READ THIS FIRST

Foam Generator Setup Guide **Smoke Ejector / PPV**

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SUPER VAC
THE VENTILATION SPECIALISTS

SUPERVAC INLINE EDUCTORS

These instructions are provided to allow safe and efficient use of this product. all personnel expected to use this product should be trained with these recommended operating procedures.

Principles of Eductors

An Eductor is a device that uses the venturi principle to introduce a proportionate amount of liquid concentrate into a water stream. This venturi principle is used in all Supervac eductors to induce foam or other liquid agents into a fire control stream.

The venturi is the constricted portion of the waterway near the eductor inlet. This restricted passage increases water velocity, thus momentarily reducing its pressure as it passes into the larger area of the induction chamber. Concentrate is introduced into this reduced pressure area through a metering device. The venturi orifice performs as a very efficient straight bore nozzle that is calibrated for a given flow at a given pressure. Supervac eductors are calibrated to flow rated capacity at 200 p.s.i. (14 Kg / cm²) inlet pressure and most non-aspirating fog/straight stream nozzles achieve rated flow at 100 p.s.i. Eductor inlet pressure of 200 p.s.i. (14 Kg / cm²) is necessary to overcome significant friction loss through the venturi and additional friction loss between the eductor and the nozzle. The nozzle must match the flow rate of the eductor. The eductor controls the flow through the entire system. If inlet pressure is increased, the flow of water will increase and if inlet pressure is decreased, the flow of water will decrease. As long as 200 p.s.i. (14 Kg / cm²) inlet pressure is maintained, the eductor will flow rated capacity, even with different nozzles and hose lays. Even with no hose or nozzle connected to the eductor outlet. The exception is if the nozzle has a lesser rated flow than the eductor. The nozzle will then take over control of the entire system and the eductor will not function properly. Once the eductor has established the flow of water, the performance of the downstream portion of the system will be determined by that flow. Friction loss through the eductor is not fixed.

Friction loss through the eductor can be calculated by subtracting the following three factors from the inlet pressure:

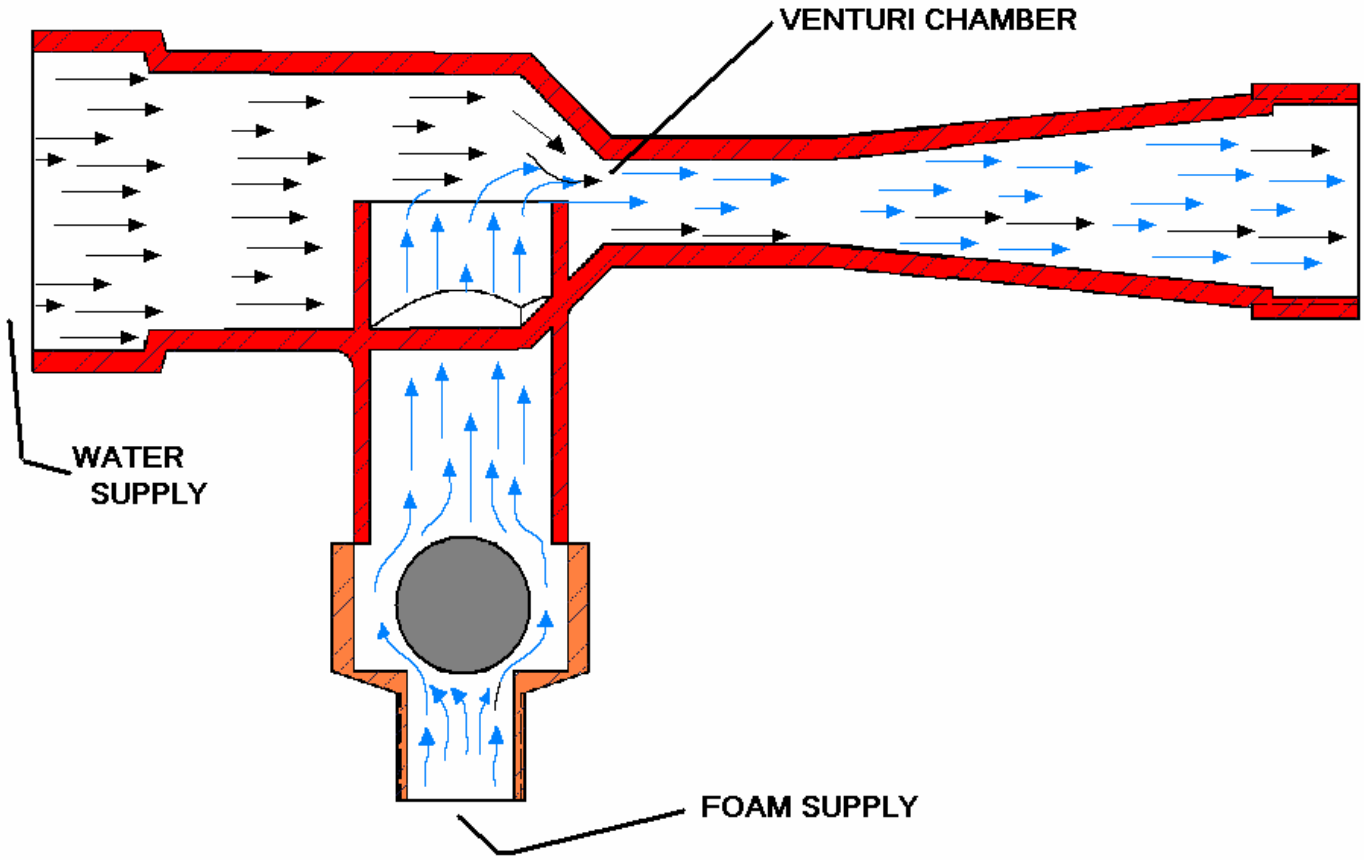
a) nozzle pressure
b) hose friction loss between the eductor and the nozzle
c) any pressure change due to a difference in elevation between the eductor and the nozzle. The eductor will pick up concentrate whenever the outlet pressure is less than 65% of the inlet pressure.

A metering device controls the flow of concentrate into the eductor. Atmospheric pressure acting on the surface of the foam concentrate, in its container, pushes the concentrate into the pickup tube, through the metering device and into the reduced pressure inlet chamber. Atmospheric pressure does not change, so the flow of concentrate remains the same as long as the low pressure area is created. However the flow of water will be different at different inlet pressures. Since the flow of concentrate remains the same but the flow of water changes, the resulting solution will have different percentages of concentrate at different inlet pressures.

The percentage shown on the metering device only applies at the correct eductor inlet pressure, 200 p.s.i. (14 Kg / cm²) If the eductor is operated at less than 200 p.s.i. (14 Kg / cm²) inlet pressure and thus a lower flow of water through the unit, the resulting foam solution will have a higher percentage of concentrate. With inlet pressure higher than 200 p.s.i. (14 Kg / cm²) the foam solution will have a lower percentage of concentrate.

For example, an eductor which produces a concentration of exactly 6% at 200 p.s.i. (14 Kg / cm²) inlet pressure will produce the following concentrations at different pressures:

5.5% at 250 p.s.i. (17.6 Kg / cm²)
6.0% at 200 p.s.i. (14 Kg / cm²)
6.9% at 150 p.s.i. (10.5 Kg / cm²)
8.4% at 100 p.s.i. (7 Kg / cm²)

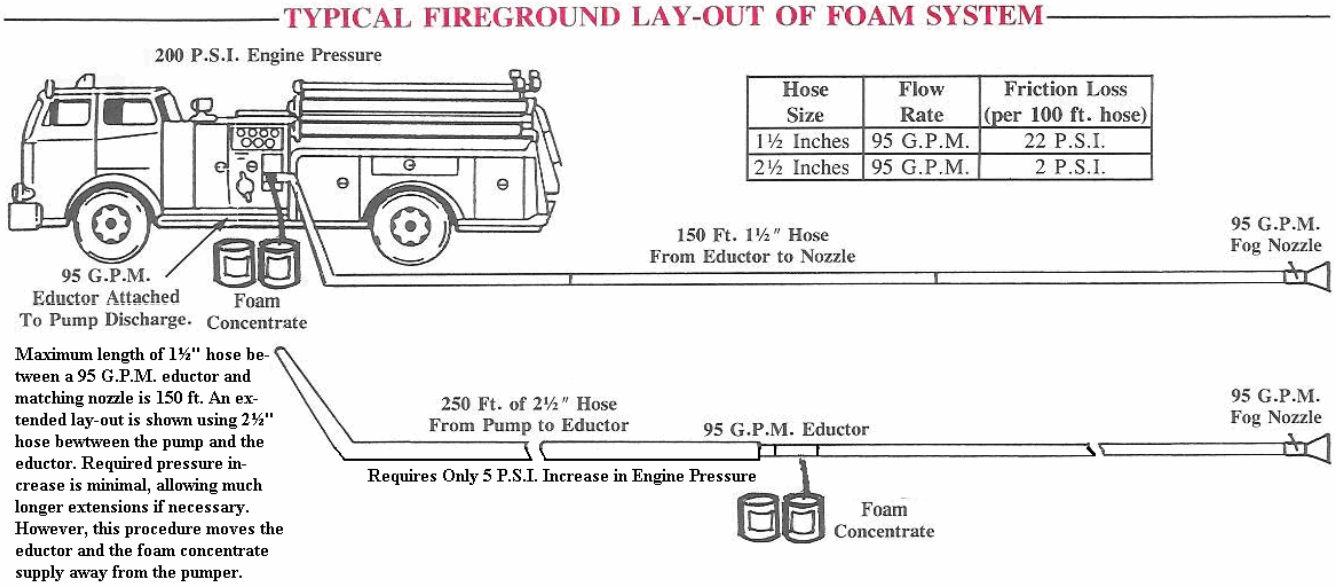


Basic Operating Instructions

1. Connect eductor to discharge outlet of apparatus.
2. Connect hose to discharge of eductor.
3. The eductor must be used with a nozzle having the same rated flow.
4. Open discharge and set proper flowing pressure. Eductor inlet pressure of 200 p.s.i. (14 Kg / cm²) is required for accurate proportioning of concentrate into the water stream and efficient nozzle performance. Be sure that nozzle is fully open.
5. Insert pickup tube into foam supply. There will be a delay of 12 to 15 seconds before the foam solution will be discharged at the nozzle in a typical system.
6. The hose lay between the eductor and the nozzle must not exceed the recommended length for the combination of flow rate and hose size being used.

Important Reminder

Eductor inlet pressure must be 200 p.s.i. (14 Kg / cm²) If correct pressure has been established and the eductor fails to pick up concentrate, increasing the inlet pressure will not correct the problem. Increased inlet pressure will increase water flow and thus nozzle pressure will also increase, creating excessive back-pressure at the eductor venturi.



Hose Size	Flow Rate	Friction Loss (per 100 ft. hose)
1½ Inches	95 G.P.M.	22 P.S.I.
2½ Inches	95 G.P.M.	2 P.S.I.

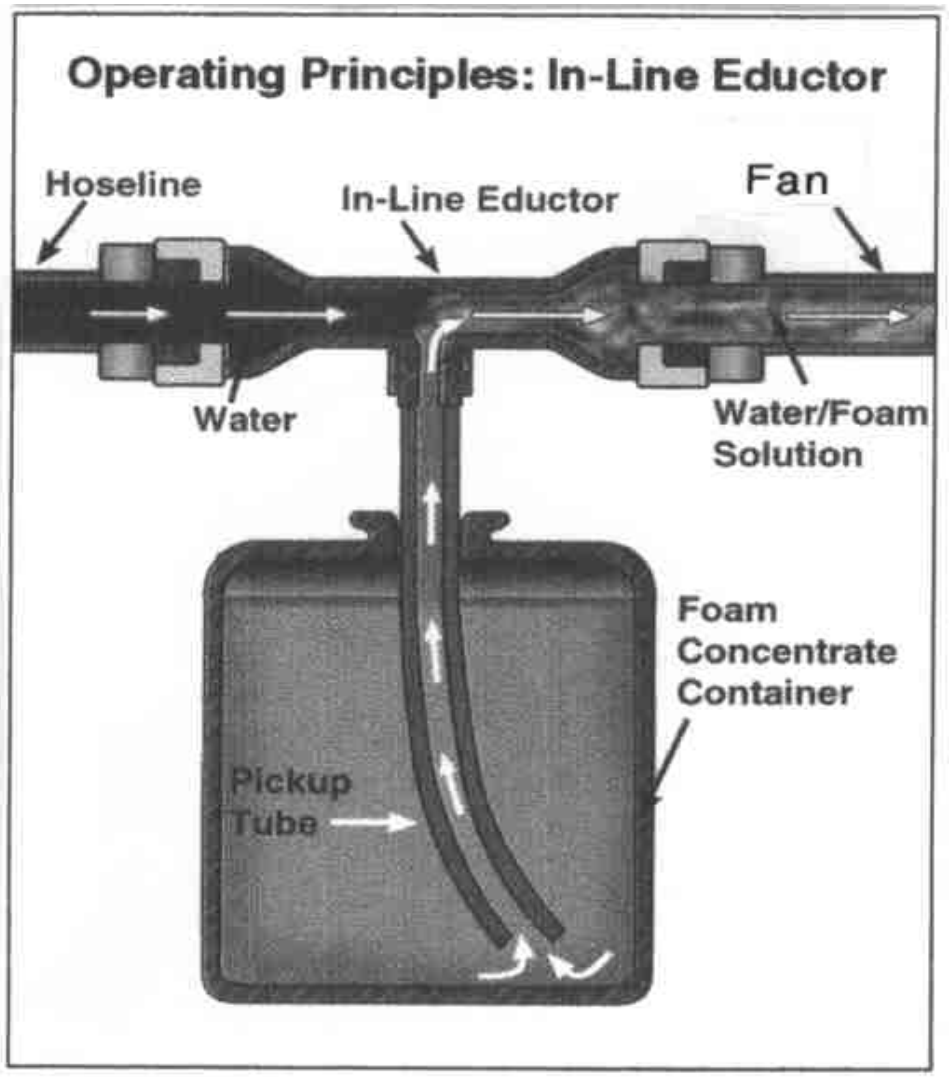
EDUCTOR/NOZZLE PERFORMANCE CHART

EDUCTOR MODEL	RECOMMENDED NOZZLES FOR USE WITH EDUCTOR	HOSE SIZE	INLET PRESSURE	FLOW RATE G.P.M.	FLOW RATE L./MIN.	MAXIMUM HOSE LAY	NOZZLE PRESSURE	EFFECTIVE REACH*
241-30	SFS or SFS-G (Set @ 30), 4000-02 (30)	1″	200 PSI	30	114	100′	100 PSI	74′
			150 PSI	26	98	100′	75 PSI	63′
			100 PSI	21	79	100′	49 PSI	57′
	SM-3F, SM-3FG	1″	200 PSI	30	114	100′	95 PSI	65′
			150 PSI	26	98	—	91 PSI	—
			100 PSI	21	79	—	88 PSI	—

The inline foam eductor is to be attached directly to the SUPER-VAC foam generator. The safe operating pressure of the pump, hose lines along with the required eductor operational pressure must always be monitored by the operator.

It is extremely important to follow the manufacturer's operating instructions regarding the inlet pressures.

Hose line lengths and sizes between the eductor and the supply may cause the foam performance to vary. The eductor employs a venturi principle which draws or drafts foam concentrates and inducts them into the water stream mixing with the air produced by the fan, which produces a finished foam solution.



Check List For Some Common Eductor Problems

Mismatched nozzle

The eductor will not pickup concentrate is the nozzle discharge rate is less than the eductor flow rate. If the nozzle has variable gallonage settings, adjusting to the next higher flow rate should correct the problem. for example from 95 g.p.m. (360 l.p.m.) to 125 g.p.m. (473 l.p.m.). While this procedure will usually allow the eductor to pickup concentrate, the effective reach of the resulting stream will be slightly diminished because of reduced nozzle pressure.

Partly closed nozzle

If nozzle shut off is not fully open, discharge flow rate will not be achieved. Nozzle pressure will increase. Eductor will not function. The eductor will also fail if a variable flow nozzle is inadvertently set at a lower gallonage than the eductor (i.e. from 95 down to 65 g.p.m.), again creating back pressure.

Clogged nozzle

If nozzle waterway is partly clogged with debris, it will not flow proper gallonage. Adjust nozzle to flush position to clear foreign matter, then return to proper flow setting.

Nozzle elevated too far above eductor

The additional back pressure created by elevating the nozzle may cause eductor to fail. Keep in mind that elevating the nozzle above the eductor will increase back pressure by 5 p.s.i. (.4 Kg / cm^2)for every additional 10 feet (3 meters) of elevation. This condition would be quite obvious if the attack line is advanced to upper levels of a structure. Extending the hose line up a hill such as a highway overpass, while being less obvious, would still create the same back pressure increase.

Hose lay too long

Refer to chart recommending maximum hose lays for various eductor nozzle combinations. Increasing nozzle flow rate, as suggested under “mismatched nozzles”, will compensate for a longer hose by reducing nozzle pressure.

Ball check stuck

If the eductor has not been properly flushed, the dried concentrate may cause the ball check to stick closed. This ball is located in the metering device immediately inside of the nipple which connects the pick-up tube assembly to the eductor. By removing the clear plastic tubing from the nipple, the ball can be visually inspected in the nipple opening. If it is stuck, it can be dislodged with a pencil or other blunt tool.

Clogged strainer

When flushing eductor system after use, be sure that strainer on end of pickup tube is also clean. The strainer assembly threads on to the tube and can be removed for thorough cleaning. Concentrate will not be correctly proportioned, even if strainer is only partly clogged.

Kink in hose

A restriction in the hose line can be dangerous under any conditions. When a kink occurs in the foam attack line, not only does it restrict the discharge flow but it also completely stops the foam induction in to the water stream. Back-up personnel should observe and prevent the hose from kinking.

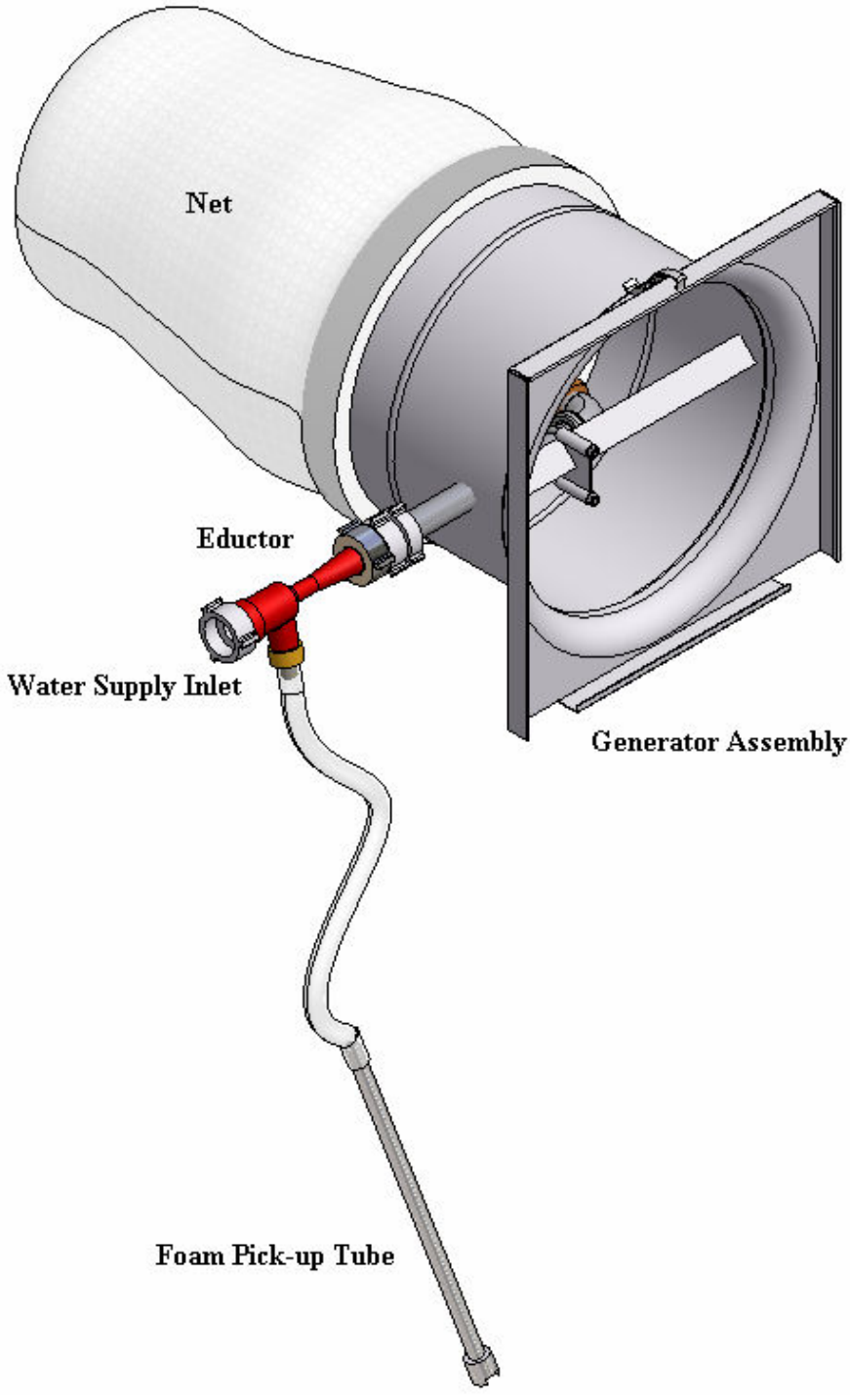
Setup Instructions

Smoke Ejector kit includes:

Foam Generator
Eductor with pickup tube
Discharge Net

Setup:

1. Attach generator to 16 inch Super Vac Smoke Ejector discharge side.
2. Attach eductor to generator.
3. Secure discharge net to generator housing.
4. Insert pickup tube into foam source.
5. Make necessary water supply connection.
6. Refer to performance chart for settings to achieve desired results.

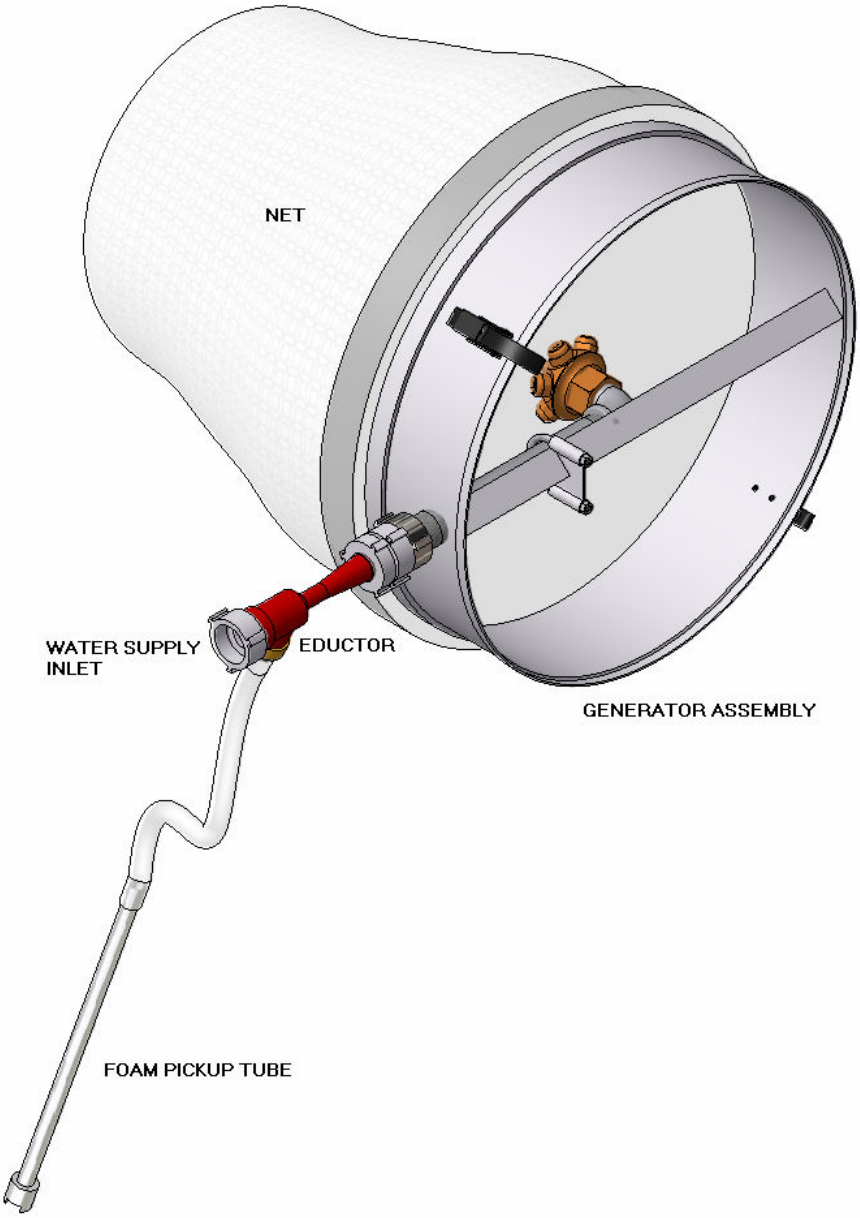


PPV kit includes

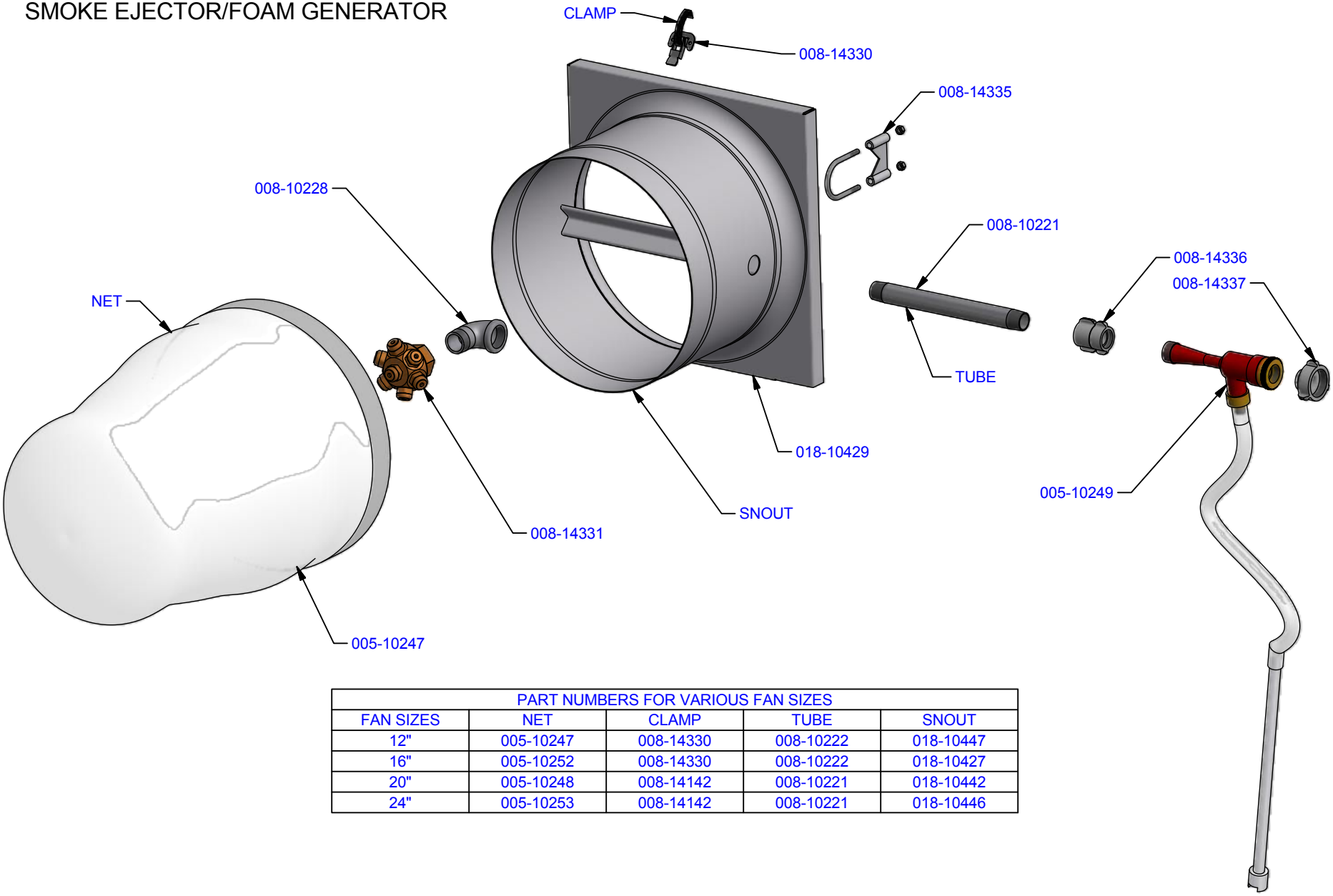
Foam Generator
Eductor with pickup tube
Discharge net
Spacers (2) for latch connection

Setup:

1. Align foam generator to discharge side of ventilator with support foot at bottom of unit.
2. Remove the 2 guard screws from ventilator that line up with latches on foam generator, insert spacers and replace screws. This will insure proper connection of generator latch to ventilator shroud.
3. Attach generator to ventilator.
4. Attach eductor to generator.
5. Secure discharge net to generator housing.
6. Insert pick up tube into foam source.
7. Make water supply connection.
8. Start ventilator adjust R.P.M. to approx. 1/2 throttle (1700 R.P.M.).
9. Eductor is designed to operate at a maximum of 200 p.s.i., but will operate at anywhere from 50 p.s.i. to 200 p.s.i.
10. Hose length, hose size, operating water supply pressures as well as R.P.M. of ventilator will all affect foam performance. It is recommended to train and adjust all of these variables to achieve optimum foam performance.

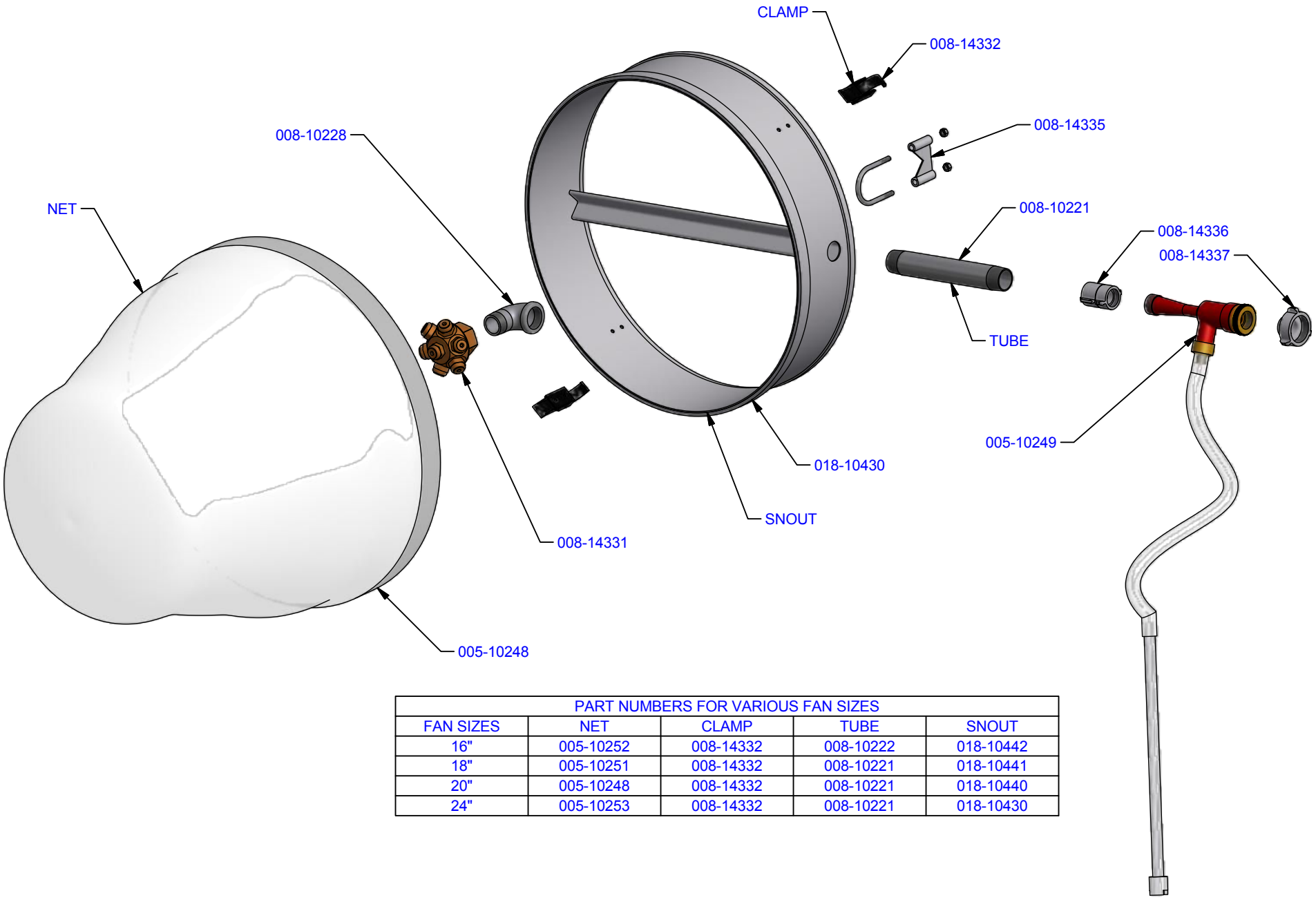


SMOKE EJECTOR/FOAM GENERATOR



PART NUMBERS FOR VARIOUS FAN SIZES				
FAN SIZES	NET	CLAMP	TUBE	SNOUT
12"	005-10247	008-14330	008-10222	018-10447
16"	005-10252	008-14330	008-10222	018-10427
20"	005-10248	008-14142	008-10221	018-10442
24"	005-10253	008-14142	008-10221	018-10446

PPV FOAM GENERATOR



PART NUMBERS FOR VARIOUS FAN SIZES				
FAN SIZES	NET	CLAMP	TUBE	SNOUT
16"	005-10252	008-14332	008-10222	018-10442
18"	005-10251	008-14332	008-10221	018-10441
20"	005-10248	008-14332	008-10221	018-10440
24"	005-10253	008-14332	008-10221	018-10430