough gas through the governor to maintain proper air/gas ratio. In this case, an impulse line with bleed fitting should be installed downstream of the control valve from the air manifold to the top diaphragm chamber of zero governor. As a result, any change in air flow is transmitted to the zero governor, and air/gas ratio is maintained throughout the range of operation. Mixers are available from the factory complete with impulse line and bleed fitting installed. (See pricelist).

The Vari-Set Mixer can be turned to discharge the mixture in any direction for flexibility of piping, however, the zero gas governor must be in the horizontal position with spring stem upright so that the balancing spring hangs vertically. Several mixers may be manifolded to one zero governor if located reasonably close together. Each size of Vari-Set Mixer is available in four different assemblies for ease in selecting the mixer and accessory combinations to fit your particular needs (see pages 3 and 4).



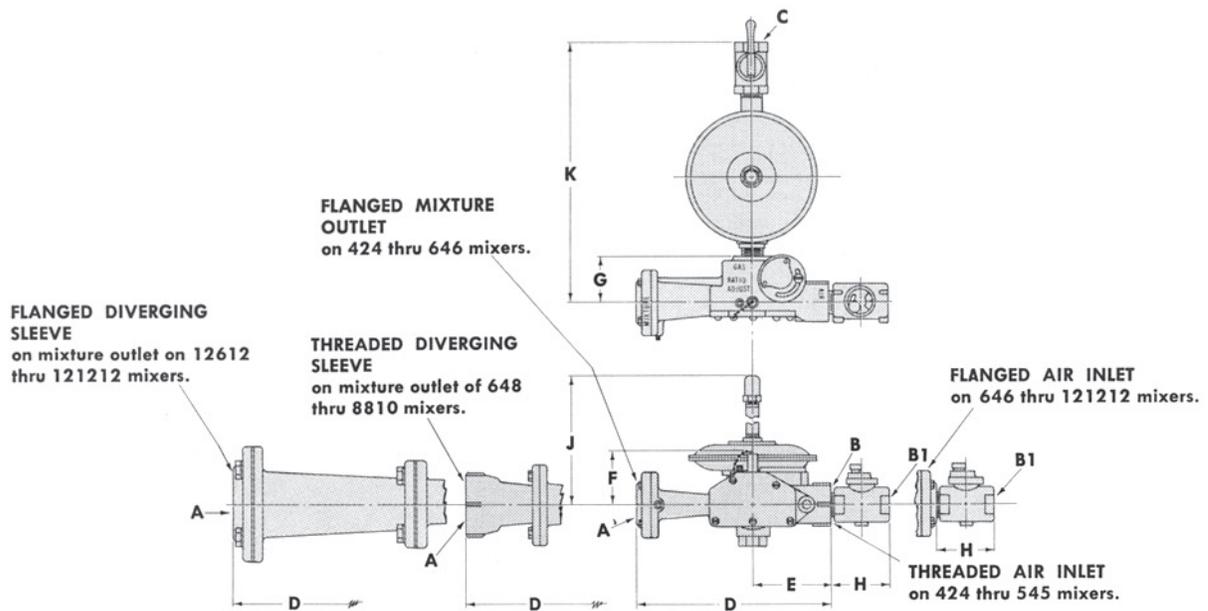
## Selection

Selection Tables 654-1 through 654-3 give mixer selection information for various commercially available fuel gases.

Locate required gas capacity (CFH) in left-hand vertical column of appropriate selection table, locate air pressure available at mixer in upper horizontal column, and select mixer. Approximate mixture pressure is shown in bottom horizontal column.

Tables are based on all air for combustion taken through the mixer (100% aeration). When less than 100% aeration is used, as in the case of open burners, correct the capacity for the amount of aeration and use corrected capacity for selecting mixer. (Correction factor for 80% aeration = 0.80; 70% aeration = 0.70, etc.)

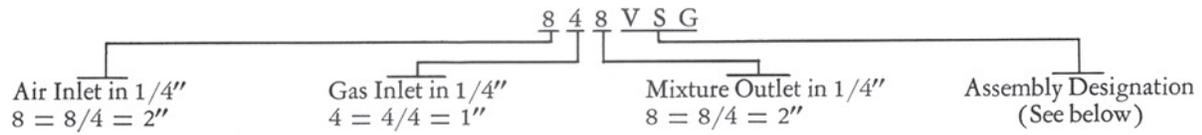
## Dimensions and Specifications



Mixer No.	"A" NPT Mixture Outlet	"B" NPT Air Inlet	"B1" NPT Butterfly Valve	"C" NPT Gas Inlet	D	E	F	G	H	J	K	Approx. Shipping Weight lbs			
												VS	VSB	VSG	VSBG
424	1	1	1	1/2	10-1/8	4	3-1/16	2-1/2	3-1/2	1-7/32	11-1/8	15	17	17	18
434	1	1	1	3/4	10-1/8	4	3-1/16	2-1/2	3-1/2	1-1/4	13-1/8	15	17	18	20
444	1	1	1	1	10-1/8	4	3-1/16	2-7/32	3-1/2	13-3/8	15-23/32	15	17	37	39
535	1-1/4	1	1-1/4	3/4	10-1/8	4	3-1/16	2-1/2	3-3/4	1-1/4	13-1/8	15	18	18	21
545	1-1/4	1	1-1/4	1	10-1/8	4	3-1/16	2-7/32	3-3/4	13-3/8	15-23/32	15	17	37	39
646	1-1/2	1-1/2	1-1/2	1	13-1/8	4-11/16	3-3/4	2-3/4	4-1/4	13-3/8	16-1/4	20	23	42	45
648	2	1-1/2	1-1/2	1	17	4-11/16	3-3/4	2-3/4	4-1/4	13-3/8	16-1/4	21	24	43	46
666	1-1/2	1-1/2	1-1/2	1-1/2	13-1/8	4-11/16	3-3/4	2-3/4	4-1/4	13-3/8	20-1/16	19	22	57	60
668	2	1-1/2	1-1/2	1-1/2	17	4-11/16	3-3/4	2-3/4	4-1/4	13-3/8	20-1/16	21	24	58	62
848	2	2	2	1	14-1/16	5-5/16	4-7/16	3-15/32	4-1/4	13-3/8	17	25	29	45	49
8410	2-1/2	2	2	1	17-9/16	5-5/16	4-7/16	3-15/32	4-1/4	13-3/8	17	25	29	45	49
868	2	2	2	1-1/2	14-1/16	5-5/16	4-7/16	3-15/32	4-1/4	13-3/8	20-23/32	25	29	63	67
8610	2-1/2	2	2	1-1/2	17-9/16	5-5/16	4-7/16	3-15/32	4-1/4	13-3/8	20-23/32	25	29	63	67
8810	2-1/2	2	2	2	17-9/16	5-5/16	4-7/16	3-7/32	4-1/4	15-1/4	20-23/32	25	29	94	98
12412	3	3	3	1	22-5/16	7-7/32	3-7/8	5-3/4	4-7/8	13-3/8	18	45	54	67	75
12612	3	3	3	1-1/2	22-5/16	7-7/32	3-7/8	5-3/4	4-7/8	13-3/8	18	43	53	82	91
12812	3	3	3	2	22-5/16	7-7/32	3-7/8	5-3/4	4-7/8	15-1/4	15-3/4	43	53	114	122
121212	3	3	3	3	22-5/16	7-7/32	3-7/8	5-3/4	4-7/8	16-3/4	26-5/8	43	53	-	-

NOTE: All dimensions are in inches.

## Catalog Number Example



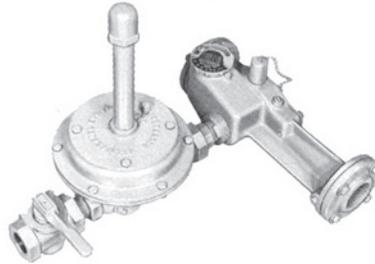
## Assemblies Available



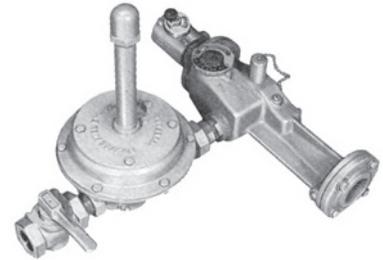
**ASSEMBLY "VS"**  
Basic Mixer Only



**ASSEMBLY "VSB"**  
Assembly "VS" Plus  
Manual Air Butterfly Valve



**ASSEMBLY "VSG"**  
Assembly "VS" plus  
gas zero governor and gas cock



**ASSEMBLY "VSBG"**  
Complete mixer — Assembly "VSG"  
plus manual air butterfly valve