



3 GAS MIXING SYSTEMS

Models 8110, 8115, 8210, 8215, 8610, 8615



Model 8615
Shown with the pressure alarm system
(Model 8610 is similar)



Model 8115
Shown with the pressure alarm system
(Model 8110 is similar)

APPLICATION

The Thermco 3 gas mixer is designed to mix three non-flammable and non-corrosive gases. A constant mixture ratio is maintained between the three gases from shutoff to full flow conditions. The 3 gas mixing system is normally used with a process where the supply gases are drawn from bulk sources and the mixture is produced on site to supply a process by a pipeline. The system is designed for applications that require a very reliable production of mixed gas on a continuous basis such as shield gases for welding.

The 3 gas mixing system is capable of replacing 3 gas mixtures which are prepared in cylinders, which are costly and sometimes difficult to obtain. The 3 gas mixer is able to utilize inexpensive and commonly available bulk sources of gases, such as liquid cylinders.

Three capacities are available; 0-750 SCFH, 0-2000 SCFH, and 0-5000 SCFH. All 3 gas mixers are designed to be mounted indoors.

EXAMPLES OF POSSIBLE MIXTURES

Gas Mixtures

88% argon/9%carbon dioxide/
3% oxygen

90% helium/7.5% argon/
2.5% carbon dioxide

Application

GMA welding of
carbon steel

Welding of
stainless steel

FEATURES

- Infinite flowrate turndown
- Electrical design incorporates common pressure switches, solenoid valves, and regulators for easy maintenance
- Option of pressure alarm system.

PRINCIPLES OF OPERATION

The gases to be mixed are supplied from bulk storage system to the gas mixer. Normally the required pressure will be between 100 and 125 PSIG. Within the gas mixer these gas streams are regulated to the same pressure. Downstream of the gas regulators, the major gas flows through a fixed orifice and the two minor gases flow through fine metering valves. After passing through these devices, the three gas streams are combined and pass into a surge tank. Once the pressure in the surge tank reaches the upper set point on the pressure switch, the gas supplies are automatically shutoff with a solenoid valve. As mixed gas is required, the pressure in the surge tank falls until it reaches the lower set point of the pressure switch. At this point the gas supplies are turned on and the cycle repeats.

The principle of the system is that under changing mixed gas flowrate only the cycling frequency changes; the pressure drops across the flow devices remain the same producing the consistent mixture.

SPECIFICATIONS

Model	Flowrate	Gases
8610	0-750 SCFH	Any 3 non-flammable,
8110	0-2000 SCFH	non-corrosive gases,
8210	0-5000 SCFH	not oxygen

Model	Flowrate	Gases
8615	0-750 SCFH	Any 3 non-flammable,
8115	0-2000 SCFH	non-corrosive gases,
8215	0-5000 SCFH	one oxygen

Accuracy: ±5% of the minor component for minor components larger than 7.0%; ±.35% of the minor component absolute for components from 1.0 to 7.0%. For components less than 1.0%, consult the factory.

Example: for a 3% O₂, 9% CO₂ in Ar mixture, the accuracy of the O₂ is ±0.35%; the O₂ will be within the limits of 2.65% to 3.35%. The accuracy of the CO₂ will be 9% x 0.05 = ±0.45%; the CO₂ will be within the limits of 8.55% to 9.45%.

Accuracies assume that the gases entering the gas mixer are at equal temperatures and the supply gases and gas mixer ambient are in the range of 50-90°F (10-32°C). Accuracy outside these temperature limits will vary; consult the factory for details.

Ambient Operating Temperature Limits: 32-100°F (0-38°C)

Supply Gas Pressure: 100-125 PSIG (6.9-8.6 Bar) All Models

Mixed Gas Pressure Supplied by Mixer: 10-50 PSIG (0.7-3.4 Bar) All Models

Supply, Mixed Gas Connection: ½" NPT female all ports for Models 8610, 8615, 1" NPT female all ports for Models 8110, 8115, 8210, 8215.

Surge Tank: 5 gallon, Model 8610, 8615; 30 gallon, Models 8110, 8115; 60 gallon, Models 8210, 8215. All surge tanks are ASME coded and CRN registered with a pressure relief valve.

Power Requirements: 115 VAC, 50/60 Hz, 0.5 amp. Acceptable voltage range 102-120 VAC. Available on request, 220 VAC, 50/60 Hz, 0.25 amp. Acceptable voltage range 204-240 VAC.

	Net Weight	Shipping Weight
Weight: Models 8610, 8615:	70 lbs. (32 KG)	125 lbs. (57 KG)
Models 8110, 8115:	170 lbs. (77 KG)	250 lbs. (113 KG)
Models 8210, 8215:	270 lbs. (122 KG)	350 lbs. (159 KG)

Dimensions: Models 8610, 8615: 31.6" (81cm) height, 20.6" (52cm) width, 10.3" (26cm) depth.
Models 8110, 8115: 31" (79cm) height, 41" (104cm) width, 29" (74cm) depth.
Models 8210, 8215: 35" (89cm) height, 51" (130cm) width, 29" (74cm) depth.

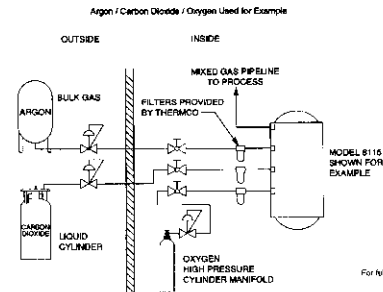
Mounting: Models 8610, 8615 – wall or bench mounted
Models 8110, 8115, 8210, 8215 – floor mounted

OPTIONAL PRESSURE ALARM SYSTEM

A pressure alarm system is available to alert personnel in the event of low input gas pressure. When one of the input gas pressures falls too low to create an accurate mixture, a light specific to the low pressure gas is illuminated on the front door, and a horn on the enclosure sounds. The operator can silence the horn with a horn silence button on the front door. This alarm will help prevent the creation of an improper mixture if one gas source is exhausted, or low input pressure is caused by some other reason.

 Printed on recycled paper using vegetable based inks.

TYPICAL INSTALLATION



CHANGING THE GAS MIXTURE

The gas mixture proportion is set at the factory per the customer request. Since the gas mixer is designed with a fixed orifice for the major gas and metering valves for the two minor gases, the proportion can be changed by the user. If the user desires to make a change, the user can adjust the metering valves in the gas mixer to create a new proportion, but the user must use a gas analyzer to measure the resulting mixture. For information concerning the range of adjustability, please contact the Thermco factory.

SPECIAL REQUIREMENTS

Gas mixers utilizing the basic design can be engineered for special applications. These include applications which require higher or lower pressures or the addition of special switches or gas analyzers. Consult Thermco for details on these special requirements.

THE THERMCO QUALITY ASSURANCE PROGRAM

All gas mixers are tested for a minimum of 24 hours on the actual process gases at the ordered pressure conditions. Each gas mixer is precisely tested with gas analyzers to verify the mixture accuracy. Thermco has available gas chromatography, infrared, paramagnetic and electrochemical types of gas analyzers to test the mixture. A copy of the inspection report is available on request.

DOCUMENTATION

A comprehensive instruction manual is provided with each gas mixer. A specific data sheet is made for each order which specifies pressure settings, orifice sizes, critical components and recommended spare parts. A copy of the manual is kept on file at Thermco to assist in service help.

WARNING

Improper use of this product can cause death, serious injury, or property damage. Personnel dealing with this equipment should read and understand warning labels and instruction manuals provided by Thermco. Only personnel familiar with industrial gases should attempt to install or service this equipment. Gases from high pressure cylinders must be reduced to the specified pressure before entering the gas mixing system to prevent the possibility of equipment damage and personal injury.

Only use oxygen in gas mixers specifically designed for oxygen service. Gas mixers not designed for oxygen service can not be converted to oxygen service. Flammable or corrosive gases should not enter these gas mixing systems.

NOTICE

In the interest of continued product development, Thermco reserves the right to change design features without prior notice. Sale of this equipment is under the terms of the Thermco warranty available upon request.

ORDERING INFORMATION

Orders may be placed directly with Thermco or thru many local gas suppliers.

When ordering, please state the mixture proportion, the application for the gas mixture, if the pressure alarm is required, and whether the standard pressures are acceptable.