

Mechanical Equipment & Systems Checklist For the PE Exam

Test Date: _____

Name: _____

		Confident	Knowledgeable	Need More Work
Air Distribution Systems				
1.	<u>Ducts</u> . How do you size ducts? Can you quickly determine the velocity and pressure drop in a duct?			
2.	<u>Dampers</u> . What is the purpose of an air damper?			
3.	<u>Diffusers</u> . How are diffusers selected and sized? What is throw?			
4.	<u>Registers and Grilles</u> . What is the difference between a register and a grille?			
5.	<u>Types of Fans</u> . What are the different types of fans?			
6.	<u>Fan Sizing</u> . How are fans sized? Can you determine the total pressure drop in a duct run?			
7.	<u>Air Coils</u> . Can you conduct an energy balance on an air coil to determine the heat transferred from the cooling or heating medium to the air?			
8.	<u>Variable Air Volume Terminal Units</u> . What are variable air volume terminal units? How are they controlled?			
9.	<u>Enthalpy Wheel</u> . What is an enthalpy wheel? What is the equation for effectiveness?			
10.	<u>Heat Pipe</u> . What is a heat pipe? What is the equation for effectiveness?			
11.	<u>Fan Curves</u> . Can you read a fan curve? What occurs when fans are placed in parallel or series? What is the system curve?			
12.	<u>Air-Side Economizer</u> . What is an air-side economizer? How does it save energy?			
Water Distribution Systems				
1.	<u>Pipes</u> . How do you size pipes? Can you quickly determine the velocity and pressure drop in a pipe?			
2.	<u>Control Valves</u> . What is the purpose of a control valve? How are they controlled? How are they sized?			
3.	<u>Pumps</u> . What are the different types of pumps?			
4.	<u>Total Dynamic Head</u> . Can you determine the total dynamic head for a piping system? Can you calculate friction loss in a pipe or in a pipe fitting? Do you have quick access to pipe inner diameter data, roughness factors, Moody Diagram, etc.			

5.	Net Positive Suction Head. <i>What is net positive suction head available and required? Can you calculate NPSHa?</i>			
6.	Pump Sizing. <i>How are pumps sized? Can you determine the total pressure drop in a pipe run?</i>			
7.	Pump Curves. <i>Can you read a pump curve? What occurs when pump are placed in parallel or series? What is the system curve?</i>			
8.	Affinity Laws. <i>Can you use the affinity laws to determine the resulting power, pressure and flow rate, if the impeller diameter or pump speed is changed.</i>			
Insulation				
1.	Pipe and Duct Insulation. <i>Can you determine the heat transfer through a pipe/duct and its insulation and to the surroundings? Can you determine the resulting surface temperature of a material?</i>			
Cooling Towers				
1.	Types of Cooling Towers. <i>What are the different types of cooling towers and how are they characterized?</i>			
2.	Cooling Tower Performance. <i>Can you calculate the range, approach and effectiveness of a cooling tower?</i>			
3.	Cooling Tower Water Side. <i>Can you determine the amount of heat removed from the water? Can you determine the make-up water required? Can you determine the amount of water lost due to evaporation?</i>			
Furnaces				
1.	Types of Furnaces. <i>What are the different types of furnaces and how are they characterized?</i>			
2.	Furnace Performance. <i>How are furnaces rated? What is AFUE? What are the typical AFUE values for different types of furnaces?</i>			