

## ***IRI Requirements For Gas Burner Systems***

### **General Remarks:**

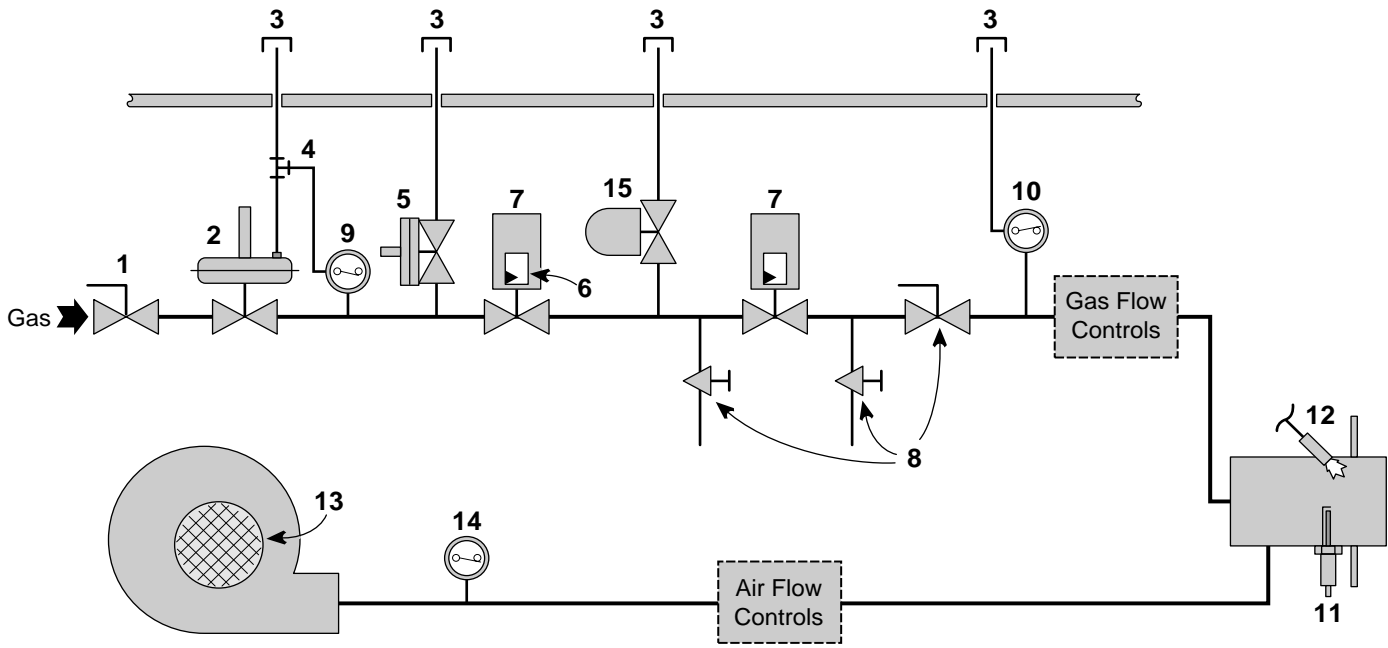
The schematic and notes on the following pages condense the gas burner system requirements of Industrial Risk Insurers (IRI) into an easy-to-use format. They should provide most of the engineering information required to lay out burner air and gas trains. In general, IRI follows the requirements of National Fire Protection Association (NFPA) 86, but adds a vent valve.

In addition to the requirements shown on the schematic, IRI also requires that the combustion control system have the following features:

- 1) Forced low fire lightoff of burners that cannot be safely ignited at all firing rates.
- 2) Prior to energizing spark or lighting pilot, a timed prepurge of at least four standard cubic feet of air per cubic foot of furnace or oven volume. Purging of radiant tubes, however, is not required.
- 3) Except for burners with inputs not exceeding 150,000 Btu/hr (44kW) and radiant tube burners, direct spark igniters must be shut off after main burner trial-for-ignition.
- 4) Trial-for-ignition of pilots or main burners must not exceed 15 seconds.
- 5) Automatic relight (recycling) after unintentional flame failure is prohibited.
- 6) Safety control circuits must be single phase, one side grounded, with all breaking contacts in the "hot", ungrounded fuse (or circuit breaker) protected line. Maximum line voltage is 120V.

Piping and electrical schematics of the proposed system must be submitted to the local IRI office in whose jurisdiction the system will be located. Schematics must be approved and stamped before construction begins.

# Piping Schematic



Item	Description																		
1	Individual manual shutoff valve to each piece of equipment. 1/4 turn valves recommended.																		
2	Pressure regulator required wherever plant supply pressure fluctuates or exceeds level required for proper burner function.																		
3	Regulator vent with water protection & bug screen (not required for lighter-than-air gases at 1 psig [6.9 kPa] or less).																		
4	Gas pressure switches may be vented to regulator vent lines if backloading won't occur.																		
5	Relief valve required if gas pressure at regulator inlet exceeds rating of safety shutoff valve.																		
6	Position indication (not proof-of-closure) required on safety valves to main burners larger than 150,000 Btu/hr (44 kW).																		
7	Listed* safety shutoff valve(s). Two required over 400,000 Btu/hr (117 kW). Also applies to pilot gas system. Secondary shutoff valve can be a solenoid valve if it has position indication and a closing spring with at least 5 lb. closing force.																		
8	Test cock(s) and downstream shutoff valve for checking leak tightness of safety shutoff valves.																		
9	Listed* low gas pressure switch (normally open, makes on pressure rise).																		
10	Listed* high gas pressure switch (normally closed, breaks on pressure rise).																		
11	Listed* combustion safeguard. Heat-actuated (thermocouple) safeguards or safety pilots permitted up to 150,000 Btu/hr (44 kW). Above 150,000 Btu/hr, must be flame rod or scanner system with a nominal flame response of four seconds or less.																		
12	Ignition by manual torch, direct spark or constant, intermittent or interrupted pilot.																		
13	Where required to screen out solid matter, blower inlet filter is required.																		
14	Listed* combustion air flow or pressure proving switch (normally open, makes on pressure rise).																		
15	<p>Listed* electrically operated, normally open vent valve with vent pipe run to a safe outside location. Valve port area must be equal to the vent line cross section. Vent valve and vent line pipe size are related to main fuel line size as follows:</p> <table> <thead> <tr> <th>Fuel line size, inches (mm)</th><th>Minimum vent line size, inches (mm)</th></tr> </thead> <tbody> <tr> <td>Up to 3/4 (20)</td><td>Same as fuel line</td></tr> <tr> <td>3/4 (20) to 1-1/2 (38)</td><td>3/4 (20)</td></tr> <tr> <td>2 (50)</td><td>1 (25)</td></tr> <tr> <td>2-1/2 (65) to 3 (75)</td><td>1-1/4 (32)</td></tr> <tr> <td>4 (100)</td><td>2 (50)</td></tr> <tr> <td>6 (150)</td><td>2-1/2 (65)</td></tr> <tr> <td>8 (200)</td><td>3-1/2 (90)</td></tr> <tr> <td>Greater than 8 (200)</td><td>At least 15% of the cross sectional area of the main fuel line.</td></tr> </tbody> </table> <p>If vent line exceeds 50 feet (15.24 meters) or has an unusual number of fittings, vent line size may have to be increased. Vent lines should not be manifolded together.</p>	Fuel line size, inches (mm)	Minimum vent line size, inches (mm)	Up to 3/4 (20)	Same as fuel line	3/4 (20) to 1-1/2 (38)	3/4 (20)	2 (50)	1 (25)	2-1/2 (65) to 3 (75)	1-1/4 (32)	4 (100)	2 (50)	6 (150)	2-1/2 (65)	8 (200)	3-1/2 (90)	Greater than 8 (200)	At least 15% of the cross sectional area of the main fuel line.
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\* Underwriters Laboratory (UL) listing is accepted throughout the United States. Listed products can be found in the UL Gas and Oil Equipment Directory, available from Underwriters Laboratory, Inc., Publications Stock, 333 Pfingsten Road, Northbrook, IL 60062-2096.