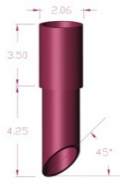
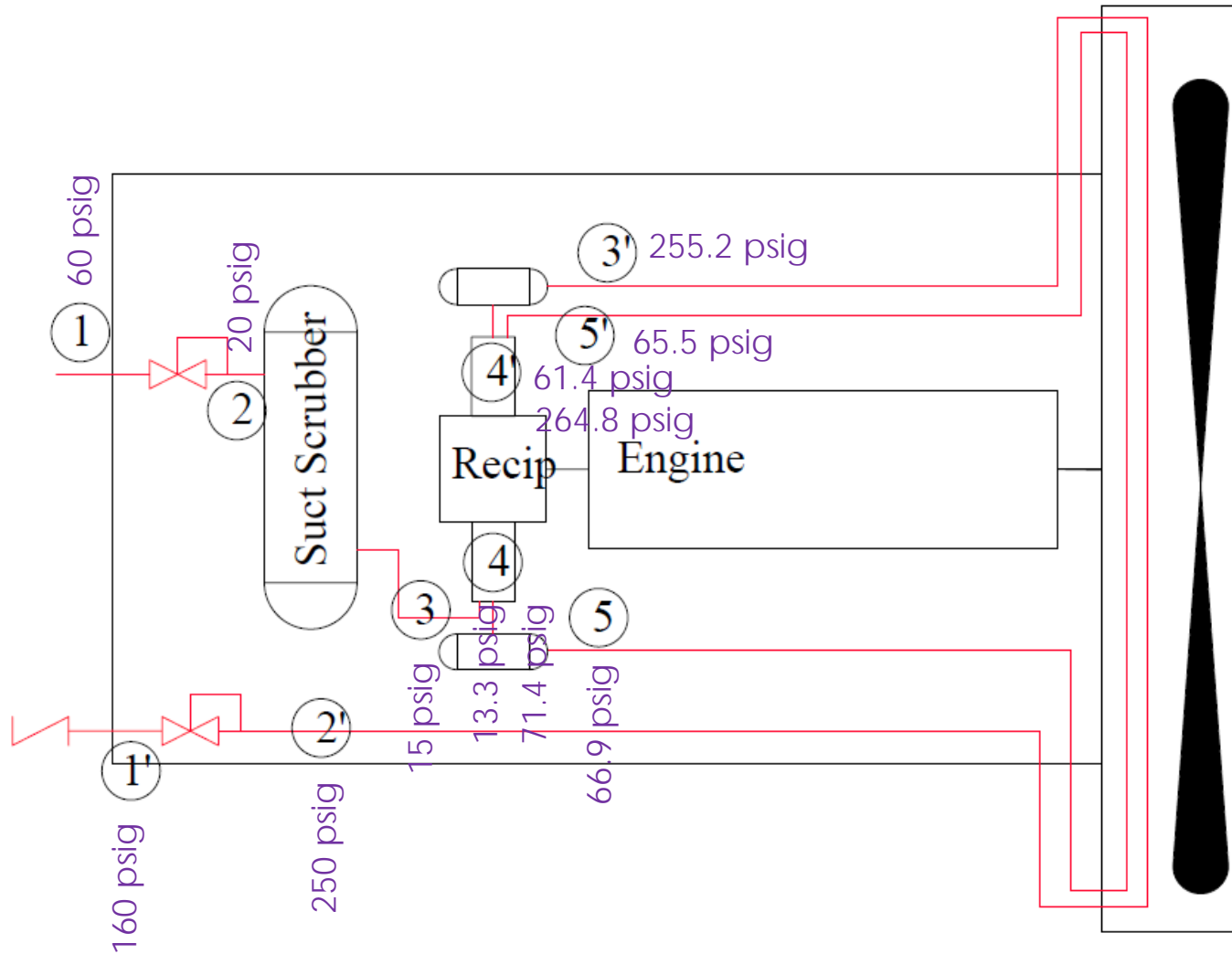


Example



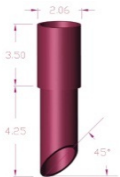
Example Conditions

		Press (psig)	Temp (°F)	Enthalpy (BTU/lbm)
Wellhead	1	60.0	70	353.13
After Suction Controller	2	20.0	68	353.31
Upstream of suction valve	3	15.0	68	353.45
In cylinder on suction stroke	4S	13.3	77	357.72
In cylinder on discharge stroke	4D	71.4	251	443.45
Downstream of discharge valve	5	66.9	251	443.72
Upstream of suction valve	5'	65.5	120	376.98
In cylinder on suction stroke	4S'	61.4	127	380.49
In cylinder on discharge stroke	4D'	264.8	332	485.31
Downstream of discharge valve	3'	255.2	332	485.43
Before backpressure valve	2'	250.0	120	372.59
Line Pressure	1'	160.0	115	372.27



Energy Traverse

	Equation	ΔT or Δh	BTU/hr	hp
1→3	$mc_v\Delta T$	-2°F	-593	-0.2
3→5	$m\Delta h$	90.3 BTU/lbm	181,612	71.4
5→5'	$mc_p\Delta T$	-118°F	-45,700	-18.0
5'→3'	$m\Delta h$	108.5 BTU/lbm	218,187	85.8
3'→2'	$mc_p\Delta T$	-192°F	-74,359	-29.0
2'→1'	$mc_v\Delta T$	-5°F	-1,482	-1.0
Traverse total (including heat transferred to ambient in cooler)				108.4
Traverse total (without heat transferred to atmosphere in cooler)				155.4
1→1'	$m\Delta h$	19.14 BTU/lbm	3,697	15.13



Example Conclusion

- Compressor Net (from Ariel Performance)
 - First Stage 74.0 hp
 - Second Stage 81.4 hp
 - Total 155.4 hp
- This compressor is driven by a Waukesha F-18
 - Hp calculated from manifold pressure 220 hp
 - Fuel usage 2.54 MMBTU/hr (73 MSCF/day, 998 hp)
- Efficiency of compression
 - Theoretical compressor efficiency 81%
 - Compr net vs. Engine output 70%
 - Compr net vs. Energy in fuel 16%
 - Engine output vs. Energy in fuel 22%
 - 1→1' vs. Energy in fuel 2%
 - 1→1' vs. Engine output 7%
- Bottom line: Theoretical efficiency is the worst possible parameter for choosing a compressor technology

