



FIRE LION BALANCED PRESSURE PROPORTIONING SYSTEMS

Key Features are:

- Independent Foam Or Water Flow At Any Outlet
- Automatic Foam Pressure Balance Control As Flows Change
- Foam Percentage Independently Variable by manual metering valve adjustment
- Positive Displacement Foam Pump driven by PTO from Engine transmission

The Fire Lion balanced pressure system provides the option of foam and or water at every discharge equipped with a proportioner. Once the percentage (foam concentration) is set, the system automatically maintains that percentage as the flows change (with the flow range of the proportioner). Each outlet is independently controlled so that any combination of water or different percentages of foam is possible for each discharge.

The following major components comprise Fire Lion's balance pressure system:

- A Fire Lion, all bronze, Positive Displacement Foam Pump which discharges foam concentrate to the Pressure Control Valve.
- The Pressure Control Valve adjusts the correct amount of foam needed for each discharge and returns the unused portion of the foam pump output back to the foam tank.
- Panel mounted Metering Valves are required to set the desired percentage of foam for each discharge. Normal percentages are 0%, 1%, 3% (options for 6% are available).
- Pump suction Wye strainer to protect the pump.

- Check Valves are required in each foam concentrate line before the Metering Valves, which prevents water from entering the foam line when the foam system is not being used.
- Ratio Controllers are required for each outlet that foam is desired.
- A Duplex Gauge is installed to monitor the pressure of the water and foam systems, and will be needed to adjust the foam pressure when operating in the manual over-ride mode.
- A Relief Valve is required in the foam concentrate line to relieve excess foam pump pressure.
- Foam Pump: This pump must flow at least 10 gallons more than the total foam flow required (all discharges combined), at a pressure higher than the maximum water pump pressure. This figure is arrived by multiplying the maximum output of the water pump (GPM) by the highest percentage of foam concentration that will be used, then adding 10 gallons. The following is an example: -

Water Pump output 1250 GPM

Max. Foam % x .06 % = 75 GPM foam pump output

Added Balancing Valve Minimum Flow of 10 GPM

Foam Pump capacity is required to be 85 GPM -

The following are important information needed that will influence the type of foam pump required and should be discussed with Fire Lion Global LLC.

- The primary type of foam to be used.
- Maximum system Discharge pressure
- The truck engine speed combined with the PTO ratio, must produce sufficient RPMs to properly operate the foam pump.
- Pump Drive: Hydraulic or PTO. Fire Lion will advise required hp/torque and rpm needed to produce design flow rate at design discharge pressure.

• **Fire Lion Ratio Controllers/Metering Valves:**

The size of the ratio controller is determined by the pipe size and the flow required for each discharge.

The chart below will aid in determining what size, and how many ratio controllers, metering valves and check valves will be required for a specific truck.

Part Number	Flow Rating GPM(LPM)	Pipe Size MNPTx FNPT inch (mm)
1306-6	100 (380)	1-1/2" (38 mm)
1308-6	190 (720)	2" (50 mm)
1311-0	300 (1135)	2-1/2" (63 mm)

• **Duplex Gauge:**

We recommend the use of a liquid filled gauge for truck installations. This unit is flush mounted with lower back mounted gauge connections. The liquid filled gauge dampens vibration of the needle.

• **Relief Valves:**

A relief valve must be installed on the pump discharge piping to prevent damage to the foam pump and piping as a result of over-pressure of the foam pump. We use valves that are have a relief pressure of 275 PSI. Most Class A Fire Truck pumpers operate at pressures at or below 250 psig. Other pressure ratings are available upon request.

• **Wye Strainer:**

Wye strainer selection is matched to the foam pump port size with adequate consideration given to the viscosity of the primary foam that will be used on the apparatus being considered. The perforated screen in the Wye strainer must have holes in it which are not too small or too big, in either case the strainer will not function properly. It is generally recommended that the suction piping and strainer be increased one nominal pipe size when alcohol resistant foam concentrate is used.

• **Pressure Vacuum Vent:**

This is installed on the foam tank, and is used to keep the atmospheric pressure inside the tank at a stable level. This is not a part of Fire Lion scope but a key requirement.

Fire Lion Foam Pressure Balance Valve, either 1.5” or 2” NPT all bronze balance valve.

The Fire Lion Ratio Controllers are designed so that the percentage of foam remains constant throughout the entire flow range providing that the foam concentrate pressure is kept the same as the water pressure. The Pressure Control Valve automatically keeps the foam pressure equal to the water pressure. Since the system uses a positive displacement pump, there must be a return line for the excess foam to return to the concentrate tank. The 1 1/2" pressure control valve has pipe connections that are 1 1/2" FNPT. The maximum flow allowed is 135 GPM of foam concentrate (total solution flow x maximum %).

If larger flows are required, a 2" pressure control valve, with a maximum flow rate of 250 GPM of foam concentrate is available. This valve has 2" FNPT pipe connections.

Final design and quotation cost accuracy is dependent on the key factors as noted above. To properly quote a balanced pressure foam system, all key data must be provided to avoid confusion.

Flow Range U.S. GPM (LPM)	Proportioner Pipe Size	PART NUMBER		
		Ratio Controller inch (mm)	Metering Valve	Check Valve
60 to 200 (227 to 985)	2 in (50 mm) NPT	7959-0	9129-5	1102-2
	2 in (50 mm) Grooved	6003-5		
100 to 320 (380 to 1200)	2-1/2 in (63 mm) NPT	7959-5	-9130-0	1102-2
	2-1/2 in(63 mm) Spec FIG.	9504-1		
170 to 625 (645 to 2365)	3 in (75 mm) FIG.	8091-1	9136-0	1112-2
	3 in (75 mm) Grooved	6020-5		
350 to 1200 (1325 to 4545)	4 in (100 mm) FIG.	8091-7	9137-0	1112-2
	4 in (100 mm) Grooved	9524-2		
680 to 2500 (2575 to 9465)	6 in (150 mm) FIG.	8092-3	9142-0	1114-2

Installation is not complex and is simple to understand in comparison to electronic flow control systems on the market. In addition, operator training is streamlined.