

# Consta-Mix Valves

Algas-SDI Consta-Mix valves are precision gas/air or gas/gas mixers and controllers, designed specifically for use in these applications: Pre-mix systems to supply a combustible gas/air mixture to gas burning equipment; Gas/air or Gas/gas mixing to supplement digester gas for use in engine generators to generate electricity at wastewater treatment facilities or landfill reclamation sites; Standby systems to replace or augment the supply of natural gas by mixing LP-gas with air in the event of interruption; and enriching or trimming natural gas with LP-gas or air to achieve a stable heating value for process quality improvement.

The Consta-Mix valve offers extreme flexibility. Any type of commercial fuels can be used. Once the gas/air ratio is set, no further adjustments are required. Regardless of demand requirements, exact mixing ratio is maintained with smooth, pulse-free operation. Consta-Mix valves and systems are designed for continuous use.

Algas-SDI Consta-Mix valves are Factory Mutual Research approved and are available with maximum capacities ranging from 3,000 to 140,000 cfh. Delivery pressure is dependent on the booster or compressor used. Turndown ratios from maximum to minimum flow exceed 100:1.

To aid in the selection of the proper Consta-Mix valve to suit your requirements, contact your nearest Algas-SDI representative or the factory.

## Operation

Algas-SDI Consta-Mix valves are variable area, constant pressure drop devices incorporating two precision cones mounted on a common shaft, which float over a pair of precision orifice plates. The two cones and their respective orifices are machined to maintain the same mixing proportion of the two gases throughout the entire operating range.

The two cones are factory preset to just close off the annular areas but do not actually rest on the orifice plates, minimizing wear on the cones. Consta-Mix valves have been in operation for over 50 years needing only minimal maintenance.

Referring to Figure 1, when suction is created, the two gases (both at atmospheric pressure) are drawn into the mixing valve chamber through their respective openings. The ratio of the gases is

controlled by the annular orifice area which is created by the opening between the cone and orifice. Within the mixing chamber, the two gases are mixed and then drawn into the booster/compressor where the pressure is elevated.

Suction in the valve is transmitted to the diaphragm through an impulse line. As the demand increases, the resulting pressure drop across the orifices forces the diaphragm further open until the pressures balance and the demand is satisfied.

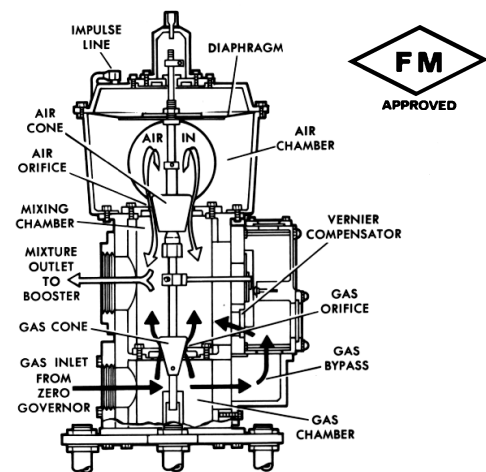


Figure 1

The reverse happens as the demand decreases.

A predetermined amount of the primary gas is diverted through a bypass containing the vernier compensator. The vernier compensator provides very precise and controlled tuning of the final gas mixture over the entire flow range. The vernier compensator illustrated in Figure 2 features a large adjustable slide for adjusting the mixing ratio over the entire range and an array of smaller individual slides that can be used to fine tune the mixture at any specific flow rate within the flow range of the Consta-Mix.

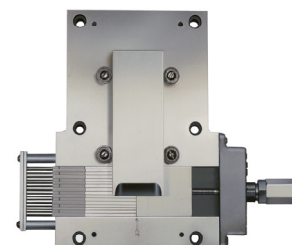
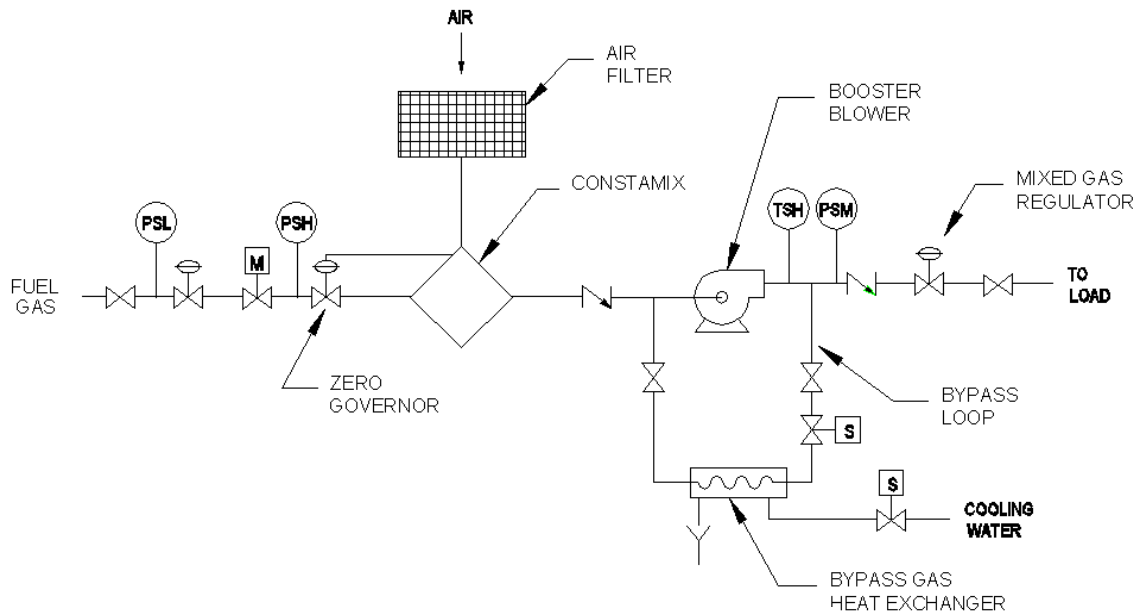


Figure 2

## ***Waste Water Treatment and Landfill Gas***



**Typical WWTP Consta-Mix P&ID**

Consta-Mix systems are used at wastewater treatment facilities that burn digester gas in internal combustion engines to generate electricity. In these applications the Consta-Mix system supplies a natural gas/air or propane/air mixture to the engines as a supplement to the fluctuating digester gas supply. In actual operation, as the digester output varies, the supply from the Consta-Mix makes up the difference allowing the engines to maintain continuous output all-the-while using all of the digester gas available. Only as much natural gas or propane is as is needed to make up the difference. In the event the digester is down for maintenance or repair, the Consta-mix system can be used to continue full operation of the engines. The superior turndown of the Consta-Mix machine assures smooth engine operation at all levels of demand. The typical mixture setting for natural gas/air is 60% natural gas and 40% air, with discharge pressures ranging from 10" w.c. to 3 psig.

All Consta-Mix systems are supplied mounted on a heavy-duty steel base with solid top plate. All systems come standard with FM-style inlet gas train with zero-gas governor and all safeties, air inlet filter, discharge booster with starter, check valve, low mixed gas pressure safety switch and Consta-mix valve. Standard configuration meets Class I, Division 2, Group D.

In some applications it may be necessary to use an optional booster by-pass cooling circuit to remove excess heat from the gas in the booster during down cycles.

| Model | Mixing Capacity, scfh |
|-------|-----------------------|
| 30CM  | 3,000                 |
| 116CM | 10,000                |
| 124CM | 25,000                |
| 32DV  | 40,000                |
| 32SDV | 72,000                |
| 40DV  | 140,000               |