

TRAINING BULLETIN NO. 16
SYPHON EJECTORS
1" - 1 1/2"

DESCRIPTION

These ejectors are "Penberthy" series 65-A (1") and 67-A (1 1/2"). Reference by size, i.e. 1" or 1 1/2", is with regard to the inlet hose dimension.

Each ejector is equipped with hose thread adapters (N.S.T.) and a combination foot valve and strainer.

PURPOSE

This ejector will permit water to be picked up from streams, lakes, swimming pools, and other sources of water. This appliance may be utilized where the distance from, or the height above, the water source makes it impractical to draft with hard suction hoses.

PRINCIPLE OF OPERATION

The syphon ejector is actually a jet pump unit (see illustration). NOTE: Illustration is a schematic representation, hose connection to the inlet is through a 180 degree return bend, thus allowing the inlet and discharge lines to lay parallel without kinks or bends.

INLET

Water under pressure enters the ejector through an inlet nozzle, 5/16" diameter on the 1", 1/2" diameter on the 1 1/2". The restriction provided by this nozzle converts the incoming fluid pressure into a high-velocity jet stream.

SUCTION

When water flow is started through the ejector, air in the suction chamber is entrained by the jet stream and emerges from the discharge, thus lowering the air pressure in the chamber. As pressure in the suction chamber is brought below atmospheric pressure, water is forced through the strainer into the suction.

DISCHARGE

Water from the suction is "picked up" by the high-velocity jet stream and acquires part of its energy. In the diffuser, the velocity of the water is converted to a pressure greater than the suction pressure but lower than the inlet "motivating" pressure.

FOOT VALVE

The foot valve prevents loss of water or back-flow through the suction. For example: Water will not be syphoned from the apparatus

tank if pump is shut down and tank-to-pump valve left open; pump discharge will not go out through suction if the discharge line is restricted or closed.

OPERATION - SERIES 65-A 1 IN.

This ejector will supply one 1" spray tip.

To place in operation:

1. Spot apparatus as close to water source as possible.
2. Connect a 1" line between the apparatus discharge outlet and the syphon inlet; open the discharge valve.
3. Connect a 1 1/2" line between the syphon discharge and the apparatus suction inlet. If more than two sections of 1 1/2" hose are required, it may be necessary to utilize siamesed 1 1/2" or a 2 1/2" hose in order to get an adequate flow.
4. Place the ejector in the water source **SO** the strainer is below the surface. Prevent it from resting on the bottom if mud or sand may be picked up.
5. Open the dump valve so the pump, line to ejector, ejector, and return line will fill with water. The foot valve will prevent escape of water. The dump valve may be closed after ejector is in operation.
6. If the water is to be utilized to refill the tank, open the fill valve, if equipped, or place discharge line into the tank; otherwise, lay a 1" discharge line to the fire or to another apparatus..
7. Place the pump in gear and increase the engine speed. The ejector is more efficient at the higher engine pressures.
8. To keep the pump from running away from the water, watch the compound gage, if equipped. Do not let the gage pressure drop below zero or the ejector will cease to operate. If there is no compound gage, feel the 1-1/2 " line into pump inlet; do not allow it to collapse. To prevent cavitation, control the amount of water being discharged into the tank or out of the nozzle by partially closing the tank fill valve or discharge valve.

The friction loss in the return line will have an effect on the efficiency of the ejector the same as discharge head.

OPERATION - SERIES 67-A 1 1/2"

This ejector will supply three 1" spray tips at 75# n.p.

To place in operation

1. Spot apparatus as close to water source as possible.
2. Connect a 1 1/2" line between the apparatus discharge outlet and the syphon inlet; open the discharge valve.
3. Connect a 2 1/2" line between the syphon discharge and the apparatus suction inlet. If more than two sections are required, it may be necessary to use a siamesed 2 1/2" to get adequate flow.
4. Place the ejector in the water source so the strainer is below the surface. Prevent it from resting on the bottom if mud or sand may be picked up.
5. Open the dump valve so the pump, line to ejector, ejector, and return line will fill with water. The foot valve will prevent escape of water. The dump valve may be closed after ejector is in operation.
6. If the water is to be utilized to refill the tank, open the fill valve, if equipped, or place discharge line into the tank; otherwise, lay needed discharge lines to the fire or to another apparatus.
7. Place the pump in gear and increase the engine speed. The ejector is more efficient at the higher engine pressures.
8. To keep the pump from running away from the water, watch the compound gage, if equipped. Do not let the gage pressure drop below zero or the ejector will cease to operate. If there is no compound gage, feel the 2 1/2" line into pump inlet; do not allow it to collapse. To prevent cavitation, control the amount of water being discharged into the tank or out of the nozzle by partially closing the tank fill valve or discharge valve.

The friction loss in the return line will have an effect on the efficiency of the ejector the same as discharge head.

DISCHARGE - 1 IN. EJECTOR
in g.p.m.

INLET P.S.I.

| DISCHARGE HEAD IN FEET | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 |
|------------------------|----|----|----|----|-----|-----|-----|-----|
| 0 | 12 | 37 | 46 | 46 | 46 | 46 | 46 | 46 |
| 10 | | 16 | 37 | 46 | 46 | 46 | 46 | 46 |
| 20 | | 3 | 20 | 37 | 46 | 46 | 46 | 46 |
| 30 | | | 7 | 22 | 37 | 46 | 46 | 46 |
| 40 | | | | 10 | 24 | 38 | 46 | 46 |
| 50 | | | | 1 | 14 | 26 | 38 | 46 |
| 60 | | | | | 5 | 16 | 27 | 38 |
| INLET GPM > | 13 | 18 | 23 | 26 | 29 | 32 | 35 | 37 |

DISCHARGE - 1 1/2 IN. EJECTOR
IN G.P.M.

INLET P.S.I.

| DISCHARGE HEAD IN FEET | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 |
|------------------------|----|----|-----|-----|-----|-----|-----|-----|
| 0 | 30 | 92 | 115 | 115 | 115 | 115 | 115 | 115 |
| 10 | | 40 | 92 | 115 | 115 | 115 | 115 | 115 |
| 20 | | 8 | 50 | 92 | 115 | 115 | 115 | 115 |
| 30 | | | 18 | 55 | 92 | 115 | 115 | 115 |
| 40 | | | | 25 | 60 | 95 | 115 | 115 |
| 50 | | | | 3 | 35 | 65 | 95 | 115 |
| 60 | | | | | 13 | 40 | 68 | 95 |
| INLET GPM > | 33 | 46 | 57 | 66 | 73 | 80 | 87 | 92 |

Discharge head in feet is the distance elevation from water surface to center of pump.

Inlet p.s.i. is the pressure at the "nozzle" of the ejector.

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