

## Motor Pump Operator – Module 4: Hydraulics

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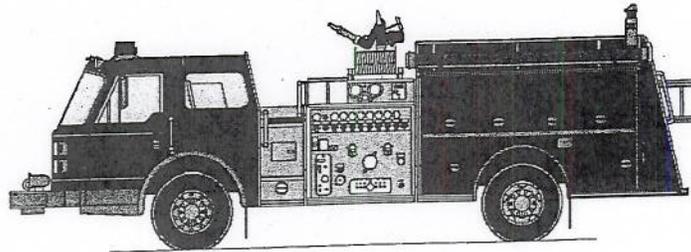
Static Pressure of 100 psi  
One line working delivering 250 gpm  
Residual pressure of 85 psi

100 psi (static)  
- 85 psi (residual)

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15% drop

2 or more lines or a total of 500 gpm available



Static Pressure of 100 psi  
Three lines working deliver 250 gpm each (750 gpm)  
Residual pressure of 60 psi

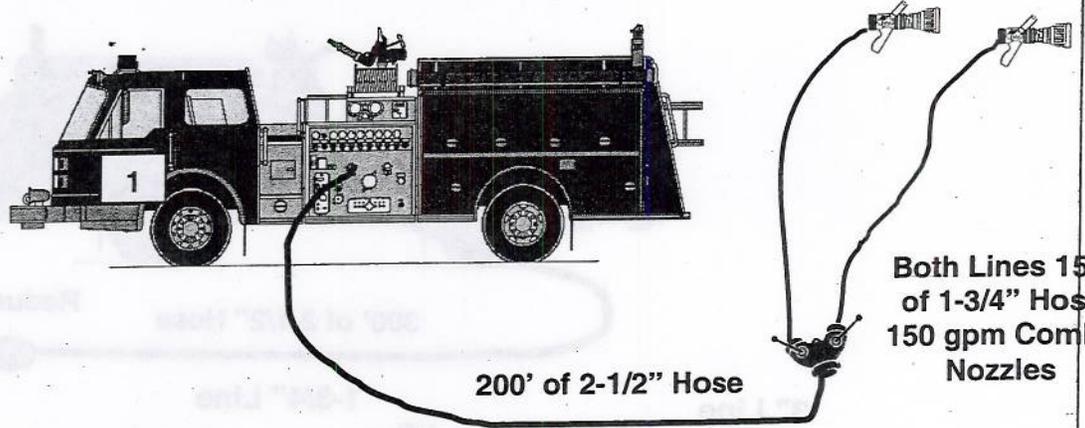
100 psi (static)  
- 60 psi (residual)

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40% drop

No more 250 gpm lines available  
Total Flow left is less than 250 gpm

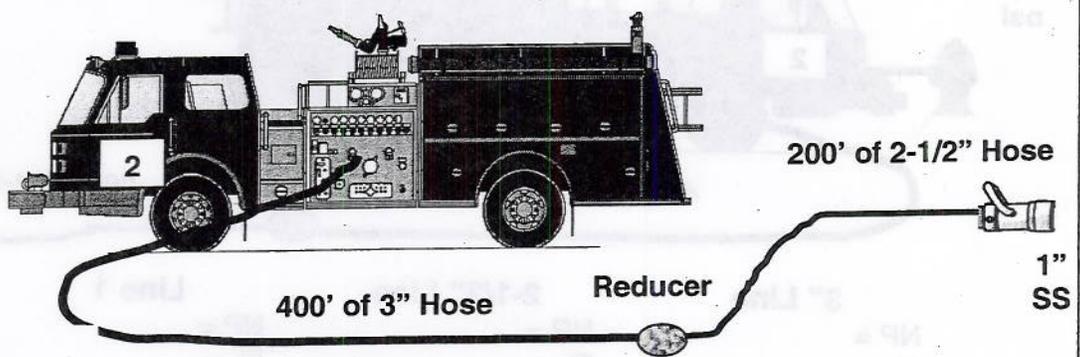
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2-1/2" Line	Line 1	Line 2
NP = _____	NP = _____	NP = _____
FL = _____	FL = _____	FL = _____
EL = _____	EL = _____	EL = _____
AL = _____	AL = _____	AL = _____
LP = _____	LP = _____	LP = _____

Total Flow? \_\_\_\_\_

What pressure is the pump run at? \_\_\_\_\_

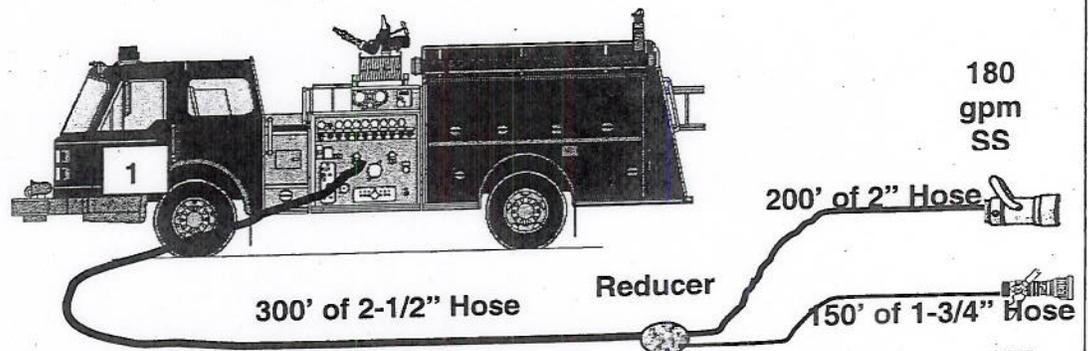


3" Line	2-1/2" Line
NP = _____	NP = _____
FL = _____	FL = _____
EL = _____	EL = _____
AL = _____	AL = _____
LP = _____	LP = _____

Total Flow? \_\_\_\_\_

What pressure is the pump run at? \_\_\_\_\_

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**3" Line**  
 NP = \_\_\_\_\_  
 FL = \_\_\_\_\_  
 EL = \_\_\_\_\_  
 AL = \_\_\_\_\_  
 LP = \_\_\_\_\_

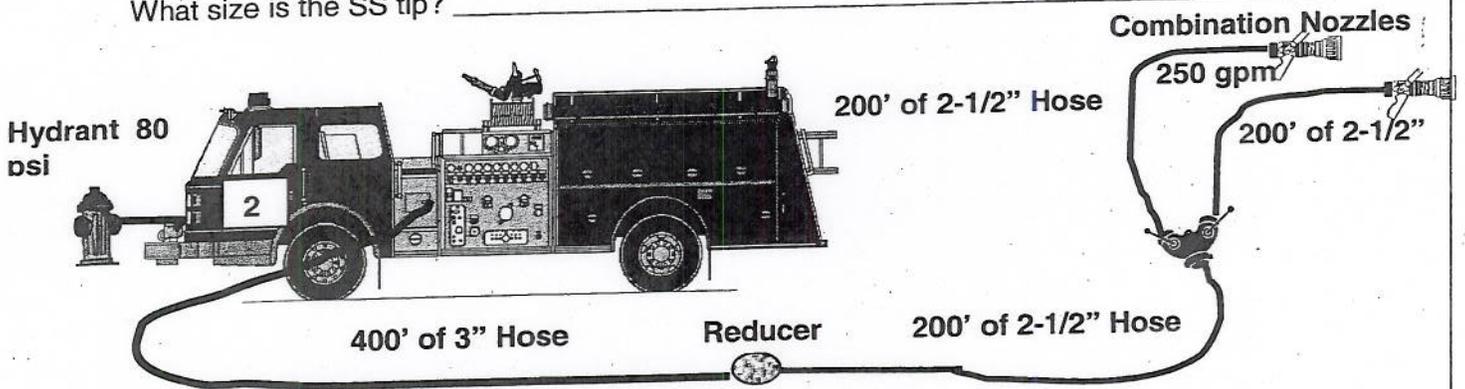
**1-3/4" Line**  
 NP = \_\_\_\_\_  
 FL = \_\_\_\_\_  
 EL = \_\_\_\_\_  
 AL = \_\_\_\_\_  
 LP = \_\_\_\_\_

**2" Line**  
 NP = \_\_\_\_\_  
 FL = \_\_\_\_\_  
 EL = \_\_\_\_\_  
 AL = \_\_\_\_\_  
 LP = \_\_\_\_\_

180 gpm SS  
 125 gpm Comb

What pressure is the pump run at? \_\_\_\_\_

What size is the SS tip? \_\_\_\_\_



**3" Line**  
 NP = \_\_\_\_\_  
 FL = \_\_\_\_\_  
 EL = \_\_\_\_\_  
 AL = \_\_\_\_\_  
 LP = \_\_\_\_\_

**2-1/2" Line**  
 NP = \_\_\_\_\_  
 FL = \_\_\_\_\_  
 EL = \_\_\_\_\_  
 AL = \_\_\_\_\_  
 LP = \_\_\_\_\_

**Line 1**  
 NP = \_\_\_\_\_  
 FL = \_\_\_\_\_  
 EL = \_\_\_\_\_  
 AL = \_\_\_\_\_  
 LP = \_\_\_\_\_

**Line 2**  
 NP = \_\_\_\_\_  
 FL = \_\_\_\_\_  
 EL = \_\_\_\_\_  
 AL = \_\_\_\_\_  
 LP = \_\_\_\_\_

What is the Total Flow? \_\_\_\_\_

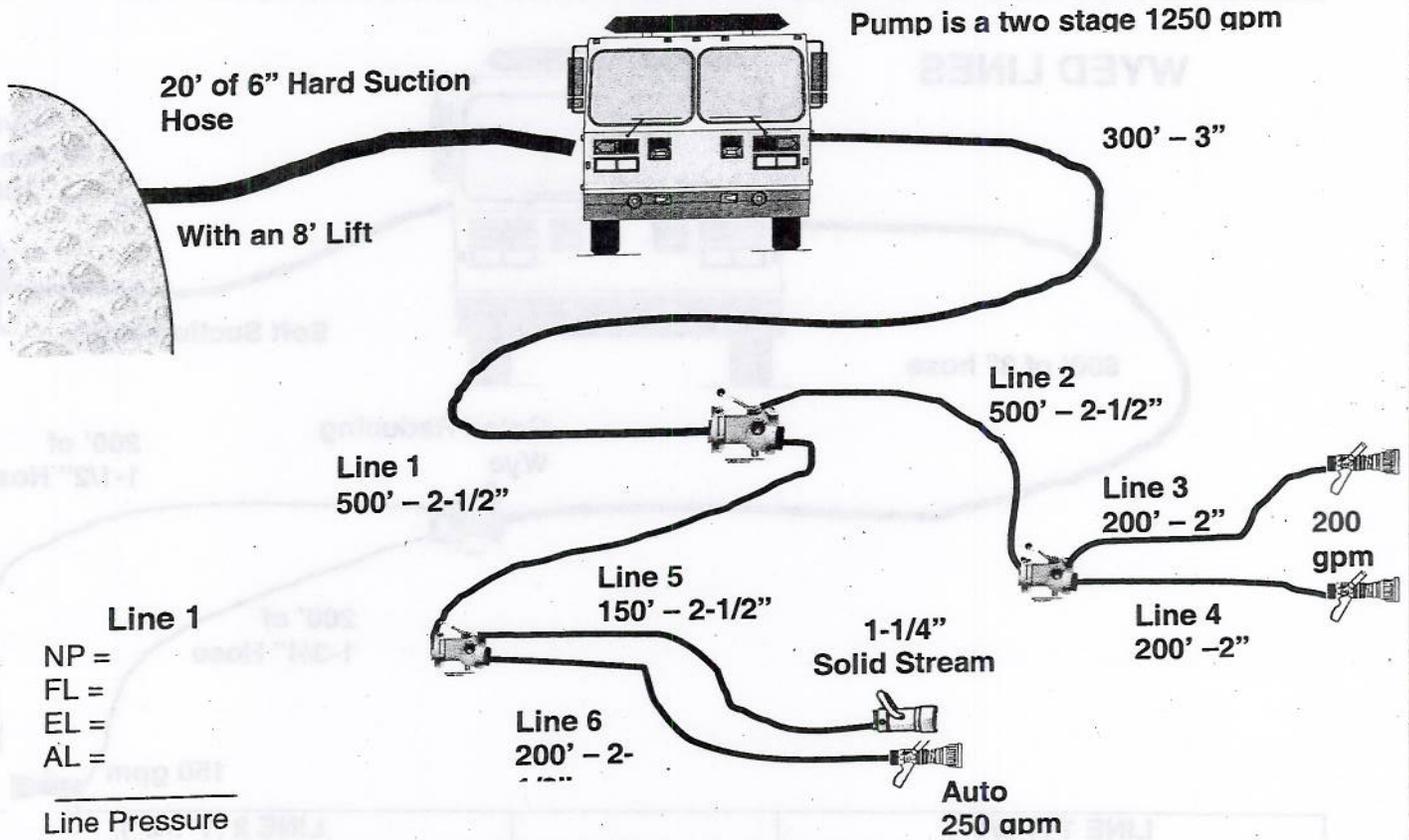
What is the pump pressure? \_\_\_\_\_

What is the pressure at the gated wye? \_\_\_\_\_

How many more lines are available? \_\_\_\_\_

How much flow is available? \_\_\_\_\_

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Line 2	Line 3	Line 4	Line 5	Line 6
NP =				
FL =				
EL =				
AL =				
Line Pressure				

What stage should this pump be in? \_\_\_\_\_

What is the flow in 3" hose? \_\_\_\_\_

What is the friction loss per 100'? \_\_\_\_\_

What is the total flow? \_\_\_\_\_

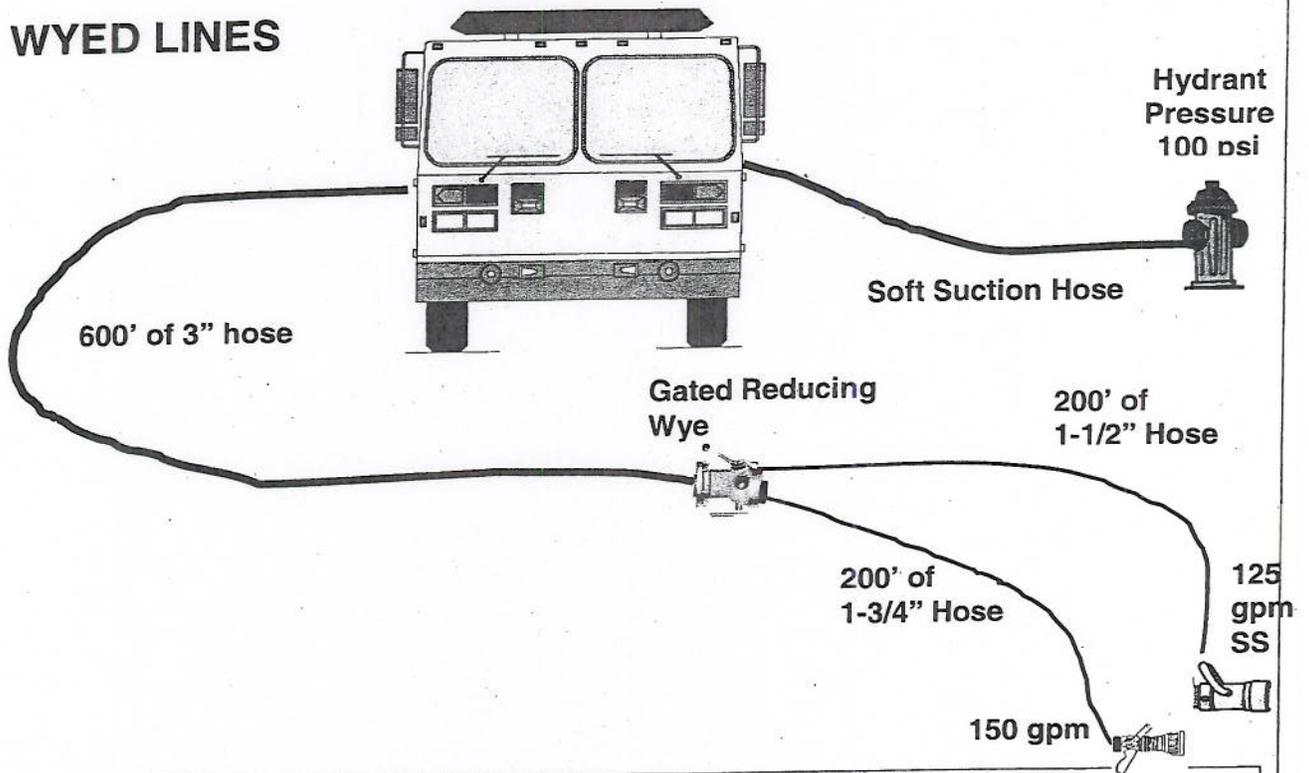
What size is the 2" Solid Stream? \_\_\_\_\_

Is this a practical hose layout? \_\_\_\_\_

Why? \_\_\_\_\_

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**WYED LINES**



LINE 1 (1-3/4")		LINE 2 (1-1/2")
50 psi	NP	50 psi
60 psi	FL	100 psi
0 psi	EL	0 psi
0 psi	AL	0 psi
110 psi		150 psi

Pressure = 150 psi (Pressure at the wye)  
 FL = 55 psi (Total Flow in 3" 3x3 = 9 9x6=54 round up to 55)  
 AL = 5 psi  
 EL = 0 psi  
 210 psi = Discharge Pressure

Line 1 is gated back to 100 psi at the wye

The hydrant pressure static is 100 psi. The residual pressure is 90 psi.

What is the % of drop? \_\_\_\_\_

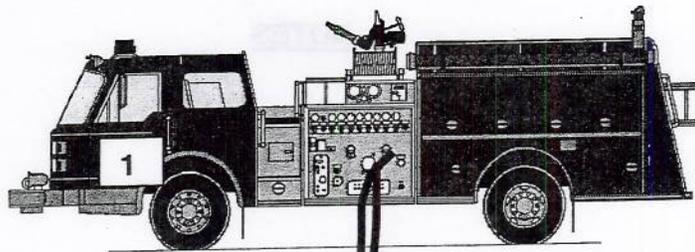
What is the remaining flow available? \_\_\_\_\_

What size straight stream tip would be on the 1-1/2" line? \_\_\_\_\_

What size straight stream tip would be on the 1-3/4" line? \_\_\_\_\_

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**2 Stage 1500 GPM  
Pumper**



Static Pressure  
200 psi



550' of 3" Hose

What stage should this pump be in?  
Pressure or Volume? \_\_\_\_\_

**NO ELEVATION LOSS OR GAIN**

Residual Pressure is 20 psi

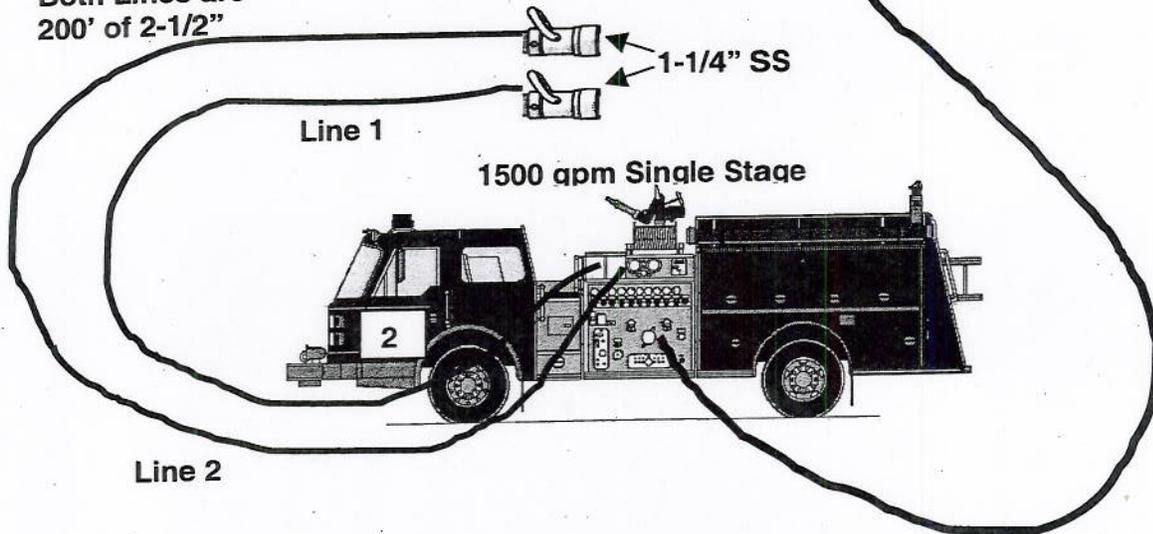
What is the remaining flow? \_\_\_\_\_

What is the % of drop? \_\_\_\_\_

What is the flow from the 1-1/4" solid stream? \_\_\_\_\_

300' of 3" Hose

Both Lines are  
200' of 2-1/2"



1500 gpm Single Stage

1-1/4" SS

Line 1

Line 2

What is the Total Flow? \_\_\_\_\_

What is the Friction Loss between E-1 and E-2? \_\_\_\_\_

What is E-2 discharge pressure? \_\_\_\_\_

What would the pressure be at E-1 if both of E-2's lines are shut down? \_\_\_\_\_

What is the Friction Loss is 3" hose between the hydrant and E-1? \_\_\_\_\_

**NOTES**

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Ending each segment should include the:

**Application Step:**

Students will be given the opportunity to meet all objectives during field evolutions

**Testing:**

Present questions to cover objectives

**Notes:**